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# Contribution of Microfinance to the Gross Domestic Product (GDP) of Bangladesh

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# Abstract

Microfinance has at this point spread throughout the length and breadth of rural Bangladesh,covering more than half of the rural population. As per a recent study, somewhere in the rangeof 55 percent of rural households have taken microfinance at some stage in their lives, and almost 46 percent of households hold the status of current borrowers (as of 2010).With such huge expansion, microfinance is bound to have direct and indirect repercussion on the overall economy. Microfinance is believed to be contributing to the integration of the rural financial sector and stimulating the economy through microcredit and saving programmes. Our study found that the contribution of microfinance to GDP in Bangladesh in 2012 was between 8.9 percent and 11.9 percent depending on the assumption of the labor market. Furthermore, the contribution of rural microfinance to rural GDP in Bangladesh in 2012 was between 12.6 percent and 16.6 percent depending on the assumption of the labor market. However, such estimation is subject to underestimation due to two major reasons: (i) the model didn't consider underemployment, and the labor market adjustments compensate some of the negative effects generating from withdrawing of MFI-capital; and (ii) the share of the rural GDP might be lower than 60 percent as very high urban income are not usually captured by household survey; and this would imply that the contribution of rural microfinance to rural GDP in Bangladesh would be higher than what we have reported here.



**Key Words:** Contribution of Microfinance, GDP, Labar Market, Rural Microfinance

# Contribution of Microfinance to the Gross Domestic Product (GDP) of Bangladesh

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## 1. Introduction

Microfinance has at this point spread throughout the length and breadth of rural Bangladesh, covering more than half of the rural population. As per a recent study, somewhere in the range of 55 percent of rural households have taken microfinance at some stage in their lives, and almost 46 percent of households hold the status of current borrowers (as of 2010).[1] With such huge expansion, microfinance is bound to have direct and indirect repercussion on the overall economy. Microfinance is believed to be contributing to the integration of the rural financial sector and stimulating the economy through micro credit and saving programmes. While a considerable amount of scholarly effort has been expended in the last couple of decades to evaluate the effect of microfinance on the welfare of the borrowers – regarding their income, consumption and poverty – relatively little effort has been made to look at the economy-wide impacts – in particular, the impact on national income.

Most of the available studies have been partial equilibrium in nature, and therefore fail to capture the indirect and induced effects of microfinance on the national economy. The present study seeks to overcome this limitation by employing a general equilibrium framework to estimate the contribution of microfinance to the GDP of Bangladesh. For this purpose, the study uses a computable general equilibrium (CGE) model based on an updated version of the Social Accounting Matrix (SAM) of Bangladesh with the base year of 2012. The model is simulated to derive a measure of GDP that would have obtained in Bangladesh in the counterfactual scenario in which there were no microfinance at all. The difference between this counterfactual GDP and the actual GDP is taken as the contribution of microfinance to GDP. Our estimates suggest that microfinance has contributed at least 9-12 per cent to the GDP of Bangladesh.

The rest of the paper is organized as follows. Section II provides an overview of the microfinance sector in Bangladesh so as to set the context in which modelling exercise has been undertaken later in the paper. Section III undertakes an analytical review of the existing literature on the macroeconomic impact of microfinance with a view to extracting some lessons for our own modelling exercise. Section IV explains the methodology and modelling

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[1] See Osmani et al. (2015). This study was based on a nationally representative household survey covering the whole or rural Bangladesh and was carried out in 2010 by the Institute of Microfinance in Dhaka.

assumptions adopted in this study. Section V presents the results; and finally some concluding remarks are offered in section VI.

## 2. Overview of the Microfinance Programme in Bangladesh

The microfinance sector in Bangladesh has undergone some major transformations over the past two decades. Microfinance institutions (MFIs) started as non-government voluntary social organizations with the basic objective of providing microcredit services to the poor households. Grameen Bank started formally in 1983 under the Grameen Bank Ordinance. This led to the large-scale growth of the MFIs. These MFIs, once known as non-government organizations, are now licensed and regulated by the Microcredit Regulatory Authority (MRA) established in 2006. Some 740 MFIs are now licensed. All these institutions including Grameen Bank have been operating with a network of around 19 thousand branches; over 250,000 employees operate in this sector (CDF 2014).

Although Bangladesh has a long history of microfinance since 1978, the sector essentially took off with the establishment of PKSF *(Palli Karma Shayak Foundation)* in 1992 (Faruqee and Badruddoza 2013). Since microfinance services are provided in a manner that minimizes the risk of default despite the absence of collateral, increasingly a number of commercial banks to come forward to finance microfinance operations through wholesale lending to MFIs. Banks are now an important provider of external fund. However, member savings and reserves (generated out of surplus) remain the major source of financing of the total assets held by the MFIs.

In Bangladesh, from its very inception, access to finance including savings and credit has been recognized as essential pre-requisites for alleviating poverty. The Grameen Bank model contained in 1983 the elements of access to microcredit and compulsory weekly savings (Khandker *et al*. 1996). The underlying philosophy was that increasing financial savings is essential for the success of microfinance. In order to enhance the savings rate, the act of saving was invariably linked with micro lending. Following the devastating flood of 1988 and 1998, flexible savings schemes were introduced. The BRAC model, initially experimented in Sylhet, also emphasized savings. The greater emphasis on member savings was based on the notion that access to own savings will reduce dependency on microcredit.

All the MFIs have followed essentially the same ‘microfinance’ model. However, with the increase in loan size and volume of loans, many MFIs have introduced informal micro insurance scheme. This has been in place from the beginning of 2000. Originally it was intended to be credit risk insurance. Under the scheme, on the event of death of a borrower, MFI will waive repayment of loan outstanding and will contribute to burial expenses. In recent years, some specific insurance products like livestock and accident as well health have been introduced. There is no specific model with fixed premium. Recently, PKSF has introduced on pilot basis livestock insurance whose premium is based on scientifically determined mortality chart. Under this scheme, borrower is compensated with the amount of sum insured in case of death or loss of livestock. With the introduction of micro insurance, the microfinance model currently contains elements of credit, savings and insurance.

MFIs started their journey with providing micro loan of Tk.1,000; today, they provide loans as high as Taka one million. They operate in almost all parts of the country with the exception of some inaccessible char and hilly areas. Table 1 shows the outreach of MFIs operating in Bangladesh over the period 1996-2014.[2] The microfinance sector shows a shift in outreach, in terms of growth, from 2006. An exponential expansion has occurred since 2006 in terms of membership mobilized, annual loans disbursed, loans outstanding and net savings (Table 1). Membership increased rapidly since 2006, reaching the figure if 34 million by 2014. Compared to the period 1996-2000, average annual number of members during the period 2011-14 was 3 times higher; average annual loans disbursement increased by almost 15 times; and average net savings increased by 17 times.

While the number of members decreased marginally during the period 2011-15, an increase in loans disbursement and net savings suggest that average loan size and average savings per member has increased. Average loan size increased from Tk. 4,812 in 1996 to Tk. 24,243 in 2014. Similarly, average net savings increased by over six times over the past 10 years from Tk. 1000 in 2005. Such an increase in savings mobilization has reduced dependency of the MFIs on external finance; by the end of 2014, net savings constituted 55 percent of loans outstanding. It has also strengthened the capability of borrowing households to invest in productive activities, and has better equipped them to cope with shocks. In a recent study it has been shown that households with access to savings have higher probability of being out of poverty (Khalily *et al*. 2015).

