Are microcredits to agriculture sectors of sub-continent co-integrated?

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Abstract. The question of microcredit loan is one of an important question in microfinance since the borrowers are predominantly the poor and the lower income group, where most of them are self-employed and without having any collateral assets. This research has been conducted in order to identify whether the microcredit to agriculture sector of sub-continent co-integrated? For investigating the proposition of this paper the annual observations for microcredit for agriculture sectors of Pakistan, India and Bangladesh for last 30 years (from 1990-2020) have been collected from central banks of respective countries websites. Johenson Cointegration analysis has been employed to determine the long term association in microcredit's to agriculture sectors of subcontinent. Findings confirmed that there is a long term association exists in microcredit to agriculture sectors of Pakistan, India and Bangladesh.

1 Introduction

In the 1970's the World Bank added massive amounts for microfinance credit programs to the flow of external resources. Also, the Inter-American Development Bank actively supported microfinance credit programs. FAO promoted rural credit through technical assistance, studies, publications, seminars, and a world conference on microfinance credit in 1975. The FAO has also helped establish regional associations of microfinance credit institutions. [1] has strongly influenced the views of policy makers on the role of financial intermediation. Patrick proposed the demand-following and supply-leading approaches to the provision of credit. His discussion of the advantages of supply-leading finance provided a theoretical basis for increased government involvement in rural credit systems, and in donor support for these activities. In the demand-following approach the growth of financial institutions is a result of increased demand for their services.

In many developing countries financial institutions may not be able to respond automatically, flexibly, or inexpensively to increased demand. Market imperfections may result in an inadequate response which inhibits growth processes. Advocates of this

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approach believe that supply-leading finance has the potential to induce real growth through improved access to financial services.

The question of microcredit loan is one of an important question in microfinance since the borrowers are predominantly the poor and the lower income group, where most of them are self-employed and without having any collateral assets. Their lack of financial records, limited credit history and lack of assets for collateral has made lending to them not only costly but also very risky since it involves high screening, monitoring and enforcement costs [2]. This elaborates why it is practically unexecutable to acquire credit from financial organizations. Thus, researchers find that despite the argument that financial services should be inclusive to all levels of society, the poor and the lower income group usually find it very hard to have access to credit from the formal financial sector.

There was a developing perception in the late 1960's and early 1970's, that financial markets could play an active role in economic development. The work of [3] argued that financial market operations and policies could influence its pace and direction. [1] note that in the early 1950's the predecessor of the United States Agency for International Development began a series of farm credit programs; this marked the beginning of commitments to this type of program by donor agencies and international lending institutions.

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In this view, the evolution of the financial system is a result of economic development. The supply response of financial institutions is expected to occur automatically. It is assumed that financial institutions will expand sufficiently to accommodate the demand for their services. Furthermore, it is assumed that all the financial institutions operate in favorable legal, institutional, and economic environments. Supply-leading finance requires the creation of financial institutions where there is an inadequate response by the existing financial system.

In many developing countries financial institutions may not be able to respond automatically, flexibly, or inexpensively to increased demand. Market imperfections may result in an inadequate response which inhibits growth processes. Advocates of this approach believe that supply-leading finance has the potential to induce real growth through improved access to financial services.

The prime objective of this paper was to investigate the long term association in microcredits to agriculture sectors of subcontinent.

The question of microcredit loan to agriculture sectors is one of an important question in microfinance since the borrowers are predominantly the poor and the lower income group, where most of them are self-employed and without having any collateral assets. Their lack of financial records, limited credit history and lack of assets for collateral has made lending to them not only costly but also very risky since it involves high screening, monitoring and enforcement costs [4,5]. This study is an attempt to investigate the cointegration between the microcredits to agriculture sectors of Pakistan, India and

Bangladesh when the poor and the lower income groups of subcontinent, usually find it very hard to have access to credit from the formal financial sector.

2 Literature review

Microcredit is meant for the provision of small loans. These loans are offered to poor and low-income populations existing in rural areas and urban slums [6]. Conventionally, microcredit was focused on the provision of small loans for financially weak economic units, businesses and individuals.

The need for microfinance institutions stemmed from the failure of typical commercial banks that could not cater this segment of population. The mainstream financial service institutions like banks were reluctant to extend credit given to poor documentary evidence of collaterals provide by the target microcredit groups [7]. Since, the institutional policies of commercial banks set a minimum benchmark of documentation, little or no support was provided to people coming from lower-income strata of society.

