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Do Remittances Help Smooth Consumption During Health Shocks? Evidence From Jamaica

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Abstract

We identify whether remittances facilitate consumption smoothing during health shocks in Jamaica. In addition, we investigate whether remittances are subject to moral hazard by receivers, how the informal insurance provided by remittances interacts with formal health insurance, and whether there are differential effects by gender of the household head. We find that remittances offer complete insurance toward decreased consumption during health shocks and that moral hazard is weak. The role of remittances as a social insurance mechanism, however, is relevant only in the absence of private health insurance. No differential effects by gender of the household head are found.

JEL classifications: F24, I13, O15
Keywords: consumption smoothing; Jamaica; remittances; health shocks

1. Introduction

The literature in development economics has provided evidence on different mechanisms through which households share risk. For example, Towsend (1994), Udry (1994), Ligon and colleagues (2002), and Fafchamps and Lund (2003) show evidence for risk-pooling arrangements among households intended to smooth consumption in response to negative shocks. Households share risk by building up precautionary savings or accumulating assets during favorable periods and drawing them down in adverse episodes (Paxson, 1992; Rosenzweig and Wolpin, 1993; Udry, 1994). Households share risk also by increasing labor supply during adverse shocks (Kochar, 1999) or reducing income volatility through crop and plot diversification (Morduch, 1993).

However, households may also be insured by relatives who have left their home and whose remittances buffer adverse shocks among the receivers (as highlighted by Ratha, 2003). Unfortunately, rigorous evidence on this claim is relatively scarce. Disentangling causality between remittances and household income or consumption is problematic as a result of reverse causation. On the one hand, remittances could fund productive investments that raise household income and, therefore, induces positive correlations among remittances, income, and consumption. Alternatively, remittances may ameliorate the need among recipients to find alternative sources of income, thereby inducing a negative correlation between remittances and income. Even in the absence of reverse causation, the relations among remittances, income, and consumption could be contaminated by unobserved factors systematically related to remittances, income, and consumption (such as unobserved entrepreneurial ability of the receivers).

Therefore, identifying whether remittances serve as a social insurance mechanism toward consumption smoothing would require the existence of an exogenous and unexpected shock suffered by nonreceivers and receivers. These shocks would need to be orthogonal to observed and unobserved factors systematically related to the likelihood of receiving remittances and household consumption levels. Existing studies that have exploited credible exogenous shocks have focused on weather-related events. Clarke and Wallsten (2004) find that remittances replaced 25 percent of damages from Hurricane Gilbert in Jamaica. Yang and Choi (2007) find that remittances replaced 60 percent of income declines resulting from adverse rainfall shocks in the Philippines. Yang (2008), using country-level panel data, finds that remittances replaced 20 percent of damages from hurricanes among the poorest developing countries. Last, Combes and

Ebeke (2011), also using country-level panel data, find that full absorption of aggregate consumption decreases that are generated by natural disasters or agricultural shocks would require level of remittances equivalent to 10 and 16 percent of the gross domestic product, respectively.

While the previous studies have focused on credible exogenous shocks, all of these events are closer to systemic shocks. Therefore, not all adverse effects could be expected to be diversified. For example, after a hurricane hits, even if all foregone local income were replaced by remittances, damages would have likely affected agricultural productivity and local infrastructure (including ports, roads, and airports). At least in the short term, local markets would be in short supply, prices may increase, and not everybody (even if average lost income was totally replaced by remittances) would be able to smooth consumption. As a consequence, studying whether remittances play a significant role as social insurance and what level of insurance completeness they offer would require the identification of an exogenous idiosyncratic shock where, potentially, all risks could be diversified.

In this article, we exploit health shocks (accidents and illnesses) suffered by household members to identify the relevance of remittances as social insurance toward consumption smoothing. Health shocks are idiosyncratic in the sense that they are suffered by individual households and do not carry geographic wide damages that hurricanes do. Therefore, in theory, they could be completely diversified. After showing that the health shocks in which we focus are exogenous and as good as randomly assigned, we assess the relevance and significance of remittances as a social insurance mechanism in Jamaica.

Our main findings suggest that health shocks adversely affect total household expenditures by an average of 19 percent. However, remittances totally offset these adverse effects, indicating that in light of idiosyncratic shocks, remittances serve as a social insurance mechanism that offers full protection. We also find that moral hazard concerns are low given that remittances are not used to smooth consumption of harmful goods such as alcohol. Furthermore, we find that remittances are not relevant as an insurance mechanism against health shocks in the presence of formal private health insurance. By contrast, remittances constitute a powerful form of insurance in the absence of private health insurance. The latter implies the existance of a particularly vulnerable population: persons without private health insurance who do not receive remittances. Therefore, if an objective mechanism to identify this population could be developed

and implemented, targeting of complementary safety nets could be directed towards this particularly vulnerable group .