**Table 1: Average Outreach of MFIs, 1996-2014**
(Taka in million)

| Period | Number of Members | Annual Disbursement (Tk) | Loans Outstanding (Tk) | Net Savings (Tk) |
|---|---|---|---|---|
| 1996-2000 | 10,974,659 | 36,533 | 24,387 | 11,163 |
| 2001-2005 | 18,595,932 | 84,810 | 55,234 | 33,335 |
| 2006-2010 | 33,004,304 | 290,973 | 155,422 | 108,031 |
| 2011-2014 | 32,839,003 | 538,112 | 337,220 | 190,997 |
| **Source:** CDF (1996-2014), MRA (2006-2013) | | | | |

A growing body of evidence shows that increased access to credit and savings has had a positive impact on poverty alleviation, income, and return on investment. Khandker et al. (2015) have recently shown that with access to credit alone, some 2.5 million households graduated sustainably from poverty by the end of 2010. With increasing loan size and access to non-financial services offered by the MFIs, the number of graduating households and the rate of poverty reduction would be even higher. This is demonstrated in Osmani (2015), which shows that by sustainably improving the wealth level of borrowers microfinance has contributed to 29 percent reduction in poverty compared to the counterfactual scenario in which there is no microfinance at all. Khalily and his colleagues (2014) have shown that households with access

[2] A more detailed picture is offered in Appendix Table A.1.

to credit and non-financial interventions like training and health services had higher rate (over 40 percent) of graduation from extreme poverty than the counterfactual groups with access to microcredit alone in *monga-affected* areas. It is instructive to note that all of the recent studies mentioned above reveal a much higher level of impact of microfinance on poverty reduction compared to the studies prior to 2010 (for example, Zohir *et al*. 2001; Rahman *et al*. 2005; Khandker *et al*. 1998).

The reasons for bigger impact found in more recent studies can be traced to some of the transformations that have occurred in the microfinance sector in recent years. These transformations relate to rising loan size, changing loan use pattern, and provision of non-financial services, among others.

(a) Loan size: The emergence of Microcredit Regulatory Authority (MRA) has changed the structure of the microfinance market in a significant way. While more active regulation has imposed a cost on the licensed MFIs, on the positive side the MRA has allowed them to lend as high as 50 per cent of the loanable fund. This has enabled the MFIs to offer large loans for micro enterprises. For example, in 2014, 28 percent of the loans disbursement was accounted for by micro enterprises. A similar pattern was also observed for 2012 and 2013. Although one may argue about a possible drifting of the MFIs from their social mission of poverty alleviation, financing micro enterprises has been linked to inclusive economic growth including creating employment opportunities. Muneer and Khalily (2015) showed that these enterprises generated average economic returns of 64 percent, and created around two full time employments per micro enterprise. They further showed that it has also had a positive impact on total factor productivity.[3] Considering the number of micro enterprises and income generating activities of microcredit borrowers, it has been estimated that some 10 million new employments have been created.

(b) Loan use: Loans that are offered by MFIs are utilized by borrowers for multiple purposes. Because of the fungibility of funds, it is very difficult to trace out the actual use of borrowed funds. Nevertheless, Bangladesh Microfinance Statistics (2014) provides some information on the uses of borrowed funds as stated by the borrowers. Drawing from this source, Table 2 shows the distribution of microcredit by purpose.

Table 2 shows that around 45 per cent of the loans were intended for productive purposes. More reliable estimates of actual uses can be derived from household level survey. Based on nationally representative household surveys, Osmani et al. (2015) showed that around 48 percent of loans were used for productive purposes excluding housebuilding and Khalily et al. (2015) estimated this to be 47 percent. In the early stage of microfinance development in Bangladesh, by far the major part of the microcredit was used for off-farm economic enterprises, with very little of it going to agriculture. This has changed dramatically in the recent years. During the past three years (2012-14), more than 25 percent of the loans were used for agriculture – most of it for crops cultivation (Table 2).[4]

[3] Similar results were also reported by Osmani (2015) and Khandker *et al*. (2013).

[4] Similar figures were also reported in Khalily *et al*. (2015) and Osmani *et al*. (2014).

**Table 2: Distribution of Loans Disbursed by Stated Purpose, 2012-14**
(Taka in million)

| Description | 2014 | Percent | 2013 | Percent | 2012 | Percent |
|---|---|---|---|---|---|---|
| Agriculture: | | | | | | |
| Crops | 216.97 | 18.65 | 192.22 | 18.79 | 130.11 | 19.29 |
| Fisheries | 22.39 | 1.93 | 20.09 | 1.96 | 22.86 | 3.39 |
| Livestock | 64.15 | 5.52 | 52.78 | 5.16 | 21.57 | 3.20 |
| Total | 303.51 | 26.10 | 265.09 | 25.91 | 174.54 | 25.88 |
| Cottage industries | 10.89 | 0.94 | 10.83 | 1.06 | 10.06 | 1.49 |
| Trade & Communication | | | | | | |
| Small business | 186.01 | 15.99 | 163.64 | 15.99 | 86.65 | 12.85 |
| Transport | 19.49 | 1.68 | 18.56 | 1.81 | 7.88 | 1.17 |
| Total | 205.50 | 17.67 | 182.20 | 17.81 | 94.53 | 14.02 |
| Social Sector | | | | | | |
| Health | 2.56 | 0.22 | 3.47 | 0.34 | 5.69 | 0.84 |
| Education | 2.07 | 0.18 | 3.41 | 0.33 | 12.49 | 1.85 |
| Housing | 6.07 | 0.52 | 6.02 | 0.59 | 8.08 | 1.20 |
| Total | 10.70 | 0.92 | 12.90 | 1.26 | 26.26 | 3.89 |
| Others | 112.77 | 9.70 | 92.03 | 8.99 | 73.72 | 10.93 |
| Aggregate | 1163.08 | 100.00 | 1023.24 | 100.00 | 674.44 | 100.00 |
| **Source:** CDF (2014) | | | | | | |

(c) Non-financial services: It is widely recognized that microcredit alone cannot eliminate poverty because of the existence of deep-rooted structural poverty. A multi-pronged strategy is required involving education, housing and wealth accumulation. A small amount of credit may be a step towards poverty alleviation, but the impact of microcredit is magnified when the borrowers have necessary skills. In recognition of this complementarity between finance and skills, provision of relevant training has become an increasing important feature of the microfinance sector in Bangladesh. Although data is not available for all years on the number of members receiving training, recent statistics show that, on an average, every year more than two per cent of the members received training, more than 25 per cent of which was related to livestock and poultry (Table 3). Not all the MFIs are engaged in providing training because of the lack of appropriate infrastructure and low level of operations. Nonetheless, more than half the MFIs, including large and medium sized ones, provide training to its clients. It is plausible to argue that increased provision of training has raised the potency of microfinance in enhancing its impact on borrowers' income. This is evident from Khalily et al. (2014). They showed that non-financial interventions like training have contributed to gains of more than 15 per cent compared to microcredit without any training in the relevant areas of investment.

Because of the multi-dimensionality of poverty, anti-poverty interventions will also require provision for social or community development interventions, which will empower participating poor households, and ensure access to different socio-economic institutions. More than 74

percent of the MFIs are engaged in social development programs with major focus on education and related supports, water and sanitation, health and treatment, women empowerment and development. As a result, participation of microfinance members in these programs is quite high (CDF 2014).

