

INTEREST RATE SENSITIVITY OF MICROCREDIT DEMAND IN BANGLADESH

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Abstract

Microcredit is predominantly perceived to have the purpose of providing access to credit to poor and otherwise marginalized clients. However, for quite some time there is criticism over its 'high' interest rate that is expected to impact negatively on borrowers' demand. This paper examines whether the microcredit demand in Bangladesh is sensitive to interest rate by adopting a simple stochastic demand equation. By using the Household Income and Expenditure Survey (HIES) 2010 data of Bangladesh Bureau of Statistics, the study estimates the demand equation for the households that borrow micro loans from various sources. The initial regression results reveal that interest rate has negative and statistically significant impact of the size of loan while frequency of payment shows the opposite impact in all models. At the second stage, interest rates were disaggregated by broad sources, which show that interest rate of the big microfinance institutions has negative and significant effect on amount of borrowing in all models, while the same of the other sources including bank and government departments demonstrate mixed effects. Finally, disaggregating size of loan for broad sources, the study reveals mixed effects of interest rate.

1. Introduction

Revolutionized in Bangladesh in late-1970s for which the concept and practice received the highest esteem as a means of sustainable peace in the world, microcredit is predominantly perceived to have the purpose of providing access to credit to poor and otherwise marginalized clients (Mersland and Strøm, 2010). The country has been termed to be a 'social laboratory' of microfinance that is being replicated across the border. Many economic and social variables have also been undergoing significant changes due to the presence of hundreds of microfinance institutions (MFIs). Although Grameen Bank made the initial intervention; the (Grameen) model has further been developed and adjusted by other NGOs both domestically and in more than a hundred countries. It is the reality that almost all major and minor NGOs are now deeply involved in microfinance operation in Bangladesh. Most of the micro financial services are going to the rural areas and to the female clients. A lot of product differentiations are also taking place in microfinance industry (Rahman and Kabir, 2004). Many commercial banks, government departments and other institutions are also currently providing microcredit.

However, there are criticisms over its price (high interest rate), hard terms (repayment and frequency of payment) and whether the borrowers are trapped into loans (previous loans) that are supposed to determine the demand for microcredit. Nevertheless, there are solid concerns in

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practice by MFIs due to their greater emphasis on profits, which is likely to harm the well-being of poor clients (Yunus, 2011). Even though the profit motive comes from their strive to sustain in the market, it increases the operational costs of the MFIs which are then covered up by higher interest rate of loan products offered to their poor clients. Now, a significant policy question is whether the interest rates charged by various microcredit providers are prohibitive to demand for credit. If the answer turns out to be “yes”, it is perhaps alarming news for sustainable expansion of such a big microfinance industry worth nearly Tk.400 billion.

Given this backdrop, this paper tries to assess the interest rate sensitivity of microcredit demand for Bangladesh by estimating a credit demand function. Elementary interpretation of the law of demand implies that the quantity demanded for a particular product is a function of prices of its own and other products, *viz.* substitutes and complements. Building on this basic law, the paper tries to estimate a simple demand equation for microfinance by considering some industry-related factors of classical demand function. The traditional demand equations and impact studies on microfinance overly take into account the socio-economic factors like income, education, health, poverty of the borrowers, etc. The value addition of this paper is that it considers only the factors related to loan price and its conditions, without going into the socio-economic characteristics of the borrowers by assuming that they are from nearly similar socio-economic conditions.

The rest of the paper has been organized as follows. Section 2 describes the impacts of microcredit in Bangladesh on poverty, socio-economic development and productivity based on recent studies along with apprehensions on loan prices. Section 3 highlights the major findings of the most recent studies on interest rate sensitivities of microcredit demand, while Section 4 discusses the methodology of the present study. The empirical results and their analyses are presented in Section 5. Finally, conclusions are made in Section 6.

