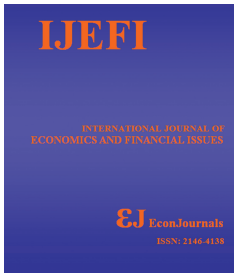

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Roles of SME Financing in Inclusive Economic Growth and Poverty Reduction in Bangladesh

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ABSTRACT

The objective of this study is to examine the roles of SME, non-SME, and agricultural financing in inclusive economic growth and concomitant headcount poverty reduction in Bangladesh. ADF (augmented dickey-fuller) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests for non-stationarity of time series variables, the ARDL (autoregressive distributed lag) procedure for cointegration and the associated VECMs (vector error- correction models) are implemented for convergence toward long-term equilibrium, speed of adjustment toward it, long-run casual effects and short-run feedback effects. Annual data from 1976 through 2023 are employed. Data sources include the Bangladesh Bureau of Statistics and the Bangladesh Planning Commission. Evidences support financing of SMEs to positively influence inclusive real GDP (gross domestic product) growth that in turn help poverty reduction. However, the reduction in poverty through inclusive economic growth alone is relatively subdued than direct SME financing. Agricultural financing has relatively more pronounced effects on poverty reduction. The converging speed of adjustment towards the long-run equilibrium, however, seems tepid. The short-run feedback effects appear reinforcingly positive. The policymakers in Bangladesh should stay focused on due financing to SMEs and agriculture for promoting inclusive economic growth and hence, mitigating poverty. To note, enhancing inclusive economic growth alone cannot sufficiently dent poverty. Other supportive measures and micro-business lending should as well be given a priority.

Keywords: Poverty Reduction, Small and Mid-Sized Enterprise Financing, Agricultural Financing, Inclusive Economic Growth, Autoregressive Distributed Lag
JEL Classifications: I30, I32, I38, I39

1. INTRODUCTION

Small and mid-sized enterprises (SMEs) play a vital role in developing countries in poverty reduction through inclusive job creation and inclusive economic growth for wealth creation with spreading benefits through economic freedom, and equal opportunities. They encounter multiple hurdles to grow that prominently include inadequate access to funds, inadequate infrastructures, unfavorable regulations, and lack of technology support, training and marketing know-hows. Among them, lack of inclusive financing is the single most hinderance. In this context, Bangladesh made a significant progress, though many challenges still lie ahead including rising income inequality, inflation, political instability, and food insecurity. National headcount poverty rate in Bangladesh experienced substantial decline, dropping from 59% in 1990 to 18.7% in 2022. This progress in such poverty reduction is attributed to sustained economic growth in two preceding decades till 2024, social safety net programs, buoyant exports and manufacturing sector as well as targeted policies. Comparatively, Bangladesh outperformed India and Pakistan, though China achieved an even more dramatic drop, reducing poverty from 66% in 1990 to below 1% by 2020 through sustained robust economic growth since 1980 till very recent unfolding signs of a stagnating economy, and structural rural reforms. Vietnam also made significant strides, sharply reducing poverty from 58% in 1993 to 5% in 2020, driven by market reforms and surging agricultural

growth. What is even more striking is that during the same period (1990-2019), income inequality rose significantly revealing inequitable distribution of gains emanating from escalating economic progress. The most commonly used measure of income inequality (the Gini coefficient), rose from 0.39 in 1990 to 0.49 in 2019, according to the Bangladesh Bureau of Statistics (BBS). Usually, Gini coefficient within the range of 0.4-0.5 is considered to be a signal of high inequality that likely causes social and political imbalances.

Despite Bangladesh's progress on this front, recent challenges including the COVID-19 pandemic, the ongoing Ukraine-Russia conflict, and high inflation have deterred further poverty reduction efforts. The Ukraine-Russia crisis disrupted global supply chains, driving up input and food prices and fueling inflation that eroded purchasing power. This exacerbated food insecurity and the accompanying poverty. While the government interventions provided some relief, they were often short- lived. As a result, the absolute number of people in poverty could be roughly projected in the range of 30-40 million today with the total population of 170 million and even higher.

With persistent inflation interwoven with political disruptions, strengthening social protection has become a national priority. To make further progress in poverty alleviation, Bangladesh's social safety framework needs substantial reforms to address funding shortfalls, inefficient targeting, and regional disparities. Increasing investment, optimizing fund allocations, and fostering public-private partnerships (PPP) are crucial to expanding the scope and impact of poverty reduction programs. Policy inconsistencies and political challenges also continue to impede efforts for overcoming these impediments through strategic restructuring. In short, this is vital for sustained poverty reduction in resilience.