The rest of the article is organized as follows. Section 2 presents the dataset used for the empirical analysis. Section 3 describes the empirical approach adopted in the analysis. Section 4 presents and discusses our results. Section 5 concludes.

2. The Data

We use data from the April 2010 Labor Force Survey (LFS) and the 2010 Jamaican Survey of Living Conditions (SLC). These datasets are published jointly by the Planning Institute of Jamaica and the Statistical Institute of Jamaica. The LFS was first conducted in Jamaica in 1968 and has been implemented quarterly since 1988. In 2010, the reference week for the April LFS was March 21–27, 2010, and it covered 6,311 households from all 14 parishes in Jamaica. After determining the components of the labor force, the LFS compiles specific data on work experience, training, education, type of employment, and income for employed persons. Unemployed persons are asked about the duration of and reason for their unemployment, the job search, work experience, education, type of employment, and income. Persons outside the labor force are asked about previous work experience, training, education, type of employment (last job), and income.

The SLC is an annual survey that collects data on living standards. It was first carried out in Jamaica in 1988 and was created to monitor and evaluate health, education, and nutritional programs that were launched as part of the Human Resources Development Program formed by the government of Jamaica in 1987 and 1988. It comprises six core modules: demographic characteristics, household consumption, health, education, housing, and social protection. The 2010 survey was fielded between May and August 2010 and included a sample of 1,681 households, which translates to 5,534 individuals being representative at the national level.[1]

The advantage of using the April LFS is that it can be linked at the individual level with the SLC.[2] Therefore, specific labor information for the employed, unemployed, and persons

[1] The average household size for the 2010 SLC is 3.3 when taking into account all individuals in the household and 3.2 when the sample is restricted to household members only.

[2] The identification codes of parish, constituency, enumeration district, dwelling number, and household number for the SLC sample are identical with the corresponding LFS sample dwellings. However, it could be the case that members left the household (or new members arrived) in the period between LFS and SLC data were collected.

outside of the labor force can be exploited along with the SLC data. The households are visited first for the April LFS, and then a subset of households is revisited a month later for the SLC. Hence, the LFS serves as the employment module of the SLC once the datasets are merged.

Table 1 shows summary statistics on socioeconomic characteristics. We split the total sample of 1,681 households into four groups. Column 1 shows sample means for households that did not receive remittances within the 12 months before the date of the SLC interview and where no household member experienced a health shock within the previous 4 weeks (this group comprises 386 households).[3] Column 2 shows sample means for households that did not receive remittances within the 12 months before the date of the SLC interview and where at least one household member experienced a health shock within the previous 4 weeks (this group comprises 103 hoseholds). Column 4 shows sample means for households that received remittances within the 12 months before the date of the SLC interview and where no household member experienced a health shock within the previous 4 weeks (this group comprises 893 households). Column 5 shows sample means for households that received remittances within the 12 months before the date of the SLC interview and where at least one household member experienced a health shock within the previous 4 weeks (this group comprises 299 households).

The table shows the significance of remittances among Jamaicans as 71 percent of households (1,192 out of 1,681) report having received remittances during the previous year. During year 2009, remittances accounted for 14 percent of Jamaican GDP, and the country ranked 14th in the world in terms of significance of remittances for the economy.[4] The table also shows that those households receiving remittances differ in various dimensions with respect to households without remittances. Heads of households without remittances are more likely male (presumably because men are more likely to be the migrants among households with remittances), are married, are employed, and have health insurance. In addition, household income per capita obtained from local sources expressed in Jamaican dollars (excluding remittances) appears to be higher for households without remittances. The latter supports the

[3] Health shock is an indicator that takes the value of unity if at least one household member replied "yes" to any of the following questions asked in the SLC: (a) "In the past 4 weeks have you had any injury resulting from road traffic accident, a fall, a domestic or violent incident that required medical attention?" and (b) "Have you had any illnesses other than that due to injury? For example a cold, diarrhea, asthma attack, hypertension, diabetes or any other illnesses? (in the past 4 weeks)"

[4] Development Prospects Group, World Bank.

hypothesis that remittances may ameliorate the need among recipients to find alternative local sources of income.

Therefore, it is clear that households with and without remittances differ in various dimensions that may be systematically correlated with consumption. Comparing outcomes between these two groups would result in biases of unknown magnitude and direction. However, our identification strategy does not require these two groups to be similar. By contrast, we explore the effects of an exogenous health shock on the results of these two groups separately to test whether remittances offer social insurance during adverse situations. Next, we explain our empirical strategy.

