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Remittances flow during the COVID-19 pandemic: The role of digital financial services

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Abstract

The COVID-19 pandemic led to the loss of livelihoods for many households, exacerbating vulnerability. Remittances from friends and family became a major source of income especially in developing countries. Little is known about the role of digital financial services (DFS) in facilitating remittances to alleviate vulnerabilities. We address this knowledge gap using the Instrumental Variable approach on nationally representative data from Ghana and Zimbabwe. We find that households that used DFS, specifically the mobile money financial technology, were more likely to receive remittances. Proximity to agents increased the likelihood of using DFS, underscoring the importance of expanding agent networks in developing countries.

1. Introduction

The Coronavirus Disease (COVID-19) pandemic has wreaked havoc among global citizens. Most countries imposed movement restrictions including "lock downs" and "social distancing" among other measures to curtail the spread of the disease (Fong et al., 2020; Paital, Das, and Parida, 2020). This slowed down economic activities and economic performance of countries (Fong et al., 2020; Li et al., 2020). Many households lost their livelihoods and incomes, thus increasing vulnerabilities (Bruce et al., 2022; Li et al., 2020). Such vulnerabilities were more pronounced in developing countries where millions of people are employed in the informal sector without access to welfare or pension rights and limited social safety net programs (Gutiérrez-Romero and Ahamed, 2021).

Remittances became a major source of income for households across developing countries with friends and family supporting their loved ones. However, the movement restrictions imposed across countries also restricted physical access to financial institutions to send or collect cash. Besides, the exchange and use of cash was also one of the major transmission mechanisms for the virus across communities and therefore discouraged (Auer et al., 2022). These predicaments accelerated the adoption and use of digital financial services (DFS) in developing countries (Demirgüç-Kunt et al., 2022). DFS are financial services which are delivered through digital means, including mobile phones, computers, cards, or the internet (Manyika et al., 2016).

Despite the increased adoption of DFS, little is known and documented about the role played by DFS in facilitating remittances to households in developing countries during the COVID-19 pandemic. This paper addresses the knowledge gap by analyzing the impact of DFS adoption on household remittances during the pandemic using the Instrumental Variable (IV) approach on nationally representative data from Ghana and Zimbabwe collected during the pandemic.

The rest of the paper is structured as follows: Section 2 presents a review of literature on the role of DFS in channeling remittances. Section 3 presents data and measurements while section 4 outlines the empirical strategy and presents the results. Section 5 concludes.

2. The role of digital financial services in channeling remittances

Evidence shows that financial technology (fintech), particularly mobile money (MM), has contributed to increased financial inclusion (Ouma, Odongo and Were, 2017; Gosavi, 2018, Chamboko et al., 2021; Chamboko, 2022). A burgeoning literature shows that digitally delivered fintech such as MM increases the likelihood of receiving remittances (Suri, 2017; Ky, Rugemintwari and Sauviat, 2018; Wieser et al., 2019). Suri (2017) shows that DFS ensures timely flow of remittances, reduces transaction costs and saves travel time to collect cash as funds are either transferred to mobile wallets or to nearby cash-in-cash-out agents. Jack and Suri (2014) observed that households using DFS were more likely to receive remittances than non-users and users from areas with limited mobile money network coverage. This access to DFS and MM helped to smooth consumption during the pandemic.

3. Data and Measurements

Data and sample

The study uses data from the nationally representative financial inclusion surveys in Ghana in 2021 and Zimbabwe in 2022. A multistage sampling methodology based on probability proportionate to size sampling was employed to sample 5156 and 3000 respondents in Ghana and Zimbabwe respectively. The descriptive statistics for the two samples are presented in Table 3.

Table 3: Sample characteristics and descriptive statistics

Variable	Zimbabwe			Ghana		
	Sample (%)	Used DFS (%)	Received Remittances (%)	Sample (%)	Used DFS (%)	Received Remittances (%)
All	100	74.19	30.52	100	85	56.61
Gender						
Male	46.07	75.80	28.75	45.66	88.11	54.55
Female	53.93	72.78	32.03	54.34	83.58	58.35
Level of Education						
No Normal education	5.53	63.29	30.72	19.14	72.75	45.29
Primary education	27.07	58.39	29.93	12.49	78.73	54.66
Secondary education	56.23	76.86	29.36	58.11	89.35	60.15
Vocation education	7.03	92.00	37.62	3.28	98.22	56.21
Tertiary education	4.13	96.75	37.90	6.98	96.67	61.94
Locality						
Urban	40.87	83.82	32.33	50.8	90.61	60.90
Rural	59.13	66.12	29.27	49.2	80.53	52.19
Planning ahead (financial literacy)						
Plan accurately	36.71	78.24	33.42	34.89	89.61	58.25	
Plan inaccurately or neither	17.64	74.77	30.43	48.8	85.02	56.96
Do not plan	45.65	70.15	28.22	16.31	79.07	52.08
Income level						
US$ 0-500	95.7	73.51	30.34	85.65	85.28	57.50
US$ 501+	4.23	88.03	34.65	14.35	87.84	51.35
Household age group						
18-35	25.77	71.47	27.72	18.13	83.10	61.28
36-65	58.03	76.83	28.45	53.94	89.57	55.02
66+	16.2	67.92	42.39	27.93	79.72	56.67
Marital status						
Single/ never married	61.07	75.72	28.25	39.29	87.71	59.77
Married/living together	9.10	76.82	32.60	45.02	86.77	52.35
Divorced/separated	11.83	70.12	42.25	8.01	84.02	61.74
Widowed	18	69.82	29.44	7.68	70.20	60.10
Time to MM Agent						
< 30 minutes	38.69	84.52	33.79	82.99	87.75	59.69
> 30 Minutes	61.31	66.41	28.45	17.01	75.37	41.62