2. Impacts of Microcredit in Bangladesh

Microfinance has been one of the key instruments of financial inclusion through financing micro-entrepreneurs in the country. Lack of access to credit was seen as a binding constraint on the economic activities of the poor. Microcredit delivered to groups of poor women has been simple and worked as a direct remedy of the obstruction of banking the unbanked through providing collateral-free credit (Conroy, 2008). Over the years, Grameen Bank and the MFIs played a pivotal role in reaching out to the rural poor who have minimal asset and literacy. Their programmes were designed with significant degree of gender bias favoring women. In turn, microfinance has also found to be significantly women-empowering (Razzaque, 2005).

Pitt and Khandker (1998) reveal that quantity of borrowing is a major determinant of women’s and men’s labour supply and household consumption, which rejected the hypothesis that programme credit is exogenous in determining of household consumption and men’s labour supply. They reveal that unobserved variables that influence borrowing also stimulate consumption and men’s labor supply conditional on taking loan allowing for seasonality only by including seasonal dummy variables in their conditional demand equations of microcredit.

Navajas *et al.* (2000) constructed a theoretical framework describing the social value of a microfinance institution (MFI) in terms of the depth, worth to users, cost to users, breadth, length, and scope of its output. They analysed evidence of depth of outreach for five MFIs in Bolivia. The study found that most of the poor households reached by the MFIs were close to poverty line, *i.e.*, they were the richest of the poor. The urban poorest were found more likely to be borrowers, but rural borrowers were more likely to be among the poorest in the study.

Pitt and Khandker (2002) examined the effect of group-based credit used to finance self-employment by landless households in Bangladesh to help smoothing seasonal consumption by financing new productive activities. Their results indicated that the demand for microcredit was to smoothing seasonal pattern of consumption and male labour supply. By the same token, Khandker and Pitt (2003) examined the impacts of microfinance on various outcomes using panel household survey from Bangladesh. They tried to comprehend whether the effects of microfinance are saturated or crowded out over time and whether programmes generate externalities. They revealed a declining long-term effect of microfinance as well as the possibility of village saturation from microcredit. Further, Khandker (2005) examined the effects of microfinance on poverty reduction at both the participant and the aggregate levels using panel data from Bangladesh. The results indicate that access to microfinance contributes to poverty reduction, especially for female participants, and to overall poverty reduction at the village level.

In measuring the demand for microcredit, Khandker (2005) estimated the demand equations for microfinance for 1991/92 and 1998/99. The panel data analysis of the demand functions used the household fixed-effect method with the correction for the non-zero covariance of the errors of men's and women's credit demand equations. The results confirm that households that are resource poor, especially in land, have higher demand for microfinance than households that are resource rich. Landless households were likely to receive more credit from microfinance programmes than that of landed households. Female education had a negative effect on the amount of borrowing – one additional year of female education reduced the amount of female borrowing by less than 1 per cent in the panel data analysis and by more than 1 per cent in 1998/99 in the cross-sectional demand analysis.

Cuong (2008) examined poverty targeting and the impact of the microcredit programme. The study revealed that the program is not very pro-poor in terms of targeting. The non-poor account for a larger proportion of the participants. The non-poor also tend to receive larger amounts of credit compared to the poor. The programme was found to reduce the poverty rate of the participants. The positive impact is found for all three Foster-Greer-Thorbecke poverty measures.

Against recent harsh criticism that microcredit participants in Bangladesh are trapped in poverty and debt, Khandker and Samad (2013) tried to demystify the fact based on a long panel survey over 20-years. The study reveals that this allegation is not true. However, numerous participants have been with microcredit programs for many years due mainly to a range of benefits from microcredit that include higher income and consumption, assets accumulation, investment in children's schooling, and lifting out of poverty and welfare gains exclusively for women. They demonstrate that the benefits of borrowing overshadow accumulated debt, leading to increased net worth and decline in poverty and the debt-asset ratio of the households.