The goal for further substantial reduction in poverty could be achieved through the rapid and sustainable growth of the SME sector. This sector can act as an accelerating force in inclusive economic growth by generating substantial employment and ensuring the proper distribution of income. The main advantage of SMEs is their labor-intensive nature, and most SMEs have lower capital intensity than larger industrial sectors. In terms of the merits of high labor intensity and low capital requirements, the entire SME sector provides huge benefits to private enterprises through their cost-effective business nature.

Bangladesh is primarily an agriculture-dominated country in term of its high share in total employment. Around 65% of the total population still live in rural areas. Most of the people in rural areas are involved in agricultural activities. Significant development can be achieved by establishing agriculture-based small and medium enterprises. In many developing countries, a large portion of the private sector activities, including employment generation, mainly originated from the SME sector. Moreover, the SMEs function has expanded into the manufacturing, trade, and service sectors rather than the agro-based industry or the industries with lower dependence on technology. For maintaining rapid and sustained economic growth, the essential prerequisite is to reduce poverty, along with employment generation. With that in mind, the development of SMEs to ensure the ultimate goal of poverty reduction is essential.

The SME entrepreneurs cannot get sufficient capital due to their limited access to formal financial institutions. Timely and enhanced financing in this sector can play a greater role in national output and adequate job creation with an increasing number of SMEs. They also help increase industrial production. The relative share of SMEs in the manufacturing industry is much higher. This share in the total value-added ranges from 45% to 50% in the manufacturing industry. To add further, developing new industrial enterprises with efficient entrepreneurs in the SME sector has potential for greater contributions to domestic production and employment that in turn would help further mitigation of national poverty.

The prevailing SME scenario in Bangladesh accounts for about 80% of the total enterprise units. The job opportunities they provide account for about 40% of total employment. The contribution of SMEs to gross value added is around 22.5% while their combined contribution to total exports is about 11.3%. To note, the SME sector of Bangladesh, in its current state, is not performing, as expected, to stimulate enough economic development and employment growth.

Despite their importance, SMEs in emerging markets face numerous challenges that hinder their growth and sustainability (e.g., KindstrÖm et al., 2024; Le et al., 2021). To reiterate, these challenges include limited access to finance, inadequate infrastructure, regulatory barriers, and limited access to markets. However, SMEs also have significant opportunities in emerging markets including a growing consumer base, increasing digitization, and access to new technologies that can advance their competitiveness and market expansion.

In the backdrop of the above, this study's sole objective is to empirically examine the roles of SME financing and agri-financing in economic growth and poverty reduction in Bangladesh. The balance of the paper proceeds as follows. Section 2 provides a conceptual and theoretical framework. Section 3 presents a brief review of relatively recent related literature. Section 4 outlines the empirical design. Section 5 reports results. Section 6 offers conclusions and brief policy implications.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

In concept, theory and practice, unemployment and underemployment are the principal reason for people being and falling into poverty trap. Poverty itself swirls around in a vicious cycle originating from the above and feeding back into them. The unemployed and the underemployed are the victims of inequitable wealth distribution posing problems of low-income, low savings and investment, and lack of technology support resulting in low productivity. The associated negative consequences include food insecurity, malnutrition, poor

education and high birthrates adding further to the rank of the unemployed and the underemployed in poor health with no needed skills for higher employability. This can be described using a simple circular-flow-diagram (Figure 1).

The theoretical and conceptual relationship between SME growths and poverty mitigation stems from enhancing economic growth and accompanying job growths through a chain of interlinked virtuous effects. They include surging production and income generation through markets translating into high demand for labor. Finally, additional job creation helps poverty reduction. To restate, for existing SMEs to grow and new SMEs to evolve, both SMEs and agri-financing is vital to economic growth and employment generation in order to lift people out of poverty. The above can be shown as follows in Figure 2:

To note, inclusive financing for enhancing inclusive income and job growths is of great importance for effective working of the above framework.

3. BRIEF REVIEW OF RELATIVELY RECENT RELATED LITERATURE

Empirical studies have been growing in volume in recent two decades discussing the roles of micro-business and SMEs (MSMEs) in poverty alleviation in developing countries via enhanced inclusive economic growths and employment generation with adoptions of pro-poor and anti-poverty policy strategies. According to the International Labor Organization (ILO) in 2019, the proportion of working poor is higher in developing countries than in developed countries. The economic factors that cause poverty are differences in patterns of resource ownership, leading to unequal income distribution, limited and low-quality resources (both material and human), low wages/income and asymmetric access to capital, among other hurdles (e.g., Sharp et al., 2000; Biyase and Zwane, 2017; Ehnberg et al., 2020; Hossin et al., 2023).