Notes: Table 3 presents the sample characteristics and descriptive statistics.

Receipt of remittances and the use of DFS

The variable "receipt of remittances" was derived from two survey questions on domestic and international remittances as shown in Table 4 of the appendix. DFS use was derived from the survey question whether the respondent was using MM. MM is a recent fintech and is the main DFS used by most respondents in the two countries and therefore deemed a proxy measure of DFS use. 85% of Ghana respondents used DFS and 56.6% received remittances during the 12 months preceding the survey whereas 74% Zimbabwe respondents used DFS and 31% received remittances in the 12 months preceding the survey (See Table 3).

4. Empirical Strategy, Results and Discussion

To analyze the role of DFS in facilitating remittances, a logit model is fitted whereby remittance is regressed on DFS use while controlling for other factors. Receiving remittances is taken as the outcome variable, assuming a value of 1 if remittance was received 12 months preceding the survey and zero otherwise. DFS use assume a value of 1 if MM was used and zero otherwise.

$$Remittances_i = \beta_0 + \beta_1\,DFS\_Use_i + \beta_2 Gender_i + \beta_3 Age_i + \beta_4 Income_i + \beta_5\_Locality_i +$$
$$\beta_6 Level\ of\ Education_i + \beta_7 Time\_to\_DFS\ Agent_i + \beta_8 Financial\ Planning_i + \beta_9\_Marital\_Status + \varepsilon_i \ldots\ldots 1$$

Table 1: Relationship between DFS use and receipt of remittances

Variable	Ghana		Zimbabwe	
	Coefficient	SE	Coefficient	SE
DFS Use	2.2550***	0.1097	0.6191***	0.1132
Female	0.2295***	0.0632	0.1046	0.0935
Time to DFS Agent (< 30 mins)	0.5305***	0.0840	0.1899*	0.1138
Level of Education: reference category = tertiary education				
No formal education	-0.3426	0.1410	-0.1954	0.3274
Primary education	-0.0505	0.1467	-0.1296	0.2316
Secondary education	-0.0183	0.1206	-0.1513	0.2055
Vocation education	-0.3169	0.1938	0.0028	0.2411
Locality (Rural)	-0.0450	0.0651	0.1447	0.1181
Financial Literacy-planning ahead (reference = High)				
Medium	0.0864	0.0674	-0.1602*	0.0949
Low	-0.0288	0.0926	-0.3696**	0.1452
Income group: reference category = US$ 501+				
US$ 0 - 500	0.3857***	0.0854	-0.1541	0.2056
Age of household head: reference category = 36 -65				
18-35	0.3557***	0.0920	0.0408	0.1066
66+	0.2803***	0.0818	0.6598***	0.1302
Marital Status: reference category = Married/ living together				
Single/ never married	0.1758**	0.0754	-0.2205	0.1567
Divorced/separated	0.3949***	0.1214	0.2899	0.2010
Widowed	0.6272***	0.13912	-0.1428	0.1810
Constant	-2.3649	0.2163	-1.6290	0.3679
Pseudo R Squared	0.1351		0.0641	
AUC	0.7205		0.6655	

| Number of observations | 5156 | 3000 |

Results in Table 1 show that DFS users in Ghana (coefficient = 2.2550, p <0.01) and Zimbabwe (coefficient = 0.6936, p < 0.01) were more likely to receive remittances after controlling for other household factors. The findings also show that individuals residing closer to MM agents were more likely to use DFS, in Ghana (0.5305, p <0.01) and in Zimbabwe (0.1899, p < 0.1).

It could be argued that Table 1 results are biased because DFS use could be endogenous. Following Nan and Li (2024) and Jack and Suri (2014), we address the issue using the IV approach, with the time taken to get to the nearest DFS agent (measured in hours) as the instrument. The time taken to a DFS agent was chosen as an ideal instrument given that it affects the adoption and use of DFS, but it does not directly affect the receipt of remittances (except through DFS) (see Khandker et al., 2010).