Based on three-period panel data (of 1991/92, 1998/99 and 2011) of World Bank, BIDS and InM, Khandker and Samad (2012, 2013) find that overall participation has insignificant effect on moderate poverty, while continuous participation pushes poverty down by 5.5 percentage points. The effect of microcredit is significant for extreme poverty, which is dropped by 3.5 percentage points. Continuous participation in microcredit programme helped reduce extreme poverty by 7.1 percentage points. Khandker and Samad (2013) demonstrate that the effect of microcredit has been positive on poor member households and on women, which support the earlier finding of Razzaque (2010) based on PKSF data. They find that male participation has very negligible impact on either moderate or extreme poverty, while female participation reduces extreme poverty by about 4 percentage points.

Osmani (2014) reveals the fact that the early studies on the impact of microcredit almost invariably found that microcredit had made a positive contribution not only in reducing poverty but also in a host of other economic and social dimensions which faced substantial criticism later on the grounds of econometric methodology. It was argued, in particular, that various ‘selection biases’ vitiate their findings and lend an ‘upward bias’ to their estimates of the impact of microcredit. Citing a conservative estimate by Osmani (2012), the study mentions that microcredit helped reduce overall rural moderate and extreme poverty by about 5 and 10 per cent, respectively. Considering only the borrower households, microcredit helped roughly 10 per cent borrowers to come out of moderate poverty and 20 per cent to come out of extreme poverty. It also says that moderate and extreme poverty would have been nearly 9 and 18 per cent higher among the borrowing households, respectively.

Beside reducing poverty and attaining developmental outcomes, a recent study shows positive impact on productivity at enterprise level as well. Using the survey data of 2010 conducted by InM, Khalily and Khaleque (2013) show that about 32 per cent of the households have at least one enterprise and some of the enterprises have received credit from MFIs and other sources such as formal institutions, and informal lenders. The econometric results show that the access to credit by the surveyed enterprises helped attain high average labour productivity and total factor productivity.

Despite these positive aspects, the microfinance industry is criticized harshly for its overly ‘high’ interest rate. Conversely, lenders argue that interest rate should cover their transaction costs as their programs are not subsidized like the public banks and similar institutions. A recent survey of Credit and Development Forum (CDF, 2013), the MFIs are seen to charge flat interest rates ranging from 12.5 to 15 percent to the borrowers in most cases. The proportion of MFIs charging interest rate at 15 per cent was found to be reduced significantly in 2012 (13 per cent) than 2011 (23 per cent) in the case of licensed MFIs. Conversely, half of the non-licensed MFIs were found to be charging 15 per cent flat interest rate. The effective interest rate is still very high at 27 per cent on average (see details in Appendix).

3. Literature Review

Since inception of microcredit program in late-1970s, the MFIs have been facing strong criticism about high interest rates. Faruquee (2010) reveals that for agricultural microcredit, MFIs borrow

funds from Palli Karma-Sahayak Foundation (PKSF) at low interest, while adding other costs the MFIs are lending at 15 to 18 per cent interest rate. This rate is described as higher than the return from the agricultural activities, especially the traditional cropping, which is partly compensated by family labor with zero or minimum opportunity costs. Otherwise, taking loan from MFIs for agricultural activities would prove to be unprofitable.

Transaction costs for microcredit, which are more than two-thirds of the total costs, are indeed significantly higher than those of the formal financing institutions. Still, 'high cost' argument would not sustain as many MFIs get low-cost fund from PKSF. Specialized MFIs like Grameen Bank can access funds from depositors only at 8 per cent rate of interest. Given these facts, the effective interest rates charged by MFI seem to be excessively high and vary among loan products. While partner organizations (POs) of PKSF charge an effective annual average interest rate of 24-32 per cent on average, the non-POs charge as high as from 22 to 110 per cent. Despite introducing the interest rate cap at 27 per cent on declining balance by the Government, which is equivalent to 14.5 percent flat method, the effective interest charged by some MFIs is still higher than the cap (Faruqee and Badruddoza, 2011).