To reduce poverty, the strategy begins with job creation to employ the poor. As the greatest employment generator in the economy, SMEs obviously play a vital role in alleviating poverty by providing employment opportunities and contributing to economic growth (World Bank, 2020). The development of SMEs can absorb more labor, provide business opportunities, especially for women and disadvantaged ones, improve income, and push economic growth to further reduce the number of the people in poverty and improve their socio-economic conditions (e.g., Manzoor et al., 2019; Geremewe, 2018).

Most Asian developing countries heavily rely on SMEs. The development of these enterprises are essential for poverty alleviation in the region. (Begum et al., 2022) highlighted that the SME development has a positive and significant role in poverty mitigation and employment generation in Bangladesh. Ali and Islam (2018) used time series data from 1972 to 2008 to investigate the role of the MSME sector in poverty reduction in Pakistan. This study found that these enterprises have a significant contribution to economic development and employment creation thereby to reduce poverty. Islam (2020) finds that expansion of the SMEs has positive effect on economic growth that in turn can reduce poverty in Bangladesh.

(Raihan, 2001) found that only 49.5% of SMEs have access to formal sources of funding. Out of these SMEs, only 35.8% have an advantage in access to formal sources of credit without any restrictions, while the rest (13.7% of SMEs) can get access to institutional credit sources but encounter many impediments. A small percentage of entrepreneurs use bank credit, which provides only about 20% of their total outlay. About 59.6% of SMEs have demand to manage their working capital from bank credit even though half of them can obtain loans or funds from the banking system.

To add further, a Bangladesh Bank Report (2008) pointed that SMEs are not performing properly in the manufacturing sector due to several constraints such as low financial access, adequate supply of utilities (electricity and gas), and inadequate technologies. (Chowdhury et al., 2013) explored the potentials of SMEs in the Bangladesh economy. Using 100 SME units in the selected sample, this study found that SMEs have significant potential for growth and poverty reduction. This study also mentions some important barriers relating to SME financing.

Figure 1: Conceptual and working overall flow diagram

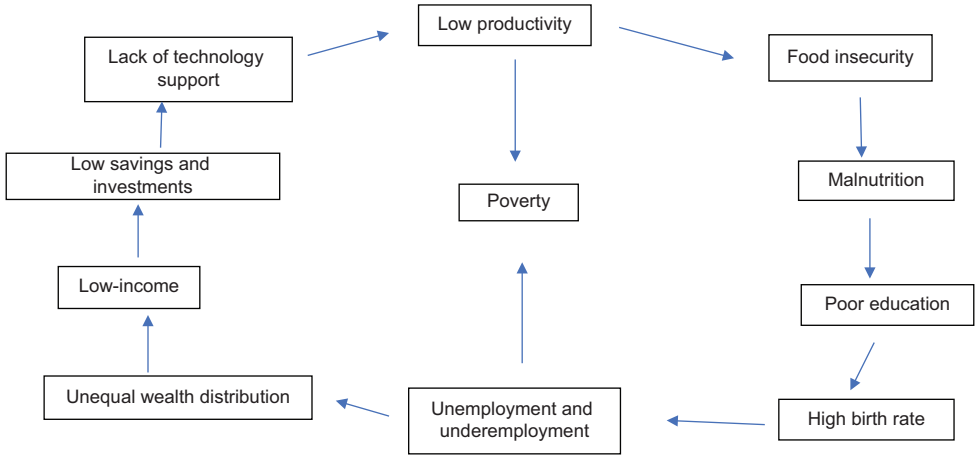
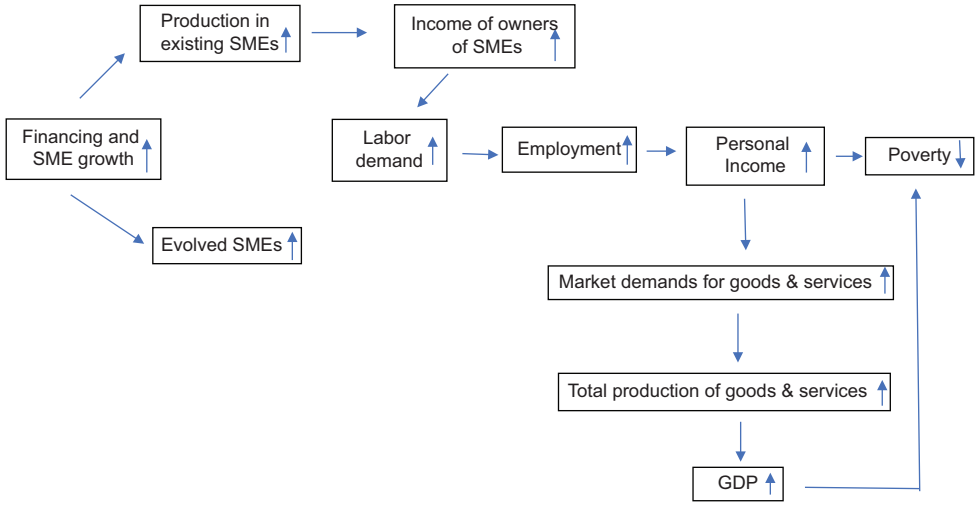