3. Empirical Strategy

As acknowledged before, analyzing the effects of remittances on consumption is problematic. This is because being the receiver of remittances is not a random event. Families that receive remittances might be inherently and unobservable different than their counterparts who do not receive them (families with migrant members might have lower risk aversion, remittances receivers might be better connected, and so on). Therefore, comparing consumption patterns between receivers and nonreceivers would be biased because differences between these groups would be plagued by several unobservable factors systematically correlated with both consumption and the likelihood of receiving remittances.

However, our identification strategy relies on the exogeneity of health shocks. Our aim is not to isolate causality between remittances and consumption. Rather, we want to isolate how remittances can help to smooth consumption during a health shock. Therefore, we will compare consumption patterns of receivers that experienced a health shock versus patterns of receivers that did not experience such shock. Conversely, we will also compare nonreceivers who experienced a health shock with nonreceivers who did not. The difference between these two comparisons conveys an estimate of the degree of insurance that remittances provide against health shocks.

The validity of our empirical strategy depends on whether health shocks to be exploited are exogenous and orthogonal to both observable and unobservable factors that might be systematically correlated with the likelihood of receiving remittances and consumption patterns. Table 1 provides evidence on the exogeneity of health shocks. Column 3 shows the adjusted

difference (including district fixed effects) between households with and without shocks that did not receive remittances on several socioeconomic characteristics typically related with consumption. Of the 18 characteristics shown, only 2 (gender and electricity) are significant at the 10 percent level or lower. It is worth noting that in the LFS, respondents were asked to report their income per capita before any health shock was realized (as health shocks information was collected 1 month later in the SLC). Therefore, if shocks were unanticipated, we should not observe significant differences in income between households with and without shocks. As expected, differences in income are statistically indistinguishable from zero. Column 6 shows the same comparisons but among households that received remittances. Again, only 1 out of 18 characteristics is significant at the 10 percent level, and no differences in baseline income are found.

We also assess whether health shocks affect the likelihood of having received remittances within the previous year. When an indicator for having received remittances is regressed on the health shock indicator, the estimated coefficient is statistically indistinguishable from zero (estimated coefficient of 0.025 with standard error of 0.03).[5] Therefore, it appears that at the extensive margin, remittances are not impacted by health shocks at least in the year preceding the survey. Nonetheless, remittances might have responded at the intensive margin. Unfortunately, no reliable data were collected on the actual amount of remittances received within the timeframe of the health shocks studied here. Therefore, we are unable to disentangle whether consumption insurance presumably offered by remittances operates through accumulated savings used as a buffer during shocks or through intensive margin responses of remittances during shocks.

Having demonstrated that the occurrences of health shocks are as good as randomly assigned (orthogonal to both the likelihood of receiving remittances and socioeconomic

[5] The estimated regression is: $R_{id} = \alpha_d + \beta_1 \cdot Shock_{id} + X_{id}^{'}\gamma + \varepsilon_{id}$ where R_{id} is an indicator for whether the household received remittances in the previous year, α_d is a district fixed effect, $Shock_{id}$ is an indicator for the occurrence of a health shock to at least one household member within the previous 4 weeks. X_{id} is a vector of control variables that include indicators for whether the household is PATH beneficiary (the conditional cash transfer program of Jamaica), ownership status of the dwelling, and for the presence of piped water, sewerage, electricity, land phone, desktop, laptop, refrigerator, washing machine, dryer, car, electric water heather, solar water heather, water tank, and generator. Last, ε_{id} is the error term clustered at the district level. The estimated β_1 coefficient is 0.025 with standard error of 0.03.

characteristics associated with consumption), we proceed estimating the following regression model:

$$Y_{id} = \alpha_d + \gamma \cdot R_{id} + \beta_1 \cdot Shock_{id} + \beta_2 \cdot Shock_{id} \cdot R_{id} + X_{id}^{'}\gamma + \varepsilon_{id} \qquad (1)$$

where Y_{id} is the outcome of interest for household *i* in district *d*; α_d is a district fixed effect; R_{id} is an indicator for whether the household received remittances within the previous year; $Shock_{id}$ is an indicator for the occurrence of a health shock to at least one household member within the previous 4 weeks; and X_{id} is a vector of control variables that include age, gender, civil status, employment status, and health insurance status of the household head. Controls also include indicators for whether the household is a PATH beneficiary,[6] ownership status of the dwelling, and for the presence of piped water, sewerage, electricity, land phone, desktop, laptop, refrigerator, washing machine, dryer, car, electric water heather, solar water heather, water tank, and generator. Last, ε_{id} is the error term that will be clustered at the district level in all of our estimations.