**Table 3: Number of Members Received Training by Type, 2012-14**

| Major Types | 2012 | Percent | 2013 | Percent | 2014 | Percent |
|---|---|---|---|---|---|---|
| Agriculture | 158,620 | 22.43 | 450,272 | 32.12 | 195,526 | 25.01 |
| Livestock and poultry | 177,242 | 25.06 | 360,079 | 25.68 | 223,747 | 28.62 |
| Nursery | 15,456 | 2.19 | 62,617 | 4.47 | 14,771 | 1.89 |
| Tailoring | 34,368 | 4.86 | 62,619 | 4.47 | 25,833 | 3.30 |
| Driving | 832 | 0.12 | 51,299 | 3.66 | 5,839 | 0.75 |
| Handicrafts | 14,367 | 2.03 | 58,404 | 4.17 | 14,183 | 1.81 |
| Entrepreneur development | 106,550 | 15.07 | 269,314 | 19.21 | 197,733 | 25.29 |
| Others | 199,707 | 28.24 | 87,396 | 6.23 | 104,093 | 13.32 |
| **Total Training Receivers** | **707,142** | **100.00** | **1,402,000** | **100.00** | **781,725** | **100.00** |
| Training receivers as % of total members | 2.19 | | 4.38 | | 2.30 | |
| **Source:** CDF (2014) | | | | | | |

All the elements of the transformation of the microfinance sector described above have had a positive impact on the livelihoods of the borrowers. First, access to non-financial services has reduced vulnerability of the households and enabled them to earn higher income from their investments on a sustained basis. Second, higher average loan size has enabled households to invest in microenterprises, with higher returns. Third, significant presence of micro insurance has reduced adverse impact of negative shocks. Fourth, creation of multiple income sources through use of credit, savings and other occupational trainings has helped raise the level of income.

In brief, micro finance institutions provide diversified services. The sector is more matured. As discussed, with increasing access to finance and non-financial services, increasing share of micro enterprises, large loan size, differential impacts of access to finance to total factor productivity, the sector is likely to have significant impact on rural and aggregate economic growth. The present study seeks to quantify the magnitude of this impact in a systematic manner.

## 3. Review of Literature on the Macroeconomics of Microfinance

From the perspective of the literature on the relationship between finance and economic growth, there is a simple intuitive reason for taking the view that microfinance should in principle make a positive contribution towards the growth of national income. Research theoretical research as well as a growing body of empirical evidence lends strong support to the view that financial

development exerts a positive impact on economic growth.[5] By reducing the costs of information, enforcement and transaction, a well-functioning financial system promotes growth through a number of channels: viz., savings mobilization, provision of investment information, better monitoring/governance, risk management, and facilitation of exchange of goods and services. Since the spread of microfinance adds to the process of overall financial development by correcting a market failure at the lower end of the financial market, it stands to reason that growth of microfinance should facilitate economic growth.

This is not merely an inference based on the general empirical relationship between overall financial development and economic growth. There is also some emerging evidence specifically on the impact of microfinance itself. This literature recognizes that one of the problems in empirical testing of the relationship between microfinance (and finance in general) and economic growth is that causality can run both ways: just as the spread of microfinance can affect growth, there can also be a reverse causation from growth to the spread of microfinance.[6] The statistical methodologies employed to study the impact of microfinance on growth must be nuanced enough to be able to isolate the true effect of microfinance from the vitiating effect of reverse causation. The study by Masudova (2010) tried to do precisely that by employing the Granger causality test. Applying this test to cross-country data from 102 countries she found evidence that greater spread of microfinance helps achieve faster economic growth, although the strength of the impact depends (positively) on the underlying level of development of the economy. A more recent study applied the generalized method of moment to isolate out the effect of reverse causation, and found evidence for the growth-promoting effect of microfinance in a sample of 71 developing countries (Donou-Adonsou and Sylwester, 2015).

Despite such support from both theory and evidence, some critics of microfinance continue to remain highly skeptical about the growth-enhancing effect of microfinance. In fact, critics such as Bateman and Chang (2009) go so far as to suggest that while bringing a measure of short term relief to some of the poor people, microfinance may eventually prove to be a barrier to long-term sustainable development. Their argument seems to rest on two premises. First, the enterprises supported by microfinance (to the extent that microfinance supports enterprises at all rather than being diverted to unproductive uses) are inherently less efficient than larger enterprises supported by the mainstream financial market owing to the absence of scale economies and other reasons. Second, spread of microfinance is tantamount to diversion of funds from mainstream finance. Together, these two premises lead to the conclusion that spread of microfinance leads to less efficient use of resources overall and thus stymies economic growth. No evidence is adduced, however, to support either of the premises. In fact, the second premise is completely at odds with the current reality of the microfinance sector in Bangladesh in which, as noted in section II, some 55 per cent of outstanding loans are financed from within the sector itself – i.e., from the borrowers' savings.[7]

[5] For a comprehensive review of the relevant theory and evidence, see Levine (2005).

[6] For evidence on the existence of reverse causation, see Ahlin *et al*. (2011).

[7] In the case of Grameen Bank, the largest MFI in Bangladesh, internal savings in fact exceeds the amount of loan outsanding.

In contrast to the outlandish claims made by critics such as Bateman and Chang, a much more nuanced point has recently been made by a number of theoretical studies on the macroeconomics of microfinance. These studies have made a fairly compelling case for recognizing that in theory at least there may exist some channels through which microfinance may exert a negative effect on growth. The import of these studies is not to assert that microfinance will necessarily act as an impediment to growth but to alert us to the fact that there are multiple channels through which microfinance can affect growth and while some of those channels may transmit a positive impact (for example, those emphasized by the standard literature on finance and growth) some others may act as a conduit of negative impact. In so far as the negative channels operate in a particular empirical context, the potentially positive impact of microfinance may be attenuated to some extent, and may in extreme cases be completely offset.

An example of studies in this vein is that of Emerson and McGough (2010), which examines the impact of microfinance on growth via investment in human capital. In the standard literature, it is common to assume that by ensuring greater access to finance at reasonable cost, microfinance would enable poor households to spend more on the schooling of children, thereby contributing to the growth of human capital, which in turn would promote growth.[8] The study by Emerson and McGough, however, highlight the existence of a mechanism that may subvert this positive impact. Their argument is based on the premise that by raising the returns to household-based enterprises microfinance will also raise the opportunity cost of schooling. This will have the effect of discouraging parents from sending children to the school, even as greater access to credit encourages them to do so. Two conflicting forces would thus be in operation. The net effect is ambiguous. However, by building on models of household decision-making in the presence of microfinance, as developed by Wydick (1999) and Maldonadoa and González-Vega (2008), the authors show that there exists a range of microfinance amounts that would result in a net reduction of schooling, especially given the manner in which microfinance currently operates by demanding early and frequent repayment. The authors then postulates the existence of externalities in education to argue that even though the decision to reduce schooling may be beneficial for the borrowing households themselves, it might hurt overall economic growth.

The idea of conflicting effects operating through alternative channels is a recurring theme in other studies of this genre. An early example is the study by Ahlin and Jiang (2008), who examined the long-run effects of microfinance on development in an occupational choice model similar to that of Banerjee and Newman (1993). A crucial feature of this model is the distinction between self-employment and entrepreneurship. Assuming that entrepreneurship is more efficient than self-employment, the model postulates a hierarchy of three occupations characterized by three distinct technologies ranked by productivity and scale; in ascending order, they are subsistence, self-employment, and entrepreneurship. Given this framework,

[8] A whole genre of theories linking income distribution with growth has been developed in the last couple of decades based on this presumed relationship between access to credit and human capital formation. For an excellent review of the literature, see Voitchovsky (2009).

microfinance's contribution to national income would depend on the rate at which it enables the labour force to move up the occupational-cum-technological scale. The study asserts that given the nature of microfinance as it currently operates, its positive impact derives almost entirely from the graduation from subsistence to self-employment but hardly anything at all from the potentially much more productive graduation from self-employment to entrepreneurship. In fact, the model even allows for the possibility of a negative effect on the latter account when general equilibrium effects are considered. The negative effect can arise because of the impact on the wage rate. As the labour force moves from subsistence to self-employment, the wage rate would rise because of the reduction of labour supply in the market for wage labour. Higher wage rate in turn may reduce entrepreneurial profits and thereby cause attrition of unsuccessful entrepreneurs from the entrepreneurial class. This will have a negative effect on growth, which in extreme cases may even swamp the positive effect emanating from the transition from subsistence to self-employment with the help of microfinance.