Figure 2: The total impact of SMEs growth on poverty



(Alauddin and Chowdhury, 2015) studied the contributions of SMEs in the development of Bangladesh using descriptive analysis. This study found that SMEs have a noteworthy contribution to GDP and other factors. They postulate that SMEs cannot function, as expected, due to lack of financing, and absence of political stability, amid others. Greater SME financial inclusion would have potential macro-finance benefits, including economic growth, employment increment, poverty reduction, enhancement of macroeconomic policy, and macro-financial stability. Generally, it is well known that SMEs are a leading player of job creation, social capital development, and ultimately fueling the national economic engine. Improving the performance of SMEs is an effective tool for poverty alleviation in developing countries, in general. The majority of studies pertaining to SMEs have revealed that the most significant barrier to their expansion is their lack of access to funding (e.g., Duygan-Bump et al., 2015; Gozzi and Schmukler, 2016; International Monetary Fund, 2014; Shinozaki, 2012; Wellalage and Locke, 2017). In addition, they include a lack of managerial abilities, inadequate tools and technology, a rigid regulatory framework, and restricted access to foreign markets (Yoshino and Taghizadeh-Hesary, 2016).

Limitations of access to finance have slowed down firm growths (e.g., Fowowe, 2017; Yoshino and Taghizadeh-Hesary, 2018). Considering South Asian countries, SMEs face difficulties when access to credits is either full or partial. The finance gap survey (SME Finance Gap, 2017) highlighted that around 65% of SMEs face difficulties accessing credits from the formal financial sector in Sri Lanka. It is comparatively high compared to other countries in South Asia. The SME finance gap can be defined as the difference between credit demand by the SMEs and credit supply by the service providers, either formal or informal. Reducing or closing supply-demand gap in SME finance would help boost economic growth and long-term employment benefits. Fiscal policy activities are more smoothly functioning due to SME financial inclusion. More remarkable financial inclusion of SMEs would influence the effectiveness of monetary policy within the country (Mehrotra and Yetman, 2014). Further, greater SME financial inclusion leads to higher macroeconomic policy effectiveness. Transmission of monetary policy and price stability are also expected to increase due to higher SME financial inclusion.

SMEs in developing countries cite access to finance as one of the biggest obstacles to growing their businesses (e.g., Amadasun and Mutezo, 2022; IFC, 2017). According to (Wang, 2016), access to finance is perceived as the single most significant challenge hindering SME growth. While SMEs are more likely to be credit-constrained than larger firms, credit access has been found to be positively related to productivity and financial deepening within an economy (Kuntchev et al., 2013). Moreover, the evidence suggests that the size of the firm itself can influence the impact of accessing finance. For example, the association between financing and job growth appears to be stronger among SMEs than among large firms (Ayyagari et al., 2021). There is extensive evidence indicating that nascent SMEs in developing countries experience a substantial increase in returns when they are able to access capital (e.g., de Mel et al., 2008, 2009; McKenzie and Woodruff, 2014). However, while the literature on access to finance is very well developed for microenterprises and small firms, it is notably lacking for medium-to-large firms (Atkin et al., 2021).