From Table 2, the first stage results of IV regression (columns 2 and 4) show that time to a DFS agent influenced adoption and use of DFS in Ghana (coefficient = 0.0859, p < 0.001) and Zimbabwe (coefficient= 0.0998, p < 0.01) (see Chamboko, 2024 for collaborating literature). The second stage results (column 1 and 3) show that after controlling for the endogeneity of DFS use, the use of DFS, specifically the MM fintech, had a positive effect on receiving remittances. This was consistent in both Ghana (coefficient= 1.7692, p < 0.001) and Zimbabwe (coefficient= 0.5237, p < 0.05).

Table 2: Special regressor IV approach.

	DFS Instrumented Ghana		DFS Instrumented Zimbabwe	
	2nd Stage (1)	1st Stage (2)	2nd Stage (3)	1st Stage (4)
DFS Use	1.7692*** (0.2825)	-	0.5237** (0.2544)	-
Time to DFS Agent	-	0.0859*** (0.0128)	-	0.0998 *** (0.0216)
Controls	Yes	Yes	Yes	Yes
Durbin (score)	chi2(1) = 39.2058, p = 0.0000		chi2 (1) = 2.82014, p = 0.0931	
Wu-Hausman	F (1,5139) = 39.3759, p = 0.0000		F (1,2463) = 2.804, p = 0.0942	
Number of observations	5156		3000	

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.

5. Conclusion

The COVID-19 pandemic exacerbated vulnerabilities of millions of households due to loss of livelihoods especially in developing countries where the informal sector employs most of the workforce without access to social safety nets. This study thus investigates the role of DFS in facilitating remittances to alleviate vulnerabilities induced by the pandemic. Using the IV approach on nationally representative samples of 5156 respondents from Ghana and 3000 respondents from

Zimbabwe, the study finds that households that used DFS, particularly the MM fintech, were more likely to receive remittances. The findings also confirm that agents are an important component of the financial architecture in developing countries and those who reside closer to the agents are more likely to adopt and use DFS. The study thus underscores the importance of deepening DFS ecosystems to facilitate the flow of remittances.

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Appendixes

Table 4: Receipt of remittances and use of DFS

Receipt of Remittances	In the past 12 months, have you received money from someone living in a different place within the country?
	In the past 12 months, have you received money from someone living in another country?
	The variable "receipt of remittances was derived from the above survey questions and takes value of 1 when one had received money from within or outside the country or otherwise a zero.
Use of DFS	Are you currently using a mobile money account? Variable takes value of 1 if answer is yes and a 0 if answer is no.

Notes: Table 4 presents measures of receipt of remittances and use of DFS extracted from the survey questionnaire.

Table 5: Correlation Matrix (Ghana)

	Time to MM agent	Age Group	Level of Education	Income Level	Gender	Financial Planning	Marital Status	Income Source	Locality
Time to MM agent	1								
Age Group	0.011	1							
Level of Education	-0.129	-0.217	1						
Income Level	-0.070	0.038	0.010	1					
Gender	-0.031	-0.013	-0.110	0.012	1				
Financial Planning	-0.047	0.005	0.133	-0.049	-0.064	1			
Marital Status	-0.075	-0.381	0.178	-0.049	-0.026	0.017	1		
Income Source	-0.028	-0.030	0.059	-0.06	0.030	0.005	0.079	1	
Locality	0.230	0.066	-0.277	-0.032	-0.061	-0.053	-0.137	-0.127	1

Notes: To conduct the multivariate analysis, the level of correlation between explanatory variables was assessed. The results presented in the correlation matrix in Table 5a show that there was no concern on the level of correlation and potential for multicollinearity.

Table 6: Correlation Matrix (Zimbabwe)

	Time to MM agent	Marital Status	Gender	Level of Education	Income Source	Locality	Financial Planning	Income Level	Age Group
Time to MM agent	1								
Marital Status	-0.049	1							
Gender	-0.029	0.01	1						
Level of Education	-0.315	-0.024	-0.113	1					
Income Source	-0.012	0.188	0.109	-0.096	1				
Locality	0.625	-0.064	-0.016	-0.374	-0.034	1			
Financial Planning	0.049	0.104	-0.007	-0.192	0.176	0.101	1		
Income Level	-0.256	-0.028	-0.024	0.368	-0.144	-0.295	-0.212	1	
Age Group	0.131	0.107	0.043	-0.228	0.090	0.159	0.109	-0.095	1

Notes: To conduct the multivariate analysis, the level of correlation between explanatory variables was assessed. The results presented in the correlation matrix in Table 6 show that there was no concern on the level of correlation and potential for multicollinearity.