In the conventional microfinance setup, informal groups mobilize financial resources through various programs aimed at financing the poor. These programs usually take the form of group financing, in which credit contracts are made to facilitate borrowers under a joint consigner account. As a result, the group liability makes each group individual accountable for the total contract, leaving little incentive to default. Monitoring takes place under information asymmetries of borrowers and lenders [8]. This kind of self-operating and monitoring credit system lends itself to a low cost of loan services on part of microcredit organizations..

The contemporary microfinance movement in South Asia can be traced to the development of microfinance institutions in Bangladesh during the early 1970s. The remarkable growth rates and results of microfinance banks during 1990s opened up new avenues and potentials fro microfinance institutions for million of clients [3].

In the late 1990s, a large amount of low-income population in Bangladesh was served by one of the financial services of microcredit. India followed the suit and relied on self-help groups or SHGs to unleash the potential of its microfinance sector. Other countries in the region, like Pakistan and Sri Lanka have also established and carried institutional frameworks for developing their microfinance sectors [6].

The economic significance of microcredit system in subcontinent rests on the fact that most of the region is struck by chronic poverty. From the independence of India and Pakistan to date, poverty and inflation remain the chief concerns and barriers to economic development [3]. In this connection, raising entrepreneurship could serve as a key driver of economic growth and sustainability in these countries. Microcredit is one way which might greatly help in directing entrepreneurship in these countries.

The developing countries in South Asia underwent significant financial development and reforms during the 1990s. However, the depth and pace of the reforms had not been consistent. In contrast, some of the far eastern countries like Japan implemented their reforms using well planned reform packages and provided strong safety nets using regulatory restructuring. The said countries opted for quick way to financial liberalization so that strong gains can be acheived as compared to the countries in South Asia. On the other hand, countries in South Asia registered a high inflow of foreign capital in the region in the absence of any formal guarantees. The negligence turned out dangerous in 1997, when the market sentiments changed drastically. The capital took flights off the region, collapsing the local markets to the previous levels. The stock markets and real estate sector in India and Pakistan suffered in the late 1990s and early 2000s [6].

Microfinance regulation in subcontinent varies across different regions. While India and Bangladesh have stringent regulatory frameworks for microfinance institutions, Pakistan relies extensively on informal microfinance actors like donors and local landlords [9].

The Human Development Report published by UNDP in 1998 ranked Pakistan in lower strata of developing countries. In its different categories the report ranked Pakistan 138 out of 174 in overall HDI index. In terms of Gender Development, Pakistan stood on 131 out of 162. In terms of Gender Empowerment, Pakistan stood on 100 out of 102 [4].

In South Asia, microcredit is recognized an ideal means to alleviate poverty across rural areas. Moreover, microcredit programs are aimed at empowering weaker economic units such as women and illiterate. In India and Bangladesh, for example, microcredit programs have taken help from public-private partnership, enabling credit to farmers, peasants and small businesses.

While few schemes are countrywide, others function with in the different areas of the country. The prominent MCI in Bangladesh is GB. Nevertheless, funding constraints, coupled with expansion and competition within the finance system of Bangladesh, has given remarkable growth opportunities for the microfinance institutions [10]. For instance, a premier microcredit organization named ASA (Association for Social Advancement), that started 1991, has reached a dominant MCI status, especially as it relates to the amount of loan disbursement and the number of loan beneficiaries. Likewise, an NGO named Proshikha has performed exceptionally well during the decade of 1990s, with an approximate customer base of over 2.8 million in 2001 [11].

In Bangladesh, there are been many institutional arrangements to cater the needs of microcredit. Consequently, the MCI number has crossed over 1000 at the onset of twenty first century [12]. Microcredit programs, unlike tradition business financing, came as a means to alleviate poverty in the less unexplored business sectors. According to [8] microcredit took momentum in the 1970s and 1990s. The Micro Credit Summit in 1997 held that enabling small credit was a key driver to reduce economic dependence of less active economic agents. The summit garnered a USD 21.6 billion investment to support microcredit in India and Bangladesh. In South Asian countries, this form of credit is getting strong recognition in light of its significance to provide easy financial access to some of the world's most poverty stricken areas and communities. In fact, the 2006 Nobel Peace Prize to the founder of Grameen Bank, Muhammad Yunus, testifies that the world appreciates the promising success that microcredit holds [9].