4. EMPIRICAL DESIGN

The estimating base-equations in general functional forms are specified as follows:

$$Y = f(SMF, AGF, NSMF) \quad (1)$$

$$PO = g(Y) \quad (2)$$

$$PO = h(SMF, AGF, NSMF) \quad (3)$$

Where, Y = Annual Real GDP per capita, SMF = Annual amounts of SME financing, AGF = Annual amounts of agricultural financing, NSMF = Annual amounts of financing non-SMEs, and PO = Annual numbers of head count poverty in monetary term. All variables for estimation of the above equations are expressed in natural log (ln). The Bangladesh National Industrial Policy of 2016 classified industries in four categories that are considered

in this study, based on the number of employees. They are as follows: small enterprises (number of employees ranges from 31 to 120), and mid-sized enterprises (number of employees ranges from 121 to 300). The sample period spans from 1976 to 2023. The data are collected from the Bangladesh Bureau of Statistics (BBS) and the Bangladesh Planning Commission. To note, the increases in the explanatory variables are expected to have desired effects on the respective dependent variable of each of the above equations.

Autoregressive distributed lag (ARDL) model is applied for estimating equations (1), (2), and (3). This model uses standard least squares regression that includes lags of both the depended variable and explanatory variables as regressors (Greene, 2008). The ARDL model of (Pesaran and Pesaran, 1997; Pesaran and Shin, 1998) has been employed for cointegration among the variables in natural log-levels with relatively small sample period. In this procedure, variables may depict a mixture of I (0) and I (1). Also, this procedure does not require all variables to be of I (1) behavior, as required in the Johansen and Juselious (1990) procedure for cointegrating relationship between or among them.

On the evidence of cointegration relationship, vector error-correction model (VECM) is/are estimated corresponding to each of the above equations following Engle and Granger (1987). VECM fits in the class of multivariate models and it is employed for time series data where the cointegrated variables show random trend and thus presents better long-run association of cointegration. The model is used for calculating both short-run and long-run impacts of one series on another that deals with the concept that last-period deviates from its long-run equilibrium due to shocks which affects its short-term dynamics. Thus, VECM calculates the pace at which a regressed variable brings back to long-run equilibrium after shocks in other regressor variables.

Prior to implementing the above, non-stationarity of each variable is ascertained by the Augmented Dickey-Fuller (Dickey and Fuller, 1979) for unit root and its counterpart (KPSS) test following (Kwiatkowski et al., 1992). The optimum lag-lengths are determined by the Akaike information criterion (Akaike, 1969). The OLS estimating cointegration regression and the associated VECM pertaining to each base equation are respectively specified as follows:

$$\Delta ln_{Yt} = \alpha_0 + \alpha i \sum_{i=1}^{j} \Delta lnY\,t-i + \alpha 2i \sum_{i=1}^{K} \Delta lnSMF\,t-i + \alpha 3i \sum_{i=1}^{m} \Delta lnAGF\,t-i + \alpha 4i \sum_{i=1}^{n} \Delta lnNSMFt-i + \beta_1 lnY_{t-1} + \beta_2 lnSMF_{t-1} + \beta_3 lnAGF_{t-1} + \beta_4 lnNSMF_{t-1} + e_t(1)'$$

For null hypothesis of no cointegration (H_0): $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$
For alternative hypothesis of cointegration(H_a): $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

The corresponding VECM is as follows:

$$\Delta ln_{Yt} = \beta_0 + \beta i \sum_{i=1}^{j} \Delta lnY\,t-i + \beta 2i \sum_{i=1}^{k} \Delta \ln SMF\,t-i + \beta 3i \sum_{i=1}^{m} \Delta \ln AGF\,t-i + \beta 4i \sum_{i=1}^{n} \Delta \ln NSMF\,t-i + \theta Ei_{t-1} + Y_t(1)''$$

Where j,k,m and n are optimum lag-lengths, determined by the AIC criterion, e = error term in equation (1)' for cointegration, Δ = first difference, t = time subscript, and EC_{t-1} = error-correction term in VECM (1)" Likewise, for base equation (2), they are respectively specified as follows:

$$\Delta \ln PO_t = \alpha_0 + \alpha_1 i \sum_{i=1}^{K} \Delta lnPO_{t-i} + \alpha_{2i} \sum_{t=1}^{m} \Delta lnY_{t-i} + \beta_1 lnPO_{t-1} + \beta_2 lnY_{t-1} + u_t(2)'$$

Null hypothesis of no cointegration (H_0): $\beta_1 = \beta_2 = 0$
For alternative hypothesis of cointegration(H_a): $\beta_1 \neq \beta_2 \neq 0$

Here, the additional symbol u_t = error term.