Some aspects of model (1) merit discussion. First, the district fixed effects control nonparametrically for any observable and unobservable characteristics at the district level. In the extreme, if some districts suffered an outbreak and all people within these districts suffered a health shock, then the inclusion of fixed effects would wash out all observations from these districts when identifying the impacts of shocks on consumption. Second, if the shock and the likelihood of having received remittances are orthogonal to all control variables, but the control variables are related to consumption, their inclusion in the regression should not change the magnitude of the estimated coefficients for β_1 or β_2. By contrast, their inclusion should only increase precision for inference on these coefficients.

In the context of (1), β_1 provides an estimate of the effect of a negative shock under the absence of social insurance mechanisms provided by remittances. While β_2 provides an estimate on the magnitude of social insurance provided by remittances under unexpected shocks. If β_2 completely offsets the presumed adverse effects under no insurance provided by β_1, then we would be in a situation where remittances are providing complete insulation against negative

[6] PATH stands for Program of Advancement through Health and Education. It is a conditional cash transfer program funded by the government of Jamaica and the World Bank and is aimed at delivering benefits by way of cash grants to the most needy and vulnerable in the society. PATH was introduced islandwide in 2002 and is the larger social program in Jamaica.

shocks (i.e., $\beta_1 + \beta_2 = 0$). However, if β_2 only offsets partially β_1, then we would be in a situation of incomplete insurance (i.e., $\beta_1 + \beta_2 < 0$). Next, we show and discuss our findings.

4. Results and Discussion

4.1 Consumption Smoothing

The upper panel of Table 2 shows estimates of β_1 and β_2 using the natural logarithm of total consumption, food consumption, and nonfood consumption within the 30 days before the SLC as dependent variables. We estimate two models for each outcome. The first one includes district fixed effects without control variables; while the second one adds all control variables detailed in model (1). Notice that adding control variables does not change the magnitude of the estimated coefficients but rather increases precision (i.e., estimated standard errors decrease). This confirms that health shocks are orthogonal to all observable characteristics systematically related to consumption and gives further confidence for our identification strategy.

The lower panel displays again estimates of β_1 as this is directly interpreted as the effect of the shock among households that did not receive remittances within the previous year (labeled as "Shock, No Remittances"). In addition, the lower panel shows the estimated value of the expression ($\beta_1 + \beta_2$) along with its estimated standard error obtained using the delta method (labeled as "Shock, Remittances"). This expression is the effect of the shock among households that received remittances. Column 2 shows that households without remittances are significantly affected by the occurrence of health shocks. Total consumption dropped by 21 log-points (equivalent to 19 percent) within the month in which the health shock was suffered. By contrast, households that received remittances are unaffected. The same pattern is observed for food and nonfood consumption with more intense effects for food consumption.

The evidence presented strongly suggests that remittances serve as a mechanism for social insurance that completely offsets adverse effects on consumption during health shocks. However, as a further robustness check for our results, we assess the relations among shocks, remittances, and expenses that we expect to be fixed (at least in the short run). We therefore look at annual property taxes, monthly mortgage, and monthly rent bills. If our identification strategy is valid, we should not observe significant relations between shocks and recurrent fixed costs

(such as mortgages or rents) or annual bills (such as property taxes) that could not be adjusted and go beyond the control of households. Table 3 offers this falsification test by running model (1) using the natural logarithm of these relatively fixed costs as dependent variables. As expected, there are no significant relations between shocks and any of these fixed or annual costs. This gives further confidence for our identification strategy suggesting that the results found on the role of remittances as a complete mechanism for social insurance are consistent and can be interpreted as causal.

4.2 Moral Hazard

One area of interest is the issue of migrant control over remittances (Yang, 2011). When remittances are sent to receivers, the sender often has little control over how they are used. Therefore, moral hazard could arrive if receivers use remittances to finance consumption in items that are undesirable for the sender. To test whether moral hazard exists in the advent of health shocks, we look at four types of goods: education, alcohol, gambling, and celebrations.

Column 1 of Table 4 shows that expenses in education, a good that we assume to be a desirable one for senders, dropped by 33 log-points (or 28 percent) as a result of a health shock in the absence of remittances. However, when remittances are present, investment in education are not reduced and are even increased by 21 log-points (or 19 percent). Therefore, it appears that receivers are using remittances in goods that are desirable for the sender.

We then look at alcohol consumption, which is presumably an undesirable good for senders. Column 2 shows that alcohol consumption drops by 71 log-points (or 51 percent) as a result of an adverse health shock in the absence of remittances. When remittances exist, alcohol consumption also drops by 45 log-points (or 36 percent). Therefore, alcohol consumption is partially offset by remittances, but it still drops significantly. We interpret this result as evidence of weak moral hazard given that only one third of decreased alcohol consumption observed without the insurance provided by remittances is offset within remittance receivers.

