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Hypothesizing resurgence of financial inclusion to reduce poverty in Afghanistan

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ABSTRACT

Reducing poverty is a critical topic of policy discussion across the world. Developing countries and post-conflict environments commonly face poverty growth. At present, Afghanistan is experiencing the highest rate of poverty in the world; only one tenth of the Afghan population has access to financial services that are mostly localized within the capital and regional cities. In this paper I hypothesize financial inclusion as a contextualized model that can significantly reduce the rate of poverty. I use a set of timeseries data on financial inclusion determinants excluding insurance as the explanatory variables and linearly regress them on the rate of poverty from 2004 to 2018. The statistical results reveal that ATMs per 100,000 adults in the country significantly reduce poverty by 0.25% by increasing capital mobility and remittances. Credit cards and borrowing facilities to the informal economy have significant coefficients of 0.00635% and 0.0207% respectively on poverty reduction as an emergent strategy. The security variable has a significant coefficient of 41% reduction of poverty. Among all other variables tested, extending mobile money facilities is also significant and reduces poverty by 0.015%.

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1. Introduction

Despite steady economic growth mainly due to international contribution and investment, poverty has been drastically growing during the last decade. Presently, 55% of the Afghan population live under the poverty line. While corruption and insecurity are the major drivers of poverty, inaccessible financial services accelerates unemployment and causes poverty to grow much faster in the informal economy. A drastic inequality of income and opportunity lowers the growth rate, hollows out the middle class, encourages corruption and rent seeking, increases crime and violence, undermines social stability, and precludes sustainable growth [1]. However, conventional approaches in tackling poverty are not sufficient to address the drivers of contextual challenges causing poverty. Financial inclusion offers incremental and complementary solutions to tackle poverty, to promote inclusive development [2], and to enable all citizens to contribute to economic growth and poverty reduction [3].

According to Morgan & Pontines [4], emerging economies should seek financial development strategies that enhance accessibility to greater financial services for low-income households. Economically, poverty does not just refer to an individual's lack of liquidity; it also includes the lack of access to sufficient financial services to help poor households generate income and improve their lives [5]. In Afghanistan, microfinance institutions have been less effective in reducing poverty, but increasing access for financial services to both formal and informal sectors is a far better tool in the reduction of poverty as enhanced financial inclusion has been shown to contribute to wealth creation, economic growth, and sustainable development in various countries [6,7].

Studies looking at development change and sustainable outreach on economic growth and poverty reduction suggest turning from microfinance to financial inclusion with new mechanisms and formal practices to facilitate broader development outcomes [8]. In this contribution, I hypothesize that the significant impact of financial inclusion as a formal strategy can reduce the growing poverty rate in Afghanistan.

2. Data and model

2.1. Data

The data used in this paper are a set of time-series data collected from the official IMF and WDI websites. The data were arranged annually and according to increasing frequency, adjusted on monthly basis (see table 1 for descriptive statistics).

Table 1: Descriptive statistics.

	Poverty	ATM²	ATMA²	Borrowing	MMA	ODCB	Credit Card
Mean	40.13	0.171	0.608	53,344.80	683.133	15,4951.3	115,325.3
Median	37.00	0.148	0.611	57,171.00	354.000	172,750.8	63,430.00
Maximum	55.00	0.522	1.599	72,455.00	1945.00	273,334.9	518,411.0
Minimum	32.00	0.003	0.015	32,445.00	25.0000	9,095.000	651.0000
Std. Dev.	8.116	0.148	0.450	12,686.80	715.909	92,871.17	148,342.0

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Skewness	1.087	0.921	0.575	-0.436334	0.69830	-0.306559	1.587459
Kurtosis	2.672	3.123	2.691	2.028096	1.94482	1.702245	4.704723
Jarque-Bera	3.024	2.133	0.887	1.066340	1.91492	1.287551	8.116369
Probability	0.220	0.344	0.641	0.586742	0.38386	0.525305	0.017280