The accompanying VECM is as follows:

$$\Delta lnPO_t = \beta_o + \beta_{1i} \sum_{i=1}^{k} \Delta lnPO_{t-i} + \beta_{2i} \sum_{i=1}^{m} \Delta lnY_{t-i} + \psi EC_{t-1} + Y_t(2)'$$

For base equation (3), they are respectively specified as follows:

$$\Delta \ln PO_t = \beta_o + \beta_{1i} \sum_{i=1}^{j} \Delta \ln PO_{t-i} + \beta_2 i \sum_{i=1}^{k} \Delta \ln SME_{t-i} + \beta_{3i} \sum_{i=1}^{m} \Delta AGF_{t-i} + \beta_{4i} + \sum_{i=1}^{n} \Delta NSME_{t-i} + \beta_1 lnPO_{t-1} + \beta_2 lnSME_{t-1} + \beta_3 \ln AGF_{t-1} + \beta_4 \ln NSMF_{t-1} + v_t(3)'$$

For null hypothesis of no cointegration (H_0): $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$
For alternate hypothesis of cointegration (H_a): $\beta_1 \# \beta_2 = \beta_3 = \beta_4 = 0$

The corresponding VECM is as follows:

$$\Delta \ln PO_t = \beta + \beta_{1i} \sum_{i=1}^{j} \Delta \ln PO_{t-i} + \beta_2 i \sum_{m}^{k} \Delta \ln SME_{t-i} + \beta_{3i} \sum_{t-i}^{m} \Delta AGF_{t-i} + \beta_{4i} \sum^{n} \Delta NSME_{t-i} + \beta_1 lnPO_{t-1} + \beta_2 lnSME_{t-1} + \beta_3 \ln AGF_{t-1} + \beta_4 \ln NSMF_{t-1} + \pi EC_{t-i} + \mu_t(3)''$$

To ascertain the nature of data distribution of each sample variable, the standard statistical descriptors include mean, median, standard deviation (SD), skewness, kurtosis and Jarque-Bera statistic. Their estimates are reported as follows:

As observed in Table 1, mean-to-median ratio of each variable is within the close proximity of unity. Standard deviation of each variable is reasonably quite low. Each variable is slightly skewed to the left. Kurtosis of each variable is below the cut-off numeric of 4.0 except for real GDP that reveals some excess peakedness. The Jarque-Bera statistics are seemingly reasonable and low. In light of the above, the overall inference is that all the variables clearly depict near-normal distribution.

Next, the time series properties of each variable are examined by implementing (ADF) and its counterpart (KPSS) tests. The results are reported as follows in Table 2:

**Significant at 1% and at 5% levels of significance respectively. The Mackinnon (1996) ADF critical values are −3.752946 and −2.998064 at 1% and 5% levels of significance respectively. The KPSS (Kwiatkowski et al., 1992) critical values are 0.73900 and 0.46300 at the aforementioned levels of significance, respectively (2).

In terms of both ADF and KPSS tests, each variable is nonstationary in comparison of the estimated numerical values with the critical values at 1% and 5% levels of significance, respectively.

The estimates of regression (1)' for cointegration are as follows:

$$\Delta ln_{Yt} = -0.150 + 0.228\Delta lnY_{t-1} - 0.115\Delta lnY_{t-2} + 0.266\Delta SMF_{t-1} + 0.923\Delta lnSMF_{t-2} + 2.117\Delta lnAGF_{t-1}$$
$$(-1.001) \quad (1.185) \quad (-0.895) \quad (0.524) \quad (1.895) \quad (4.800)$$
$$+0.974\Delta lnNSMF_{t-1} - 1.415lnY_{t-1} + 0.192lnSMF_{t-1} + 2.18lnAGF_{t-1} + 0.975lnNSMF_{t-1}$$
$$(1.165) \quad (-1.187) \quad (1.165) \quad (4.651) \quad (1.892)$$
$$\bar{R}^2 = 0.702, \text{ F} = 13.99, \text{ DW} = 1.945, \text{ AIC} = 0.469$$

The estimated coefficients of all variables in natural log levels with one-period lag are non-zeros, though some of their associated t-values deem insignificant. $\bar{R}^2$ at 0.702 is on a high side showing significant explanatory power. The calculated F-statistic at 13.99 is much higher than the upper-bound critical F-values of 6.0509 and 4.326, respectively at 1% and 5% levels of significance for K = 10. Thus, it is affirmed that the variables display I(1) behavior since they turn I (0) on first-differencing. Moreover, the AIC-value at 0.469 is abysmally low suggesting very good fitness of the estimated model with optimum lag-lengths. Moreover, DW-value indicates very mild positive autocorrelation.