The general equilibrium effect operating via the labour market is also the key for the study by Buera et al. (2012), who gave a quantitative assessment of both aggregative and distributional effect of microfinance focused on small businesses. They employed a general equilibrium model to capture the indirect effects of microfinance operating via the wage rae and used some empirical parameters drawn from the experience of microfinance in developing countries in order to derive their quantitative estimates. The theoretical framework identifies two channels through microfinance can affect national income – namely, total factor productivity (TFP) and capital accumulation. The study finds that the two routes can affect national income in opposite directions: the impact on TFP makes a positive contribution to GDP while the impact on capital accumulation makes a negative contribution. TFP rises by 4 percent, with the majority of the gain coming from a more efficient distribution of capital among entrepreneurs. At the same time, however, by inducing higher wages microfinance redistributes wealth from higher-ability entrepreneurs with higher saving rates to lower-productivity individuals with lower saving rates. As a result, aggregate saving rates fall, bringing down aggregate capital by 6 percent. This offsets most of the increase in TFP, and output increases by less than 2 per cent. In short, the positive impact of the increase in TFP is counterbalanced in part by lower capital accumulation resulting from the redistribution of income from high-savers to low-savers. Nevertheless, the vast majority of the population is positively affected through the increase in equilibrium wages. As a result, the redistributive impact of microfinance is found to be much stronger than its aggregative impact.

Thus, as in the model of Ahlin and Jiang, this model too postulates two potentially conflicting effects on national income. The channels through which microfinance is allowed to affect national income are very different in the two models, but in both cases the negative effect emanates from the general equilibrium effects of higher wages. It is important to note, however, that unlike in the model of Buera et al., the negative effect is not inevitable in the Ahlin-Jiang model. As microcredit enables the self-employment people to save and accumulate, it is possible that some of the self-employed would eventually graduate to the stage of entrepreneurs, which may conceivably offset any attrition effect emanating from higher wages.

In that case, the positive effect of a net increase in the entrepreneurial class would reinforce the positive effect of transition from subsistence to self-employment. The success of microfinance in improving national income would thus depend crucially on how well it enables the borrowers to save and accumulate.

It is clear from the preceding discussion that the macroeconomic effect of microfinance is a much more complicated issue than it is commonly believed. Just because access to microfinance enables borrowers to raise their own level of production, it would be facile to conclude that therefore microfinance would necessarily lead to higher national output. Equally, however, it would be facile to argue to the contrary – a lá Bateman and Chang, for example – that microfinance would necessarily impede growth by diverting resources to less efficient entrepreneurs. It is important to recognize that the spread of microfinance can affect national income through multiple channels, some of which are undoubtedly positive but some may be negative as well. The possible negative effects become especially evident when the general equilibrium effects are taken into account. This does not mean that all general equilibrium effects are negative, some may be positive too – for example, if higher level of borrowers' expenditure made possible by microfinance-generated higher income promotes greater production of goods and services in the rest of the economy through linkage effects, or if higher wage rate caused by microfinance induces entrepreneurs to adopt superior labour-saving technologies, an idea common in the literature on induced innovation but not considered at all in the models discussed above. The point remains valid, however, that the macroeconomic impact of microfinance cannot be reliably examined without embracing a general equilibrium approach. This is what motives the methodology adopted in the present study.

## 4. Methodology

In this section, we first provide a brief description of the structure and rationale of the computable general equilibrium (CGE) model used for the purpose of estimating the impact of microfinance on the GDP of Bangladesh. This is followed by a brief description of the Social Accounting Matrix (SAM) of Bangladesh that provides the empirical foundation of the model. We then discuss essential features of the structure of the economy that emerge from the SAM. Finally, we describe how microfinance was introduced into the CGE model and how the SAM was modified for this purpose.

### 4.1. The CGE Model

The CGE model is built using the PEP standard static model (Decaluwe et al, 2009) and with further developments and modifications. A representative firm in each industry maximizes profits subject to its production technology. The sectoral output follows a Leontief fixed coefficient production function. Each industry's value added consists of returns to composite labour and composite capital. Different categories of labour (and capital) are assumed to be imperfect substitutes of each other, but for the sake of analytical convenience the degree of substitution is assumed to be constant. As such both composite labour and composite capital

are aggregated following a CES (constant elasticity of substitution) technology. It is further assumed that intermediate inputs are perfectly complementary; as such, they are combined following a Leontief production function.

Household incomes come from labor income, capital income, and transfers received from other agents. Subtracting direct taxes yields household's disposable income. Household savings are a linear function of disposable income, which allows the marginal propensity to save to differ from the average propensity. Corporate income consists of its share of capital income and of transfers received from other agents. Deducting business income taxes from total income yields the disposable income of each type of business. Likewise, business savings are the residual that remains after subtracting transfers to other agents from disposable income. The government draws its income from household and business income taxes, taxes on products and on imports, and other taxes on production. Income taxes for both households and businesses are described as a linear function of total income. The current government budget surplus or deficit (positive or negative savings) is the difference between its revenue and its expenditures. The latter consists of transfers to agents and current expenditures on goods and services. The rest of the world receives payments for the value of imports, part of the income of capital, and transfers from domestic agents. Foreign spending in the domestic economy consists of the value of exports and transfers to domestic agents. The difference between foreign receipts and spending is the amount of rest-of-the-world savings, which are equal in absolute value to the current account balance but are of opposite sign.

The demand for goods and services, whether domestically produced or imported, consists of household consumption demand, investment demand, demand by government, and demand as transport or trade margins. It is assumed that households have Stone–Geary utility functions (from which derives the Linear Expenditure System). Investment demand includes both gross fixed capital formation (GFCF) and changes in inventories.

Producers' supply behavior is represented by nested constant elasticity of transformation (CET) functions. On the upper level, aggregate output is allocated to individual products; on the lower level, the supply of each product is distributed between the domestic market and exports. The model departs from the pure form of the small-country hypothesis. A local producer can increase his share of the world market only by offering a price that is advantageous relative to the (exogenous) world price. The ease with which his share can be increased depends on the degree of substitutability of the proposed product for competing products; in other words, it depends on the price-elasticity of export demand. Commodities demanded on the domestic market are composite goods, combinations of locally produced goods and imports. The imperfect substitutability between the two is represented by a CES aggregator function. Naturally, for goods with no competition from imports, the demand for the composite commodity is the demand for the domestically produced good.

The system requires equilibrium between the supply and demand of each commodity on the domestic market. The sum of supplies of every commodity made by local producers must equal domestic demand for that locally produced commodity. Finally, supply to the export market of

each good must be matched by demand. Also, there is equilibrium between total demand for capital and its available supply. In the case of labour, the model assumes two alternative equilibrium rules: (a) equality between demand and supply of labor with no unemployment or (b) flexible supply of labor with fixed wage rates allowing for unemployment.

## 4.2. Brief Description of Social Account Matrix (SAM) of Bangladesh for 2012

A Social Accounting Matrix (SAM) is a generalization of the production relations and extends this information beyond the structure of production to include: (a) the distribution of value added to institutions generated by production activities; (b) formation of household and institutional income; (c) the pattern of consumption, savings and investment; (d) government revenue collection and associated expenditures and transactions; and (e) the role of the foreign sector in the formation of additional incomes for household and institutions. In particular, the accounting matrix of a SAM identifies the economic relations through six accounts: (1) total domestic supply of commodities; (2) activity accounts for producing sectors; (3) main factors of productions (e.g. labor types and capital); (4) current account transactions between main institutional agents such as-households and unincorporated capital, corporate enterprises, government and the rest of the world and the use of income by the representative households; (5) the rest of the world; and (6) one consolidated capital account (domestic and rest of the world) to capture the flows of savings and investment by institutions and the rest of the world respectively.