By the year 2005, Microfinance reach relatively 35 million of nearly 270 million families in the district and met about 15 percent of the total credit demand of low-wage families. Scope was distinctly exceptional in Srilanka and Bangladesh, where microfinance benefits more than 60 percent of the poor people. In addition, the focus on engaging women as essential contributors to economic and social well being has had important spillover effects throughout the region. Microfinance is not only a domain of a highly democratic country like India, where the SHG movement sowed the seeds of promoting and developing the microfinance infrastructure. Less politically stable and socially conservative countries like Afghanistan have entered the race. Here, microfinance activities are focusing on financially empowering women and other economically disadvantaged groups [12].

In financial and economic statistics, cointegration is used as a property which describes the long run relationships of a given economic time series [13]. Cointegration helps us identify whether any long-run relationship exist between a set of non-stationary variables, like interest rates and credit volumes. Most of the empirical research conducted on the subject matter on financial cointegration addresses interest rates and stock prices as non-stationary variables. The reason for an extensive literature on these specific variables is that these broader financial health indicators are reflected in narrower financial channels like microcredit and microfinance.

Cointegration models in finance are indeed a significant theoretical innovation in econometrics in that the models are called for much research orientation. Economists have built upon a lot of evidence to explore their potential. In the basic sense, cointegration theory states that a time 2 series x_t and y_t is cointegrated in order one given follow a stationary process. To put it more simply, a time series $x = (x_t)$ is integrated in a specific order 'd', and follows a notation $x \sim I(d)$ when it turns out to be stationary differencing d times [10]. Contegration theory turned out to be an important contribution in time series when it was discovered that a large number of economic series followed its application. Hence, the theory proved true in most instances. Applying the Engle and Granger co integration test might allow researchers to find evidence of co integration among the microcredit markets of different regions or countries.

There is some literature that suggests that markets in South Asia are somewhat interlinked. That is, trends in prices and interest rates would follow same for countries in the region. Trade linkages, such as those in Europe and America, followed a pre-determinable trend. Likewise, financial linkages also been established, thereby implying contagion within these regions and elsewhere. In a similar case, if a financial market in India would dictate its shocks in other countries in the region, Pakistan and Bangladesh, for example. The investor behavior that depicts certain risks in country 'A' determines the investor behavior in country 'B'. The regional dynamic of financial portfolios risks management have certain commonalities. In other words, a financial mood in one country is reflected positively and negative in the financial mode of the other country within the.

Changes in the investor sentiments are also important drivers of financial crisis. This would mean that a country with a weaker financial market is vulnerable to even minute financial market shocks. Speculative attacks by a regional player is therefore be responded by even severe speculative behaviors. In all, the market variables follow a certain common direction within which all institutions are interlinked [13].

The point has not been reached yet, although in India some banks are already testing its limits. As long as engagement with low-income clients in South Asia, and particularly sub-continent, is largely a matter of social responsibility, financial inclusion remain a dream [12].

2.1 Hypothesis

H1: There the long term association in microcredits to agriculture sectors of subcontinent (there is Pakistan, India and Bangladesh).

3 Research Methods

This research has been conducted in order to identify whether the microcredits to agriculture sector co-integrated with each other for subcontinent? For investigating te proposition of this paper the annual observations for microcredits for agriculture sectors of Pakistan, India and Bangladesh for 30 years (from 1990-2020) have been collected from respective countries central banks' websites. Johanson Cointegration analysis has been employed to determine the long term association in the microcredits to agriculture sectors of outlined nations.

4 Results and Findings

4.1 Findings and Interpretation of Results

The final step for the Johansen-Juselius cointegration test is to determine the number of cointegration vectors. The cointegration test is sensitive to the presence of deterministic trends. These are: (1) no deterministic trends in the VAR and the cointegrating relationship has no intercept and no trend; (2) no deterministic trends in the VAR and the cointegrating relationship has an intercept and no trend; (3) linear trend in the VAR and the cointegrating relationship only has an intercept; (4) linear trend in the VAR and the cointegrating relationship only has a deterministic trend; and (5) a quadratic trend in the VAR and the cointegrating relationship has a linear deterministic trend.