Regarding gambling, previous evidence from Thailand has shown that the likelihood and amount of gambling increase with the quality of informal insurance provided by remittances (Miller and Paulson, 2007). The authors suggest that households who are more insured shift their portfolios toward riskier investments such as gambling. Our results in column 3 are consistent with this evidence as we observe that households without remittances (and hence uninsured)

decreased gambling expenditures by 0.47 log-points (or 37.5 percent) during health shocks (although imprecisely estimated). However, households with remittances (and hence insured) do not affect their gambling expenditures during health shocks.

Events such as weddings and funerals have been found to be a significant share of household budgets within developing countries (Banerjee and Duflo, 2007). The authors find that the median household spent 10 percent of its annual budget on these events. Therefore, we ask whether and to what extent are these expenditures insured by remittances in the advent of health shocks. Column 4 shows that, with or without remittances, weddings budgets are mainly unaffected by health shocks. Expenses in funerals appear to be negatively affected in the absence of remittances by 17 log-points (or 15.6 percent). However, when remittances are in place, expenses in funerals are even increased as a result of health shocks. Given that these celebrations are often seen as nostalgic events for household members living outside home; the insurance role that remittances play with respect to these expenses suggests that moral hazard is not present.

4.3 Social Insurance Beyond Remittances

An alternative mechanism by which social insurance could be achieved is through solidarity in the form of gifts. Table 5 explores this possibility by considering reported amounts of gifts in food, nonfood, and alcohol. These are gifts that households report receiving from external sources. Columns 1 to 3 of the bottom panel suggests that gifts in food and nonfood items are unaffected during health shocks within both remittance receivers and nonreceivers. Therefore, it appears that solidarity in the form of gifts for these items is weak.

When assessing the effects on alcohol gifts, the bottom panel of column 4 clearly suggests that such gifts are reduced during health shocks for households without remittances. However, no significant effects are found for households with remittances, implying that these households maintain the reception of alcohol gifts constant during health shocks. Therefore, while solidarity was found to be weak with respect to desirable goods, solidarity in terms of undesirable goods such as alcohol appears to go in the correct direction for households without remittances (i.e., people reduce their gifts of alcohol for households affected by health shocks and that do not receive remittances), while remittances receivers are unaffected.

4.4 The Role of Formal Insurance

When thinking about remittances as a mechanism through which social insurance could be achieved during adverse health shocks, we would expect that the relevance of such informal form of insurance would decrease in the presence of formal health insurance. To test this claim, we split our sample in two: households without health insurance and households with any form of health insurance (either public or private).[7] Table 6 shows the estimated effects for both samples separately.

Panel A displays results for households that reported not having health insurance at all. As expected, the bottom section of this panel shows that health shocks adversely affect all forms of consumption for households that did not receive remittances. By contrast, households with remittances are unaffected by health shocks. This shows that the social insurance provided by remittances completely insulates households against decreased consumption resulting from health shocks in the absence of formal health insurance.

Panel B shows results for households with health insurance. The bottom section of this panel suggests that health shocks do not affect consumption for neither households with remittances nor households without remittances. Therefore, it is apparent that when formal insurance is present, the role of remittances as social insurance becomes insignificant.

Another relevant question relates to the relative effectiveness of public versus private formal health insurance for consumption smoothing during health shocks. This is specially relevant for Jamaica as on April 2008 the country introduced a blanket publicly provided health insurance that eliminated user fees in all hospitals and clinics. To assess this, we split the sample of insured households in two: households with public health insurance and households with private health insurance. Table 7 shows these results. The bottom section of Panel A shows that households with public insurance and without remittances are highly vulnerable to health shocks. Total consumption for these households is reduced by 80 log-points (or 55 percent) in the advent of a health shock. However, for households with remittances, consumption remains unchanged

[7] Notice that on April 1, 2008, user fees in hospitals and clinics all across Jamaica were eliminated. Therefore, either not having health insurance at all or being beneficiary of a publicly provided health insurance yields an equivalent situation regarding health coverage. However, accessibility to privately provided health insurance, provides better and more efficient health access in terms of lower waiting periods and availability of medicines.

after a health shock. This suggests that remittances offset adverse consumption effects for those households that have public health insurance.

Panel B shows estimates for households with private health insurance. The bottom section is clear showing that households without remittances but with private insurance are not adversely affected in their consumption levels as a consequence of an adverse health shock. The same is true for households with remittances and private insurance: consumption remains unchanged during health shocks. These findings suggest that remittances make a difference when they are received by households without access to private health insurance. However, remittances do not play an insurance role when receivers are relatively well off and have access to privately provided health insurance.