Social accounting matrices can serve two basic purposes: (i) as a comprehensive and consistent data system for descriptive analysis of the structure of the economy and (ii) as a basis for macroeconomic modeling. As a data framework, a SAM is a snapshot of a country at a point in time (Pyatt and Thorbecke 1976). To provide as comprehensive a picture of the structure of the economy as possible, a particular novelty of the SAM approach has been to bring together macroeconomic data (such as national accounts) and microeconomic data (such as household surveys), within a consistent framework. The second purpose of a SAM is the provision of a macroeconomic data framework for policy modeling. The framework of a SAM can often help in establishing the sequence of interactions between agents and accounts which are being modeled. A SAM provides an excellent framework for exploring both macroeconomic and multi-sectoral issues and is useful starting point for more complex models (Robinson, 1989).

The construction of 2012 SAM of Bangladesh is based on several data sets drawn from diverse sources. They are as follows: (i) the Input-output Table 2007; (ii) a Social Accounting Matrix for Bangladesh for 2007 developed by Raihan and Khondker (2010); (iii) the supply-use table of Bangladesh from ADB (2012); (iv) the input-output table from the GTAP database version 8; (v) data on various components of the demand side as collected from Bangladesh Bureau of Statistics (BBS)[9]; (vi) the matrix of private consumption data and the matrix of factor income

[9] In particular, data on public consumption, gross fixed capital formation, and private consumption have been obtained from BBS.

data are further distributed among two representative household groups using the unit record data of Household Income and Expenditure Survey of 2010; (vii) export and import data from UN COMTRADE and UN Service trade; (viii) information on direct and indirect taxes and subsidies has been collected from National Board of Revenue and the Finance division, Ministry of Finance.

The updating/construction procedure proceeded in two steps. In the first step, a 'proto-SAM' 2012 was constructed and other data collected from diverse sources. Since the data came from different sources, in line with the expectation, the estimated 'proto-SAM' was unbalanced especially in the 'institutional accounts'. In the second step, the SAM was balanced by adjusting the household accounts (i.e. private consumption and savings).

The 2012 SAM for Bangladesh has the following accounts: (1) total domestic supply of 10 commodities; (2) production accounts for 10 activities; (3) 4 factors of productions: two labor types and two capital categories; (4) current account transactions between 4 current institutional agents- households and unincorporated capital, corporate enterprises, government and the rest of the world; household account includes 2 representative groups (1 rural and 1 urban); and (5) one consolidated capital account. A summary description of the Bangladesh SAM is described in Table 4.

**Table 4: Description of Bangladesh SAM Accounts for 2012**

| Set | Description of Elements |
|---|---|
| Activity (10) | Grains and Crops, Livestock, Fisheries and Meat Products, Mining and Extraction, Processed Food, Textiles and Clothing, Light Manufacturing, Heavy Manufacturing, Utilities and Construction, Transport and Communication, Other Services |
| Commodity (10) | Grains and Crops, Livestock, Fisheries and Meat Products, Mining and Extraction, Processed Food, Textiles and Clothing, Light Manufacturing, Heavy Manufacturing, Utilities and Construction, Transport and Communication, Other Services |
| Factors of Production (4) | Unskilled labor, Skilled labor, Capital and Land |
| Households (2) | Rural Households and Urban Households |
| Other Institutions (4) | Government; Corporation; Rest of the World and Capital |
| **Source:** Bangladesh SAM 2012 from Raihan (2014) | |

## 4.3 The Structure of the Economy as in 2012 SAM

Table 5 presents the structure of the Bangladesh economy in 2012 as reflected in the SAM. In terms of value-addition, among the agricultural sectors, the leading sector is the grains and crops with 11.3 percent share. Among the manufacturing sectors, the leading sector is textile and clothing (7.6 percent share). Among the services sectors, the leading sector is transport and communication (27.7 percent share). The textile and clothing sector is highly export oriented. The export basket is highly concentrated as 88.1 percent of exports come from textile and clothing. The heavy manufacturing sector is highly import-dependent. In the case of tariff rate, agricultural sectors have much lower tariff rates than the manufacturing sectors.

**Table 5: Structure of the Bangladesh economy in 2012 as reflected in the SAM 2012**

| Sectors | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| | Vi/TV | Ei/Oi | Ei/TE | Mi/Oi | Mi/TM | TAR |
| Grains and Crops | 11.33 | 0.42 | 0.56 | 9.09 | 8.05 | 4.52 |
| Livestock, Fisheries and Meat Products | 1.25 | 0.07 | 0.01 | 2.25 | 0.25 | 8.22 |
| Mining and Extraction | 6.60 | 0.16 | 0.08 | 2.20 | 0.75 | 7.61 |
| Processed Food | 1.34 | 1.53 | 1.59 | 15.96 | 10.87 | 13.38 |
| Textiles and Clothing | 7.55 | 51.68 | 88.12 | 17.57 | 19.70 | 25.33 |
| Light Manufacturing | 1.74 | 2.41 | 1.44 | 20.83 | 8.22 | 19.59 |
| Heavy Manufacturing | 0.99 | 1.17 | 1.26 | 60.96 | 43.16 | 11.77 |
| Utilities and Construction | 16.86 | - | - | - | - | - |
| Transport and Communication | 27.65 | 2.87 | 6.30 | 2.42 | 3.49 | - |
| Other Services | 24.69 | 0.28 | 0.63 | 3.65 | 5.52 | - |
| Total | 100.00 | — | 100.00 | — | 100.00 | — |

**Note:** Vi=sectoral value added, TV=total value added, Ei=sectoral export, Oi=sectoral output, TE=total export, Mi=sectoral import, TM=total import, TAR=tariff rate, All figures are expressed in percentages.
**Source:** Raihan (2014)

## 4.4 Introducing Microfinance in the CGE Model

In this paper a simple but intuitive approach is adopted to introduce microfinance in the CGE model. An important assumption of this approach is that not all of microfinance contributes to the creation of GDP – only the part that helps build capital is relevant for this purpose. Thus the only relevant parts are (a) loans that are used for directly productive purposes, creating either fixed or working capital, and (b) loans that are used to build or augment the housing stock. These loans add to the GDP not only directly by enabling the borrowers to produce more goods and services (including housing services) but also indirectly through consumption linkages as the borrowers spend their enhanced income. By contrast, the amount of loans used for consumption purposes is not considered relevant for the creation of GDP. These loans will of course create additional output indirectly through consumption linkages, even though they do not create any output directly in the first round; however, these linkage effects will be cancelled out when the borrowers reduce their consumption at some stage to repay the loans. Therefore, a net positive effect on GDP can only emanate from the part of microfinance that is devoted to augmenting capital. On this assumption, a natural way of introducing microfinance in the CGE model is to enter it as a part of capital. Accordingly, we have modified the SAM so as to distinguish between MFI capital and non-MFI capital. Also, both the rural and urban households are split between MFI recipient households and non-MFI recipient households. Therefore, in the modified MFI-SAM, we now have four categories of households: rural MFI recipient households, rural non-MFI recipient households, urban MFI recipient households and urban non-MFI recipient households.