2.2. Model

The econometric model is presented by which the collected data are analyzed. Model selection is based on a concept of financial inclusion affecting the rate of poverty in developing countries (see for instance, [9–11]. The foundational economic model is:

$$\text{poverty}_t = f(\text{borrwing}_t, \text{creditcard}_t, \text{mobilemoney}_t, \dots) \quad t = 1,2,3,\dots,n \tag{1}$$

Considering the base model, I constructed a linear model using first difference of the data to check with the short run coefficients of the model:

$$\Delta(\text{poverty}_t) = \beta_1 + \beta_2\Delta(\text{ATM}_t^2) + \beta_3\Delta(\text{ATMA}_t^2) + \beta_4(\text{Security}_t) + \beta_5\Delta(\text{MMA}_t) + \beta_6\Delta(\text{ODCB}_t) + \beta_7\Delta(\text{Borrowing}_t) + \beta_8\Delta(\text{CreditCard}_t) + \varepsilon_t \tag{2}$$

where Δ is the indication of short run effect of the coefficients, $\beta^s$are the coefficients of the model, poverty is the dependent, ATM² is the number of ATM per 1,000 km², ATMA² is the number of ATMs per 100,000 adults, ODCB is the outstanding deposit with commercial banks representing the access of the formal sector to financial services, borrowing is presented as the US dollar value of microfinance loans disbursed to households, MMA is the number of mobile money agents across the country representing the access of informal sector to financial services, and security is a factor included as the explanatory variables in model (2).

$$\hat{\mu}_t = \delta_1 + \delta_2 X_{2t} + \dots + \delta_k X_{kt} + \lambda_1\hat{\mu}_{t-1} + \dots + \lambda_p\hat{\mu}_{t-p} + \omega_t \; ; \; LM = (n-p) \times R^2_{aux} \sim \chi^2_p \tag{3}$$

To further ensure the reliability of the test statistics and the estimated p-values of the coefficients from (2), heteroskedasticity is computed on the residual using the Breusch Pegan Godfrey test [12] assuming that the error term is normally distributed. As the last step, I performed the Jarque-Bera test [13] of residual normality as expressed below:

$$JB = n\left[\frac{Skewness^2}{6} + \frac{(Kurtosis-3)^2}{24}\right] \tag{4}$$

where, $Skewness = \frac{\frac{1}{n}\sum(\hat{u}_i - \hat{u}_i^2)^3}{\left(\frac{1}{n}\sum(\hat{u}_i - \hat{u}_i^2)^2\right)^{2/3}}$,

$Kurtosis = \frac{\frac{1}{n}\sum(\hat{u}_i - \hat{u}_i^2)^4}{\left(\frac{1}{n}\sum(\hat{u}_i - \hat{u}_i^2)^2\right)^2}$ and n in (4) presents the number of observations included in the sample.

3. Data analysis and findings

3.1. Data analysis

The results reveal the significance of financial inclusion in poverty reduction in Afghanistan. Tables below present the regression analysis followed by corresponding diagnostic tests.

Table 2: Regression analysis.

Variable	Coefficient	Std. Error	t-Statistic	p-values
Intercept	1.583264	0.166418	9.513787	0.0000***
Δ(ATM²)	0.278908	0.034559	8.070436	0.0000***
Δ(ATMA²)	[25.46997]	4.830009	[5.273275]	0.0000***
Δ(Credit Cards)	[6.35E-06]	1.32E-05	[0.482129]	0.6303
Δ(BORR)	[2.07E-05]	3.77E-05	[0.548640]	0.5840
SD	[0.408072]	0.110657	[3.687701]	0.0003***
Δ(ODCB)	[3.09E-05]	4.08E-05	[0.759280]	0.4487
Δ(MMA)	[0.015127]	0.000785	[19.26878]	0.0000***

Significant if ***p<0.000, **p<0.05, *p<0.10

[ ] negative integers

$\bar{R}^2 = 0.724, DurbinWatson = 1.5756$
$F_{stat} = 5.883, p - value = 0.02314$

Analysis of the data using model (2) presented in Table 2. shows the significance of ATMA² in reducing domestic poverty. ATMA²is the number of ATMs per 100,000 adults in the country representing the proxy for funds and capital mobility and ease of remittances for small scale businesses both for the formal and informal sector. The coefficient value is -25.5/100 showing that by one unit increase in ATM accessibility, approximately 26/100,000 adults are affected in short run.