4.5 Differential Effects, by Gender

Table 8 shows differential effects by gender of the household head. Panel A shows effects for female-headed households; while Panel B does the same for male-headed households. Overall, we find that both types of households see their consumption adversely affected in the absence of remittances as a result of a health shock. However, when remittances are present, consumption levels are unchanged and, for the case of nonfood consumption within female-headed households, even increased. This suggests that the social insurance mechanism offered by remittances operates in the same direction within both female- and male-headed households.

5. Summary and Conclusions

This paper examines the role of remittances as a mechanism through which social insurance could be achieved during adverse health shocks in Jamaica. Our main findings suggest that health shocks adversely affect total household consumption by an average of 19 percent. However, remittances totally offset these adverse effects, indicating that in light of idiosyncratic shocks, remittances serve as a social insurance mechanism that offers full protection.

We also find that moral hazard concerns are low given that remittances are mainly used to smooth consumption of presumably desirable goods (e.g., food and education) for senders. However, remittances are not used to fully smooth consumption of presumably undesirable goods (e.g., alcohol) for senders. Furthermore, we find that remittances are not relevant as an insurance mechanism against health shocks in the presence of formal private health insurance.

By contrast, remittances constitute a powerful form of insurance in the absence of health insurance and when recipients are enrolled in publicly provided health insurance. The latter identifies a particularly vulnerable population: households without private health insurance who do not receive remittances.

A variety of corroborating evidence supports these findings. Results are robust after controlling for diverse household characteristics that are systematically related to consumption. Differences between households that experienced a shock and households that did not regarding characteristics plausibly related to consumption are insignificant. Income levels observed before the occurrence of the shocks did not differ between affected and unaffected households. Relatively fixed costs such as property taxes, mortgage and rent bills were not affected by health shocks neither for remittance recipients nor for nonrecipients.

Overall, these results provide evidence on the role of remittances as an insurance mechanism during idiosyncratic health shocks. Our study contributes to the literature on remittances and their insurance role by focusing on shocks that could potentially be totally diversified. The evidence shows that remittances offer complete consumption insurance during unexpected health shocks in Jamaica.

In terms of policymaking, our findings ameliorate concerns of moral hazard. This implies that investments directed toward allowing higher control to senders over how remittances are used among receivers, although relevant, should not be a first priority for Jamaica. However, investments in mechanisms and technologies with the potential to decrease transactions costs of sending and receiving remittances would be relatively more relevant in terms of increasing the role of remittances as an insurance mechanism. So far one example of technologies that has proven its effectiveness in strengthening the role of remittances as an insurance mechanism is the ability to send money through SMS messages (Jack and Suri, 2014). Full implementation of such innovations in both countries from where remittances are originated and receiver countries has the potential to enhance the insurance role of remittances thereby increasing welfare.

Another relevant policy implication is related to exploring mechanisms aimed at identifying households withouth private health insurance who do not receive remittances. Such identification could rely on observable and verifiable data sources such as administrative databases of private insurance companies that could be merged with recent census (2011) microdata using individual's names and dates of births. This would allow the identification of

households without access to private health insurance and that report not having emigrating members and not being remittances' receivers. An objective identification of this particularly vulnerable population could serve as an effective targeting mechanism toward focusing complementary safety nets that aim to insulate consumption of disadvantaged households during adverse health shocks.

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Table 1. Summary Statistics and Balance

	Households without Remittances			Households with Remittances		
	No Shock	Any Schock	Difference	No Shock	Any Schock	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
Hosehold Head Characteristics						
Age	39.68	36.04	-3.77	36.40	35.60	-0.05
			(3.81)			(1.59)
Male	0.68	0.51	-0.16**	0.49	0.44	-0.05
			(0.07)			(0.04)
Married	0.22	0.24	0.04	0.15	0.19	0.05
			(0.06)			(0.03)
Employed	0.93	0.92	0.02	0.77	0.71	-0.07*
			(0.04)			(0.04)
Health Insurance	0.30	0.28	-0.04	0.20	0.23	0.01
			(0.07)			(0.03)
Private	0.23	0.20	-0.02	0.12	0.13	0.01
			(0.06)			(0.03)
Public	0.07	0.08	-0.02	0.09	0.10	-0.00
			(0.03)			(0.02)
Household Characteristics						
HH Income per-capita	143,454.88	111,766.71	12,314.36	77,484.51	81,368.07	-5,750.32
			(64,980.82)			(9,943.81)
Own dwelling	0.58	0.58	0.00	0.61	0.70	0.06
			(0.07)			(0.04)
Piped water	0.57	0.61	-0.02	0.53	0.50	-0.05
			(0.04)			(0.03)
Sewerage	0.24	0.31	0.01	0.21	0.18	-0.03
			(0.06)			(0.02)
Electricity	0.92	0.98	0.05*	0.92	0.93	0.00
			(0.02)			(0.02)
Land phone	0.19	0.25	0.02	0.17	0.17	-0.02
			(0.06)			(0.03)
Cell phone	0.91	0.93	0.04	0.91	0.90	-0.01
			(0.05)			(0.02)
Desktop	0.14	0.08	-0.06	0.07	0.07	-0.01
			(0.05)			(0.02)
Laptop	0.15	0.14	0.00	0.12	0.12	0.00
			(0.05)			(0.03)
Internet	0.22	0.21	-0.01	0.15	0.14	-0.01
			(0.05)			(0.02)
Observations	386	103	489	893	299	1,192