The process of splitting the capital stock between MFI capital and non-MFI capital involved the following procedure. Since there is no macro-level information on the size of MFI capital stock in the country, we followed an indirect route by combining information from household survey on the uses of MFI loans with available data on MFI loan disbursement as well as investment at the national level. For household-level information on the uses of MFI loans, we relied on the database generated by the Institute of Microfinance (InM) in its two rounds of survey carried out for its project on Access to Finance. These are nationally representative household surveys covering both rural and urban areas, and were conducted by applying essentially the same sampling design as used by the Bangladesh Bureau of Statistics for its *Household Income and Expenditure Surveys* and by using a sample size of roughly similar magnitude. The two rounds of the InM Survey were carried out in the years 2010 and 2014 respectively. Since the base year of our SAM is 2012, we decided to use the average of the information contained in the two rounds of the survey. The share of MFI capital in total capital stock was then estimated in two steps.

In the first step, we noted from InM Surveys that, on average, around 47 per cent of MFI loans was used for productive purposes. By applying this ratio to total MFI loan disbursement, as obtained from national-level data, we estimated the absolute amount of loans used for productive investment. By comparing this amount with the size of total national investment, we found that MFI investment amounts to about 5 per cent of total investment. On the simplifying assumption that MFI's share in investment is equal to its share in capital, we designated 5 per cent of total capital stock as MFI capital.

In the second step, we made adjustment for the fact that the simplifying assumption of equating share of investment with the share of capital does not actually hold. This is because the part of investment that borrowers make out of their own resources – rather than out of loans – would be treated as non-MFI investment, but in reality at least a part of such so-called 'own-resource' investment is attributable to microfinance because the borrowers would have built up their own capital partly out of additional income generated by loan-financed activities in the past. As a result, a part of the apparently non-MFI investment in any given year must be attributed to MFI. Using the information from the InM Survey database, we find that around 20 percent of the non-MFI capital owned by the MFI recipient households is the result of accumulated MFI capital over the years. We therefore, add this to the MFI-capital stock. With this adjustment, the MFI-capital stock becomes 9.9 percent of the total capital stock in the economy in 2012.

The InM database was used for two other purposes. First, information on the ratio between borrower and non-borrower households was used to split the rural and urban households into MFI-recipient households and non-MFI-recipient households. Secondly, detailed information on the actual use of loans as reported by the households was utilized to allocate MFI capital among various sectors.

Table 6 presents the sectoral distribution of the MFI capital across 10 different sectors in the SAM. Out of those 10 sectors, MFI capital is used in 5 sectors. Different kinds of service sectors (captured as 'other services' in the SAM) accounts for 44.8 percent of the total MFI capital. 'Grains and crops' and 'livestock, fisheries and meat products' sectors have shares of 25.7

percent and 19.2 percent respectively. The shares of 'light manufacturing' and 'transport and communication' are very small, only 3.8 percent and 6.4 percent respectively.

**Table 6: Sectoral Shares of MFI Loans (2011-2013 average): Mapping with SAM sectors**

| Sectors | Share (%) |
|---|---|
| Grains and Crops | 25.74 |
| Livestock, Fisheries and Meat Products | 19.24 |
| Mining and Extraction | 0.00 |
| Processed Food | 0.00 |
| Textiles and Clothing | 0.00 |
| Light Manufacturing | 3.83 |
| Heavy Manufacturing | 0.00 |
| Utilities and Construction | 0.00 |
| Transport and Communication | 6.42 |
| Other Services | 44.77 |
| Total | 100.00 |
| **Source:** InM database and SAM 2012 | |

## 5. Estimating the Contribution of Microfinance to GDP

The basic methodology of estimating the contribution to GDP is to ask the question: what would have been the GDP in Bangladesh in the base year 2012 if there were no microfinance. We call this the counterfactual GDP. The difference between the counterfactual GDP and actual GDP is defined as the contribution of microfinance.

The actual GDP is obtained directly from the SAM. The counterfactual GDP is derived by simulating the CGE model after letting the MFI capital vanish completely. We running the scenario with zero MFI capital, we made adjustments on two accounts:

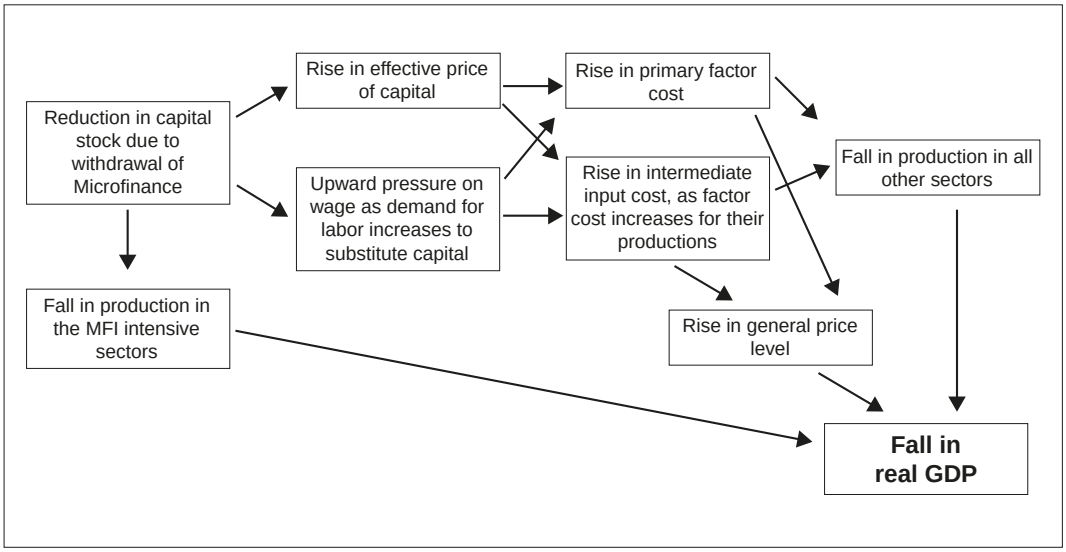
Firstly, from the InM Survey, we find that out of the total use of microfinance in rural and urban areas, some 15 per cent was spent on "construction or maintenance of house". We consider this amount as investment on housing, which is around 6.4 percent of the total investment on housing in the SAM 2012. We also eliminate this part of housing capital while setting MFI capital to zero.

Secondly, we recognise that simply setting MFI capital to zero would not adequately capture the contribution of microfinance. The loss of output would be bigger than what would entail simply from vanishing capital since the reality is that MFI loans improve the efficiency of resource use by easing the credit constraint faced by the borrowers. The estimates from the InM Survey show that total factor productivity of the income generating activities and micro enterprises with access to microfinance was 3.53 percent higher than those without microfinance (Muneer and Khalily 2015). Therefore, as we simulate the CGE model by setting MFI capital to zero, we also account for the loss in total factor productivity of that capital stock.

We run the simulation under three different closures of labor market: (i) a closure of flexible wage rates of both skilled and unskilled labor; (ii) a closure of fixed wage rate of unskilled labor and flexible wage rate of skilled labor; and (iii) a closure of fixed wage rates of both skilled and unskilled labor.

Figure 1 presents the transmission mechanism of the reduction in capital stock in the economy as a result of the withdrawal of microfinance. The first hit would be on the MFI intensive sectors as these sectors would experience fall in production, and this would directly contribute to the fall in real GDP. There will be two other effects in the economy as the effective price of capital would increase, and there would be an upward pressure on wage as demand for labor would increase to compensate the fall in capital stock, and its magnitude would depend on the degree of substitutability between capital and labor. In the next step such rises in effective prices of capital and labor would lead to the rise in the primary factor cost in the production process in the economy as well as rise in intermediate input cost, as factor cost increases for their production. Rise in primary factor cost and intermediate input cost would in turn lead to fall in production in all other sectors as well as rise in the general price level, which will lead to the fall in real GDP.