Table 1: Descriptive statistics (1976-2023)

Variables	lnPO	lnY	lnSMF	lnAGF	lnNSMF
Mean	3.76	1.58	8.45	8.89	10.91
Median	3.89	1.73	8.50	9.23	10.91
SD	0.58	0.43	2.14	1.58	2.01
Skewness	−0.42	−2.19	−0.23	−0.97	−0.19
Kurtosis	1.93	8.65	2.03	3.24	2.03
Jarque-Bera	3.36	10.22	2.32	7.68	2.16

Table 2: Unit root tests

Variables	ADF (for unit root)	KPSS (for no unit root)
lnPO	−1.027*	0.889*
lnY	−3.751**	0.718*
lnSMF	−3.387**	0.901*
lnAGF	−4.0907**	0.831*
lnNSMF	−3.865**	0.694*

The estimates of VECM in equation (1)" are reported as follows:

$$\Delta ln_{Yt} = -1.482 + 0.415\Delta lnY_{t-1} + 0.613\Delta lnY_{t-2} + 0.925\Delta lnSMF_{t-1} + 1.381\Delta lnAGF_{t-1}$$
$$(-1.321) \quad (0.168) \quad (1.695) \quad (1.532) \quad (1.823)$$
$$+ 0.985\Delta lnNMSF_{t-1} - 1.415EC_{t-1}$$
$$(1.561) \quad (-5.923)$$
$$\bar{R}^2 = 0.757, \text{ F} = 15.961, \text{ DW} = 1.967, \text{ AIC} = 0.583$$

The estimates of the VECM show that the different types of financing considered in this study uniformly exert positive influences on real GDP in varying magnitudes and statistical significance in term of the associated t-values. $\bar{R}^2$ at 0.757 is quite high and so is F-statistic at 15.961, as a result. The DW-statistic at 1.967 indicates existence of very mild positive serial correlation. The AIC-value of 0.583 suggests goodness of fit of the estimated model. There is clear evidence of moderately net positive interactive feedback effect among the variables in term of the sum of the related numerical coefficients. The estimated coefficient of the error-correction term (EC_{t-1}) at −1.415 has the expected negative sign and is statistically highly significant in terms of the associated pseudo t-value at −5.923. The speed of adjustment for convergence toward long-run equilibrium is discernible.

The estimates of regression (2)' for cointegration are reported as follows:

$$\Delta lnPO_t = -0.031 + 1.585\,\Delta lnPO_{t-1} - 0.580\,\Delta lnPO_{t-2} - 0.003\,\Delta lnY_{t-1} - 0.001\Delta lnY_{t-2}$$
$$(-1.097) \quad (12.144) \quad (-4.361) \quad (-0.445) \quad (-0.141)$$
$$+ 0.684lnPO_{t-1} - 0.016lnY_{t-1}$$
$$(-3.970) \quad (-1.685)$$
$$\bar{R}^2 = 0.568, \text{ F} = 10.682, \text{ AIC} = -5.842, \text{ DW} = 1.949$$

The estimated coefficients of $\ln PO_{t-1}$ and $\ln Y_{t-1}$ in natural log-levels are non-zeros with differing associated t-values for moderate to weak statistical significance. There is evidence of very mild positive autocorrelation with DW-value at 1.949. The calculated F-value at 10.682 is much higher than the critical F-values for I(1) behavior at 6.1375 and 4.3788 at 1% and 5% levels of significance with K = 7. In other words, the variables are nonstationary in natural log-levels.

Estimates of ECM as in equation (2)" are reported as follows:

$$\Delta lnPO_t = -1.005 + 0.687\Delta lnPO_{t-1} + 0.092\Delta lnPO_{t-2} + 0.139\Delta LPO_{t-3} - 0.004\Delta lnY_{t-1}$$

(−1.383) (3.972) (0.433) (0.615) (0.444)

$-0.001\Delta lnY_{t-2} - 0.009EC_{t-1}$

(−0.142) (−1.146)

$\bar{R}^2 = 0.386$, F = 4.651, DW = 1.983, AIC = −5.155

The coefficient of the error-correction term EC_{t-1} has the expected negative sign and it is abysmally low at 0.009 with highly insignificant associated pseudo t-value. In other words, pace of adjustment toward the long-run equilibrium at best will be very tepid. Other coefficients are insignificant in term of the associated t-values. Thus, the net interactive feedback effect among the variables is weakly positive in term of the sum of the coefficients. $\bar{R}^2$ at 0.386 and F-statistic at 4.651 are relatively subdued. The DW-value at 1.983 suggests near-absence of serial correlation. The negative AIC-value amply affirms goodness of fit of the estimated model with optimum lag-lengths.