Karlan and Zinman (2008) test the assumption of price inelastic demand using randomized trials conducted by a consumer lender in South Africa. They identified demand curves for consumer credit by randomizing both the interest rate offered to each of more than 50,000 past clients and the maturity of an example loan. The demand curves have been found to be downward sloping, and steeper for price increases relative to the lender's standard rates. They also find that the size of credit was far more responsive to changes in loan maturity than to changes in interest rates, which is consistent with binding liquidity constraints. Similarly, based on the data of 346 of the world's leading MFIs covering nearly 18 million active borrowers, Cull *et al.* (2008) show that profit-maximizing MFIs charge the highest fees amidst high transaction costs due mainly to small transaction sizes.

Armendáriz and Morduch (2010) shows that because of the principle of diminishing marginal returns to capital, enterprises with relatively little capital are capable of earning higher from their investments than the enterprises which have bulk of capital. Thus, poorer enterprises that belong to poor households can pay higher interest rates than their richer counterparts. However, due to the presence of collateral in standard banking operation, the poor are traditionally excluded from access to credit but the credit gap was bridged up by the microfinance institutions (MFIs) even though it is claimed that they charge high interest rates.

Rosenberg *et al.* (2009) reveal that the high cost of microcredit is indeed a global problem due to the question of financial sustainability of the MFIs. However, despite higher interest rate of MFIs than the formal bank interest rates due to high operating costs, they did not find any widespread exploitation of the borrower through abusive MFI interest rates. The study shows that the median interest rate for sustainable MFIs globally was about 26 percent in 2006, while the exceptional rate was revealed in the case of Mexican MFI Compartamos that charge 85 per cent interest rates, which is paid only by less than 1 per cent of borrowers. The study also finds that MFI interest rates declined annually by 2.3 percentage points between 2003 and 2006, much faster than bank rates. By the same token, Mersland and Strøm (2010) indicate that costs and therefore

interest rates are influenced by the degree of difficulty and risk associated with bringing microcredit to heterogeneous clients and in many instances at their doorsteps without collateral.

Tsukada *et al.* (2010) studied empirical determinants of how heterogeneous households are matched to different loan products in a credit market in Indonesia. The study set time-varying choice to identify parameters regarding preferences for various credit attributes. The results demonstrated that the new availability of small-scale loan products without collateral significantly increases households' probability of taking credit irrespective of their prices (interest rate). Households in self-employed business prefer formal credit as a stable financing source.

Balogun and Yusuf (2011) look into the factors influencing demand for microcredit among rural households in Ekiti and Osun states in Nigeria. A multistage sampling was employed for the study. Ekiti and Osun states were randomly selected from the six states in South-western Nigeria. Thirty microcredit groups (MGs) were selected randomly from each of the selected LGAs based on probability proportionate to the size of the MGs. The result showed that social capital variables, *e.g.*, membership density index, meeting attendance index, cash contribution index and heterogeneity index, as well as dependency ratio and credit variables, such as credit distance and interest rate were important variables in demand for credit.

In the empirical analyses of this study, the interest rate coefficients turned out to be positive for commercial bank and NGO/cooperatives, respectively while negative for local money lenders. The likelihood that households demand for credit from commercial bank and NGO/cooperatives increases as interest rate increased by 115 and 106.8 per cent, respectively. In case of local money lenders, the likelihood of demand for credit decreases as interest rate decreases by 23.3 per cent. The results indicate that irrespective of distance or interest rate, households would pursue credit, because of their dire need and shortage in supply. The result contradicted the earlier finding that higher interest rate leads to decrease in quantity of credit demanded (Mpuga, 2004 and 2008).

Dehejia *et al* (2012) examine interest rate sensitivity of microcredit of urban poor borrowers in Dhaka. It shows that the demand for credit by the poor changes insignificantly due to increased interest rates increase. Based on the data of SafeSave, a credit cooperative in the slums of Dhaka city, the study finds interest rate elasticities of loan demand ranging from -0.73 to -1.04. Less wealthy accountholders are found to be more sensitive to the interest rate than more wealthy borrowers with an elasticity of -0.86 compared to -0.26, which resulted in the shift of bank's portfolio from its poorest borrowers due to increases in the interest rate. Gross and Souleles (2002) reveal that the long term interest rate elasticity of credit is -1.3 while it is -1.13 in the short run.