**Figure 1: The Transmission Mechanism of the Impact of Setting MFI Capital to Zero**




**Source:** Authors

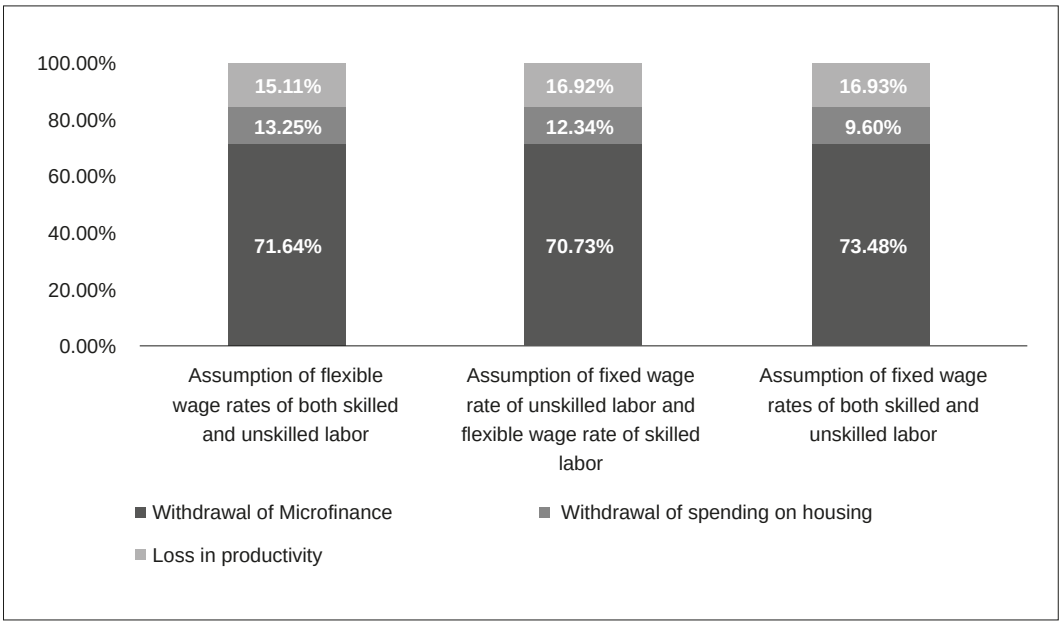
Table 7 presents the results of the simulations with respect to the impacts on real GDP and other macro indicators under three different labor market assumptions. Due to the withdrawal of microfinance in the economy, there would be negative impacts on real GDP, gross production, exports and domestic sales. The impacts would be in the range between 8.9 percent and 11.9 percent for real GDP, in the range between 8.8 percent and 12 percent on gross production, in the range between 6.9 percent and 11.7 percent on exports and in the range between 9 percent and 12.1 percent on domestic sales.

**Table 7: Impact on Real GDP and Other Macro Indicators (% Change from the Base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Real GDP | -11.9 | -10.0 | -8.9 |
| Volume of gross production | -12.0 | -9.9 | -8.8 |
| Volume of exports | -11.7 | -8.6 | -6.9 |
| Volume of domestic sales | -12.1 | -10.1 | -9.0 |
| **Source:** CGE simulations | | | |

Figure 2 presents the decomposition of the effect on real GDP. In all three cases, effect of the withdrawal of microfinance accounts for more than 70 percent of the total effect. The effect of withdrawal of spending on housing would constitute between 10 and 13 percent, whereas the productivity effect is between 15 and 17 percent.

**Figure 2: Decomposition of the Effect on Real GDP**




**Source:** Calculated from the CGE Simulation Results

The impacts on the volume of output of the broad economic sectors are shown in Table 8. Under all three scenarios, all three broad sectors would experience fall in output. However, the largest negative impact would be observed for the agricultural sector. Between industry and services, only under the first scenario, the impact is larger for the industrial sector, whereas, for the other two scenarios, impact is larger for the services sector.

**Table 8: Impact on the Volume of Output by Broad Sector (% change from the base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Agriculture | -20.5 | -18.7 | -18.5 |
| Industry | -10.7 | -7.7 | -6.4 |
| Services | -10.1 | -8.6 | -7.3 |
| All sectors | -12.1 | -9.9 | -8.8 |
| **Source:** CGE Simulations | | | |

Table 9 shows the impact on volume of output by disaggregated sectors. The largest negative effects are observed, under all three scenarios, for the 'grains and crops' and 'livestock, fisheries and meat products' sectors. Interestingly, though microfinance is not channeled to the 'processed food' 'textile and clothing', and 'heavy manufacturing' and is channeled to 'light manufacturing' in a very small proportion (see Table 6), all these sectors would be affected by some sizeable margins. These impacts are due to the indirect effect of microfinance on the economy. Similar observations hold for the services sectors.

**Table 9: Impact on the Volume of Output by Sectors (% change from the base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Grains and Crops | -26.3 | -24.1 | -23.8 |
| Livestock, Fisheries and Meat Products | -29.5 | -27.8 | -27.6 |
| Mining and Extraction | -2.2 | -1.2 | -0.9 |
| Processed Food | -8.7 | -5.9 | -4.7 |
| Textiles and Clothing | -10.7 | -7.4 | -5.7 |
| Light Manufacturing | -16.5 | -13.9 | -12.7 |
| Heavy Manufacturing | -7.9 | -6.2 | -5.2 |
| Utilities and Construction | -6.8 | -6.1 | -5.7 |
| Transport and Communication | -10.9 | -8.3 | -6.9 |
| Other Services | -12.1 | -10.7 | -8.8 |
| **Source:** CGE Simulations | | | |

In line with the transmission mechanism depicted in Figure 1, the sources of impacts are shown in Table 10. The price of capital would rise in all three scenarios, and the agricultural sector would experience the largest rise in the price of capital whereas the industrial sector would face a very small rise (Table 11). Nominal wage rises under the first two scenarios, but since we assume fixed wage rates of both skilled and unskilled labor under the third scenario, nominal

wage remains unchanged. Both the primary factor cost and intermediate input cost rise which lead to the rise in GDP price deflator. All these result in the fall in real GDP as shown in Table 7. It is also apparent from Table 10 that real exchange rate appreciates under all three scenarios and domestic export price rise as a result of rise in primary factor cost and intermediate input costs. This would result in the loss in competitiveness of the export sector and reduction in export exports as shown in Table 11.

**Table 10: Sources of Impacts (% Change from the Base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Price of Capital | 17.9 | 18.2 | 17.6 |
| Nominal Wage | 3.9 | 1.9 | 0.0 |
| Primary Factor Cost | 14.5 | 13.4 | 12.1 |
| Intermediate Input Cost | 8.1 | 6.9 | 6.1 |
| GDP Price Deflator | 14.8 | 13.8 | 12.5 |
| Real Exchange Rate | 12.9 | 12.1 | 11.1 |
| Domestic Export Price Index | 4.9 | 3.4 | 2.7 |
| **Source:** CGE Simulations | | | |

**Table 11: Impact on Sectoral Prices of Capital (% change from the base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Agriculture | 33.1 | 33.0 | 33.4 |
| Industry | 1.1 | 0.9 | 0.6 |
| Services | 19.9 | 20.2 | 19.2 |
| All Sectors | 17.9 | 18.2 | 17.6 |
| **Source:** CGE Simulations | | | |

Since microfinance is heavily concentrated in the rural areas, it is also of interest to estimate the contribution of microfinance to rural GDP. Since there is no readily available information on the size of rural GDP in Bangladesh, we have calculated the contribution of rural microfinance to rural GDP by using information from the HIES 2010. Data from HIES 2010 shows that around 60 percent of the total factor incomes are generated in the rural area. Therefore, we consider that 60 percent of the GDP in Bangladesh in 2012 was from the rural area. Also, data from InM survey shows that the average shares of rural and urban MFI loans in total MFI loans were 70 percent and 30 percent respectively. Using these ratios we find that upon the withdrawal of microfinance in the economy and its associated two other effects (withdrawal of spending on housing and productivity loss), the negative impact on the rural GDP in Bangladesh would be in

the range of 12.6 percent and 16.6 percent (Table 12). We also present the contribution of microfinance to real GDP in the same table again for better comprehension and comparison.