Table 1. Linear Deterministic Trend (India – Pakistan).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.912938	28.69379	15.49471	0.0003
At most 1	0.154137	1.841372	3.841466	0.1748
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.912938	26.85242	14.26460	0.0003
At most 1	0.154137	1.841372	3.841466	0.1748

Table 2. Linear Deterministic Trend (India – Bangladesh).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.600862	10.25356	15.49471	0.2617
At most 1	0.013602	0.150646	3.841466	0.6979
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.600862	10.10292	14.26460	0.2053
At most 1	0.013602	0.150646	3.841466	0.6979

The above table presents detailed results of cointegration among micro credit of India and Pakistan including the trace test and the max-eigenvalue test at the 5% significance level. From Table 1, both the trace and max-eigenvalue tests support one cointegrating vector at the 5% significance level as the sig value is less than 0.05.

The above table presents detailed results of cointegration among micro credit of India and Bangladesh including the trace test and the max-eigenvalue test at the 5% significance level. From Table 2, both the trace and max-eigenvalue tests does not support any cointegrating vector at the 5% significance level as the sig value is greater than 0.05.

The above table presents detailed results of cointegration among micro credit of Pakistan and Bangladesh including the trace test and the max-eigenvalue test at the 5% significance level. From Table 4, both the trace and max-eigenvalue tests support more than one cointegrating vector at the 5% significance level as the sig value is lesser than 0.05.

Table 3. Linear Deterministic Trend (India – Sri-Lanka).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.409074	9.428509	15.49471	0.3272
At most 1	0.281846	3.641791	3.841466	0.0563
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.409074	5.786718	14.26460	0.6407
At most 1	0.281846	3.641791	3.841466	0.0563

The above table presents detailed results of cointegration among micro credit of India and Srilanka including the trace test and the max-eigenvalue test at the 5% significance level. From Table 3, both the trace and max-eigenvalue tests does not support any cointegrating vector at the 5% significance level as the sig value is greater than 0.05.

Table 4. Linear Deterministic Trend (India – Sri-Lanka).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.576649	14.45321	15.49471	0.0713
At most 1	0.365156	4.998132	3.841466	0.0254
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.576649	9.455079	14.26460	0.2502
At most 1	0.365156	4.998132	3.841466	0.0254

Table 5. Linear Deterministic Trend (Pakistan – Sri-Lanka).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.414534	6.956293	15.49471	0.5827
At most 1	0.092483	1.067469	3.841466	0.3015
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.414534	5.888824	14.26460	0.6275
At most 1	0.092483	1.067469	3.841466	0.3015

The above table presents detailed results of cointegration among micro credit of Pakistan and Sri-Lanka including the trace test and the max-eigenvalue test at the 5% significance level. From Table 5, both the trace and max-eigenvalue tests does not support any cointegrating vector at the 5% significance level as the sig value is greater than 0.05.

The above table presents detailed results of cointegration among micro credit of Bangladesh and Sri-Lanka including the trace test and the max-eigenvalue test at the 5% significance level. From Table 6, both the trace and max-eigenvalue tests does not support any cointegrating vector at the 5% significance level as the sig value is greater than 0.05.

Table 6. Linear Deterministic Trend (Bangladesh – Sri-Lanka)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.386870	8.154848	15.49471	0.4490
At most 1	0.222889	2.773893	3.841466	0.0958
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.386870	5.380955	14.26460	0.6932
At most 1	0.222889	2.773893	3.841466	0.0958

5 Discussions & Conclusion

This research has been conducted in order to identify whether the microcredit to agriculture of sub-continent co-integrated?. The result indicated that there is a long term relationship exists in microcredit to agriculture sectors of subcontinent in the context of India, Pakistan and Bangladesh as the whole. The arguments and the statistical evidence presented in the preceding heading support the conclusions that for most of the pair of outlined time series are comoved with each other.

The econometric results appear to reinforce the set of rules, economic policies, controls, and institutions development. Time series analysis suggests that the emergence of derivatives was not sufficient to break the long-term relationship between macro financial patterns for agriculture sector. The cointegration analysis yielded a large, positive, and statistically significant coefficient for agriculture microcredit's patterns among countries in subcontinent. This result is also consistent with other empirical findings in the literature that pin down some inconsistencies between the countries under study.

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