Columns (1), (2), (4) and (5) present group means. Columns (3) and (6) present estimated coefficients and standard errors on an indicator for having experienced a health shock from OLS regressions with district fixed-effects. All regressions are weighted by the inverse of the sampling probability to reflect survey design. Estimated standard errors, reported in parentheses, are clustered at the district level. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 2. Consumption Smoothing, Shocks and Remittances

	Total Consumption		Food Consumption		Non-food Consumption	
	(1)	(2)	(3)	(4)	(5)	(6)
Schock	-0.22**	-0.21***	-0.30**	-0.29**	-0.13	-0.15**
	(0.08)	(0.05)	(0.12)	(0.12)	(0.10)	(0.07)
Shock * Remittances	0.22**	0.26***	0.29*	0.31**	0.17	0.22***
	(0.10)	(0.07)	(0.15)	(0.14)	(0.11)	(0.08)
District FE	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES
R-squared	0.250	0.526	0.141	0.194	0.231	0.510
Observations	1,681	1,676	1,658	1,653	1,681	1,676
Schock, No Remittances	-0.22**	-0.21***	-0.30**	-0.29**	-0.13	-0.15**
	(0.08)	(0.05)	(0.12)	(0.12)	(0.10)	(0.07)
Schock, Remittances	-0.00	0.04	-0.00	0.01	0.04	0.07
	(0.06)	(0.04)	(0.09)	(0.08)	(0.06)	(0.04)

Estimated standard errors, reported in parentheses, are clustered at the district level. Consumption outcomes are expressed in natural logs. All regressions include district fixed effects and are weighted by the inverse of the sampling probability to reflect survey design. Control variables included when indicated as discussed in the text. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 3. Falsification test

	Property Tax		Mortgage		Rent	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Schock	0.39	0.36	-0.34	-0.35	-0.14	-0.11
	(0.41)	(0.28)	(0.26)	(0.25)	(0.59)	(0.43)
Shock * Remittances	0.16	-0.05	0.22	0.17	-0.21	0.13
	(0.48)	(0.35)	(0.29)	(0.29)	(0.64)	(0.50)
District FE	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES
R-squared	0.120	0.417	0.228	0.300	0.174	0.481
Observations	1,681	1,676	1,681	1,676	1,681	1,676
Schock, No Remittances	0.39	0.36	-0.34	-0.35	-0.14	-0.11
	(0.41)	(0.28)	(0.26)	(0.25)	(0.59)	(0.43)
Schock, Remittances	0.55**	0.31	-0.12	-0.18	-0.35	0.02
	(0.21)	(0.19)	(0.15)	(0.15)	(0.27)	(0.22)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects and are weighted by the inverse of the sampling probability to reflect survey design. Control variables included when indicated as discussed in the text. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 4. Moral Hazard, Shocks and Remittances

	Education (1)	Alcohol (2)	Gambling (3)	Wedding (4)	Funeral (5)
Schock	-0.33**	-0.71**	-0.47	0.13	-0.17**
	(0.15)	(0.33)	(0.31)	(0.21)	(0.08)
Shock * Remittances	0.55**	0.26	0.55	-0.08	0.51**
	(0.21)	(0.37)	(0.39)	(0.25)	(0.20)
R-squared	0.215	0.085	0.140	0.081	0.055
Observations	856	1,681	1,527	1,527	1,532
Schock, No Remittances	-0.33**	-0.71**	-0.47	0.13	-0.17**
	(0.15)	(0.33)	(0.31)	(0.21)	(0.08)
Schock, Remittances	0.21*	-0.45**	0.07	0.06	0.34*
	(0.12)	(0.20)	(0.20)	(0.10)	(0.18)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects, control variables as discussed in the text and are weighted by the inverse of the sampling probability to reflect survey design. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 5. Gifts: Social Insurance beyond Remittances