**Table 12: Impact on rural GDP (% change from the base)**

| | Assumption of flexible wage rates of both skilled and unskilled labor | Assumption of fixed wage rate of unskilled labor and flexible wage rate of skilled labor | Assumption of fixed wage rates of both skilled and unskilled labor |
|---|---|---|---|
| Rural Real GDP | -16.6 | -14.0 | -12.6 |
| Real GDP | -11.9 | -10.0 | -8.9 |
| **Source:** CGE Simulations | | | |

We may thus conclude that microfinance contributes somewhere in the range of 8.9 – 11.9 per cent of national GDP and in the range of 12.6 – 16.6 per cent of rural GDP (as of 2012).

## 6. Conclusion

This paper has made the first systematic attempt at measuring the contribution of microfinance to the GDP of Bangladesh. In recognition of the fact that microfinance's contribution to GDP would arise not just from the difference it makes to the incomes of the borrowers but also from its indirect repercussions on the rest of the economy, a general equilibrium approach was adopted. For this purpose, a computable general equilibrium (CGE) model was used, the empirical content of which was derived from an updated Social Accounting Matrix (SAM) of Bangladesh with base year of 2012, supplemented by household survey data on the reach and uses of microfinance.

Microfinance is used for a variety of purposes, including enterprise financing, asset accumulation, consumption smoothing, meeting unexpected shocks, etc. It was assumed for the purpose of the present study that only the part of microfinance that adds to the capital stock (both fixed and working capital) would contribute to the GDP by enhancing the capacity to generate more goods and services. As such, only the share of microfinance devoted to enterprise financing and housing development was considered relevant for the present study. This share was obtained from household survey data and is based on information given by the borrowers as to how they actually used the loans rather than what they declared on paper to the MFIs.

By considering only the capital-augmenting part of microfinance, it was possible to introduce microfinance in the CGE model as a part of the capital stock of the country. We thus made a distinction between MFI capital and non-MFI capital. By combining household-level information with national-level data, we estimated that MFI-capital accounted for some 9.9 per cent of total capital stock of the country in 2012.

The issue of microfinance's contribution to GDP then boiled down to the following question: what would have been the GDP of Bangladesh if this MFI-capital did not exist? The question

was answered by simulating the CGE model to construct a counterfactual scenario in which the MFI-capital part of the capital stock was set to zero. The difference between the counterfactual GDP of this scenario with no MFI-capital and the actual GDP of the base year 2012 was then taken as a measure of microfinance's contribution to the GDP of Bangladesh. We derived a range of estimates by using alternative assumptions about how the labour market behaves. Our estimates suggest that microfinance has contributed somewhere in the range of 8.9-11.9 per cent of the GDP of Bangladesh and somewhere in the range of 12.6-16.6 per cent of rural GDP.

The contribution has two parts. Firstly, there is a direct effect, raising the production of goods and services in the sectors in which microcredit is used for productive purposes. Secondly, there is an indirect general equilibrium effect on the rest of the economy. The latter effect operates by changing the prices of capital and labour. By adding to the capital stock, microfinance first brings down the effective price of capital. As producers substitute cheaper capital for labour, the effective price of labour also falls. Reduction in the effective prices of capital and labour then reduces the cost of production in all sectors of the economy, albeit to varying degrees, which in turn stimulates more production of goods and services.[10]

It should be emphasized that the measure of microfinance's contribution to GDP that has been derived in this paper is a conservative estimate. This is because the methodology used in this study is not comprehensive enough to capture all the transmission mechanisms through which microfinance can potentially contribute to GDP. A few of the missing mechanisms can be briefly noted.

First, the model we have used does not allow for the existence of underemployment. Yet, one of the contributions of microfinance is that it enables under-employed people engaged in self-enterprises to make fuller use of their time as greater access to credit allows them to produce more goods and services. Second, we have assumed that the part of microcredit that is used for consumption purposes does not contribute to the GDP. But this is not necessarily true. When access to credit allows households to ensure consumption smoothing, they may be encouraged to undertake investments that are riskier but yield higher returns on the average. Third, as higher income earned by productive borrowers enables them to spend more on the education and healthcare of their children, the stock of human capital would improve in the future which should help achieve greater output in the long run. The static nature of our model is not capable of capturing such dynamic gains. Fourth, insofar as access to microfinance leads to greater empowerment of women, this too should result in dynamic gains in output in the long run since empowered women are known to be better able to allocate household resources in favour of better education and healthcare of children. Incorporation of these and possibly other transmission mechansims into a more comprehensive dynamic general equilibrium model remains a task for the future.

[10] In section V above, this transmission mechanism was described to explain how GDP would fall if MFI capital ceased to exist. In this paragraph, we have described the same transmission mechanism in reverse – to explain how GDP rises because of the addition of MFI-capital to the capital stock of the country.

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## Appendix Table A.1
## Outreach and Depth of Microfinance Sector in Bangladesh, 2005-2014 (in Million)

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|
| Active members | 18.79 | 20.51 | 23.96 | 35.91 | 35.71 | 33.06 | 32.25 | 32.01 | 34.04 |
| Net savings | 52 | 69 | 75 | 104 | 131 | 186 | 158 | 193 | 227 |
| Loans outstanding | 83 | 106 | 133 | 127 | 189.267 | 279.825 | 311.044 | 348.053 | 409.965 |
| Saving-outstanding ratio | 0.365 | 0.336 | 0.318 | 0.609 | 0.693 | 0.665 | 0.508 | 0.554 | 0.554 |
| Annual disbursement | 131.78 | 174.32 | 226.88 | 370.80 | 370.80 | 440.29 | 498.10 | 566.84 | 647.22 |
| Number of loanees | 11.84985 | 13.6816 | 16.53165 | 25.32745 | 22.99505 | 23.944 | 23.57 | 25.495 | 27 |
| Active borrowers | 13.941 | 16.096 | 19.449 | 29.797 | 27.053 | 27.172 | 25.952 | 25.672 | 27.241 |
| Active Micro-enterprise (ME) borrowers | n.a | n.a | n.a | n.a | n.a | n.a | 2.056 | 2.367 | 2.691 |
| ME loans outstanding | n.a | n.a | n.a | n.a | n.a | n.a | 87728.2 | 99220 | 111717 |
| ME Annual Disbursement | n.a | n.a | n.a | n.a | n.a | n.a | 141857 | 157235 | 176951 |
| Average loan size (outstanding) | 5956.39 | 6592.82 | 6860.35 | 4249.96 | 6996.16 | 10298.28 | 11985.36 | 13557.69 | 15049.56 |
| Average loan size (disb) | 11120.73 | 12741.05 | 13723.68 | 14640.08 | 16125.04 | 18388.24 | 21132.84 | 22233.42 | 24242.99 |
| Average savings | 2767.00 | 3359.71 | 3110.94 | 2902.63 | 3677.25 | 5630.33 | 4896.39 | 6023.63 | 6672.65 |
| Average savings (Borr) | 3730.22 | 4281.44 | 3831.82 | 3497.67 | 4853.69 | 6850.88 | 6083.85 | 7510.52 | 8337.80 |
| Average loan size (ME outstand) | n.a | n.a | n.a | n.a | n.a | n.a | 42651 | 41913 | 41507 |
| ME loan outstanding as % of Total loans outstanding | | | | | | | 28.2 | 28.5 | 27.25 |

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