The short run coefficient for credit card being $\left(\frac{0.00000635}{100}\right)100{,}000 adults = 0.00635\%$ is a significant variable in reducing the poverty while the borrowing access to the informal economy has an effect of 0.0207% on poverty reduction. Security is another significant variable, exhibiting a coefficient of -0.41, documenting that security maintenance reduces the poverty by almost 41%.

The ODCB (outstanding deposit in commercial banks) that mostly refers to the easy financial access to the formal economy is not significant while the mobile banking agents' distribution across the country shows a 1.5% significant reduction in poverty. To confirm the results obtained from the regression analysis and provide a rationale for a conclusion, I further test the residuals for

serial correlation, heteroskedasticity and its normal distribution which is available as note 1 at the end of this paper.

4. Diagnostic Evaluations

4.1. Serial correlation

The residual values of the regression model in table 2 are further tested for any possible existence of autocorrelation in the series using the Breusch Godfrey test. The results show an Fstat of 0.919 (p-value of 0.4693) and a chi-square p-value of 0.1103, rejecting the null hypothesis of serial correlation.

4.2. Heteroskedasticity

Since the time-series data have high heteroskedasticity, the Breusch Pegan Godfrey test was used to check for the heteroskedasticity in the residual values. The results show a scaled Explained Sum of Squares value of 1.4857, chi-square p-value of 0.9828 which does not support rejecting the heteroskedastic residual values.

4.3. Normal distribution

To evaluate the normality of error, I used the Jarque-Bera test. The result is 0.688819 with a p-value of 0.708639, which is insufficient to reject the normality of the residuals. As a final test, the model stability and suitability with the included variables is examined using the CUSUM test, and the result of which is graphically shown in Figure 1.

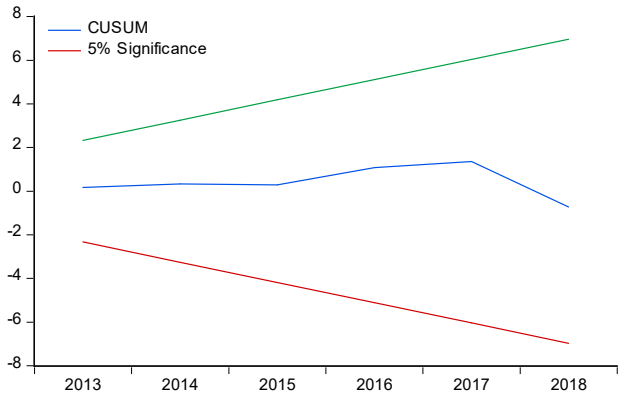

Figure 1. Test of model stability.

5. Conclusion

Though, many scholars concluded that the main reason for poverty growth is the failure of economic growth in a country [7,14,15] many others believe and offer evidence in favor of financial inclusion as an effective policy, paving access to low income households to a wide range of financial services through which they generate income and manage their lives [16,17]. In this paper I hypothesize that financial inclusion as a contextualized model can significantly reduce the domestic rate of poverty. I used time-series data on financial inclusion determinants excluding the insurance as the explanatory variables and linearly regress them upon the rate of poverty from 2004 to 2018. The statistical results reveal that ATMs per 100,000 adults in the country can reduce poverty by 0.25% by increasing capital mobility and easing remittances. Credit card and borrowing facilities to the informal economy show significant reductions of 0.00635% and 0.0207% reduction of domestic poverty. Security also significantly reduces domestic poverty by 41%. Among all other variables tested, expanding mobile money facilities can significantly reduce poverty by 0.015%. The statistical results are further examined, and the relevant claims of their accuracy are appended in note 1.

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