The estimates of regression (3)' for cointegration are reported as follows:

$\Delta lnPO_t = 0.497 + 0.425\Delta lnPO_{t-1} - 0.036\Delta lnPO_{t-2} - 0.004\Delta lnSMF_{t-1} - 0.053\Delta lnSMF_{t-2}$

(1.469) (2.432) (−0.173) (−0.124) (−2.148)

$-0.019\Delta lnAGF_{t-1} - 0.015\Delta lnAGF_{t-1} - 0.015\Delta lnNSMF_{t-1} - 0.097\Delta lnNSMF_{t-2} - 0.092lnPO_{t-1}$

(−1.657) (−0.818) (−0.384) (−2.007) (−1.884)

$-0.019lnSMF_{t-1} - 0.015lnNSMF_{t-1}$

(−0.690) (0.384)

$\bar{R}^2 = 0.524$, F = 5.139, AIC = −5.875, DW = 2.027

As observed, the estimated coefficients of the variables in natural log-levels with one-log are non-zeros with insignificant associated t-values. The DW-value at 2.027 indicates presence of very modest negative autocorrection. $\bar{R}^2$ at 0.524 is relatively lower. The calculated F-statistics at 5.139 is higher than 4.3264 at 5% level significance, but less than 6.0509 at 1% level of significance for K = 10.

The estimates of VECM (3)" are reported as follows:

$\Delta lnPO_t = -0.006 - 0.530\Delta lnPO_{t-1} - 0.115\Delta lnPO_{t-2} - 0.027\Delta lnSMF_{t-1} - 0.0199\Delta lnAGF_{t-1}$

(−0.853) (−3.208) (−0.686) (−1.208) (−2.278)

$-0.024\Delta lnNSMF_{t-1} - 0.077EC_{t-1}$

(−0.687) (−4.136)

$\bar{R}^2 = 0.537$, F = 6.540, AIC = −5.971, DW = 2.084

$\bar{R}^2$ at 0.537 shows that different modes of financing, as considered in this paper, helps headcount poverty reduction by 53.7%. The computed F-statistic at 6.50 seems quite significant. The DW-value at 2.084 shows very mild negative autocorrelation. The negative AIC-numeric depicts that the estimated model is of very good fit with optimum lag-lengths. The estimated coefficient of the error-correction term EC_{t-1} has the expected negative sign being at 0.077. It is also statistically highly significant in term of the associated pseudo t-value at −4.136. This shows convergence towards the long-run equilibrium at a moderate pace, and the full convergence will tend to occur approximately in 13 years (1/0.077).

5. CONCLUSION AND BRIEF POLICY IMPLICATIONS

As evidenced from the estimates of the relevant vector error-correction models (VECMs) in this study, SME, non-SME, and agricultural financing positively contribute to real GDP growth that in turn helps headcount poverty alleviation in Bangladesh. Comparatively, these entitles play more direct role in poverty reduction. Finally, policy makers in Bangladesh should increase direct formal financing in the above modes aspiring for any further reduction in poverty.

To note, poverty becomes a more complex issue in Bangladesh when its severity intensifies during the periods of unpredictable natural disasters (floods and cyclones) in yearly monsoon season, rising political instability, geopolitical risk and macroeconomic vulnerability. Poverty is more prevalent and severe in rural areas than in urban areas. Rural people live below $2.15 purchasing power parity per day.

Inclusive economic growth strategy through enhanced financial inclusion of SMEs to narrow rural-urban imbalances in opportunities relating to employment and income sources is an imperative. To bring anti-poverty and pro-poor strategies to further fruition, a host of measures to be taken that may include (i) expansion of digital financial services, (ii) promotion of financial literacy and capacity building, (iii) credit guarantee schemes, (iv) further regulatory easing and policy reforms, (v) offering of peer-to-peer lending, crowdfunding, and microloans through mobile platforms, (vi) strengthening support for financial institutions focused on SME financing, (vii) promotion of public-private partnership, (viii) development of SME- targeted microloan, feasible factoring and leasing financing options, (ix) allowing SMEs to use movable assets as collateral, and (x) providing better access to funding, training and marketing assistance. More importantly, people at risk need early interventions so that they do not fall in an abject poverty trap. To add further, such lessons can be drawn from the practicing models of Brazil, China, India, Indonesia, Malaysia, Mexico, Sri Lanka, and South Korea.

In closing, the focus of this study has been on as how to advance further mitigation of monetary headcount poverty in Bangladesh. The most commonly used measure of poverty is unidimensional, though poverty is quite likely to be multidimensional. Addressing this issue, in itself, may be a possible extension of this current empirical endeavor.

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