	Food and Non-food	Food	Non-food	Alcohol
	(1)	(2)	(3)	(4)
Schock	0.25	0.39	0.68	-0.24**
	(0.45)	(0.53)	(0.50)	(0.10)
Shock * Remittances	-0.39	-0.21	-1.15**	0.18
	(0.48)	(0.60)	(0.57)	(0.16)
R-squared	0.280	0.244	0.296	0.150
Observations	1,676	1,676	1,676	1,628
Schock, No Remittances	0.25	0.39	0.68	-0.24**
	(0.45)	(0.53)	(0.50)	(0.10)
Schock, Remittances	-0.14	0.18	-0.47	-0.05
	(0.23)	(0.29)	(0.29)	(0.10)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects, control variables as discussed in the text and are weighted by the inverse of the sampling probability to reflect survey design. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 6. Formal Insurance versus Social Insurance

	Total Comsumption (1)	Food Consumption (2)	Non-food Consumption (3)
Panel A: Without Health Insurance			
Schock	-0.28***	-0.30*	-0.28***
	(0.07)	(0.17)	(0.08)
Shock * Remittances	0.26***	0.29	0.27***
	(0.08)	(0.18)	(0.10)
R-squared	0.436	0.195	0.445
Observations	1,334	1,317	1,334
Schock, No Remittances	-0.28***	-0.30*	-0.28***
	(0.07)	(0.17)	(0.08)
Schock, Remittances	-0.02	-0.01	0.00
	(0.04)	(0.09)	(0.04)
Panel B: With Health Insurance			
Schock	0.02	-0.12	0.10
	(0.18)	(0.20)	(0.21)
Shock * Remittances	0.21	0.37	0.15
	(0.22)	(0.40)	(0.24)
R-squared	0.649	0.442	0.645
Observations	342	336	342
Schock, No Remittances	0.02	-0.12	0.10
	(0.18)	(0.20)	(0.21)
Schock, Remittances	0.23	0.26	0.25
	(0.16)	(0.29)	(0.16)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects, control variables as discussed in the text and are weighted by the inverse of the sampling probability to reflect survey design. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 7. Private, Public and Social Insurance

	Total Comsumption (1)	Food Consumption (2)	Non-food Consumption (3)
Panel A: With Public Health Insurance			
Schock	-0.80***	-0.69*	-0.53*
	(0.26)	(0.36)	(0.30)
Shock * Remittances	0.69*	1.09	0.51
	(0.38)	(1.14)	(0.40)
R-squared	0.597	0.297	0.627
Observations	130	129	130
Schock, No Remittances	-0.80***	-0.69*	-0.53*
	(0.26)	(0.36)	(0.30)
Schock, Remittances	-0.11	0.40	-0.02
	(0.26)	(0.85)	(0.22)
Panel B: With Private Health Insurance			
Schock	0.49	0.22	0.40
	(0.32)	(0.31)	(0.32)
Shock * Remittances	-0.21	-0.09	-0.09
	(0.36)	(0.35)	(0.39)
R-squared	0.543	0.609	0.547
Observations	213	208	213
Schock, No Remittances	0.49	0.22	0.40
	(0.32)	(0.31)	(0.32)
Schock, Remittances	0.28	0.13	0.31
	(0.26)	(0.23)	(0.29)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects, control variables as discussed in the text and are weighted by the inverse of the sampling probability to reflect survey design. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.

Table 8. Gender of the Household Head, Schocks and Remittances

	Total Comsumption (1)	Food Consumption (2)	Non-food Consumption (3)
Panel A: Female			
Schock	-0.20**	-0.40*	-0.13
	(0.10)	(0.24)	(0.12)
Shock * Remittances	0.28**	0.48*	0.27**
	(0.11)	(0.26)	(0.13)
R-squared	0.592	0.252	0.557
Observations	780	769	780
Schock, No Remittances	-0.20**	-0.40*	-0.13
	(0.10)	(0.24)	(0.12)
Schock, Remittances	0.08	0.08	0.14**
	(0.05)	(0.09)	(0.06)
Panel B: Male			
Schock	-0.26***	-0.29**	-0.21*
	(0.10)	(0.14)	(0.12)
Shock * Remittances	0.25**	0.31	0.18
	(0.12)	(0.23)	(0.14)
R-squared	0.547	0.239	0.556
Observations	896	884	896
Schock, No Remittances	-0.26***	-0.29**	-0.21*
	(0.10)	(0.14)	(0.12)
Schock, Remittances	-0.01	0.02	-0.03
	(0.07)	(0.15)	(0.07)

Estimated standard errors, reported in parentheses, are clustered at the district level. Outcomes are expressed in natural logs. All regressions include district fixed effects, control variables as discussed in the text and are weighted by the inverse of the sampling probability to reflect survey design. Significance at the one, five and ten percent levels is indicated by ***, ** and *, respectively.