Roberts (2013) examines whether the profit-orientation of microfinance institutions (MFIs) leads to higher interest rates of its loan products by assessing the relationship between interest rates and adopting the for-profit legal form, appointing private sector representation and traditional banking experience, and joining extensive for-profit networks. Based on data of 358 MFIs, the study reveals that stronger for-profit orientation of MFI is related to higher interest rates for MFI

clients consistently for all regressions. The study also argued that the prevailing interest rates are also influenced by the degree of microfinance sector competition.

4. Methodology and Data

The interest rate sensitivity of microcredit has been examined by adopting a simple demand function of microcredit. The demand function postulates that the demand for microcredit primarily depends on its price, *viz.* interest rate and other related factors. It has been described formally in the following.

Ceteris paribus, demand for a particular product x is inversely related to its price, P_x , so that the following simple Bernanke-Blinder (1988) demand function for credit can be written as $D_x = f(P_x)$. Thus, the preliminary empirical demand function for credit can be written as:

$$\ln BOR_i = \beta_1 + \beta_2 INT_i + e_i \quad ; i = 1, \dots, n \quad (1)$$

where \ln implies natural log, BOR stands for amount of borrowing, INT indicates annual interest rate, e is the error term with usual properties, β is regression coefficient.

While this simple model can be found to be negative and statistically significant almost without exception, it can be criticized severely for not taking into cognizance of the source preference of the borrowers, interest rate variations by sources and conditions. Thus, for better understanding of the behavior of the borrowers, the demand function of microcredit [Equation (1)] can be extended below:

$$\ln BOR_i = \beta_1 + \beta_2 INT_i + \beta_3 INBAN_i + \beta_4 INBMFI_i + \beta_5 INGOV_i + \beta_6 INOMFI_i + \beta_7 INOTH_i + \beta_8 PAYPER_i + \beta_9 FRE_i + \beta_{10} \ln PBOR_i + e_i \quad (2)$$

where $INBAN$, $INBMFI$, $INGOV$, $INOMFI$ and $INOTH$ stand for interest rates charged by banks, big MFIs, government departments, other MFIs and other providers.

Some of the really significant variables, however, may not turn out to be significant due to the presence of statistical problems. In that case appropriate diagnostic tests will be performed. A further investigation will be made using probit model for five groups of source of borrowing: bank, big MFI, government departments, other MFIs and other sources. Hence, we denote each of the categories as 1 if they fall in that particular category, and 0 if not. For example, $BAN_i = 1$ if the money is borrowed from bank, and 0 = otherwise. Then we estimate probit regression for that group. Therefore probit approach introduces a latent continuous dependent variable (Y_i^*) as

$$Y_i^* = \alpha_0 + \sum \alpha_j X_{ij} + e \quad (3)$$

where X_{ij} is the j determinants of borrowing from i th providers and e is the error term with usual properties.

In Equation (3), it is also assumed that when $Y_i^* > 0$, then dummy dependent variable is 1, and if $Y_i^* < 0$, then dummy dependent variable 0. In this way we can replace a discrete dependent variable by a continuous one.

Now, provided the normality assumption of probit regression and symmetric distribution of e , it is possible to show that

$$P_i = Pr(Y_i = 1) = \Phi \left(\alpha_0 + \sum_{j=1}^k \alpha_j X_{ij} \right)$$

where $\Phi(\cdot)$ is the cumulative distribution function of a standard normal.

The probit model can be interpreted in the way that each source of microcredit has a specific index determined as a linear function of a set of explanatory variables, which would be compared to the source's own critical values that are assumed to be distributed normally among the sources. In our analysis the probit model is

$$Z_i = \alpha_0 + \sum \alpha_j X_{ij} + e$$

where marginal effect can be measured by $\frac{\partial P_i}{\partial X_{ij}} (Z_i)$.

The data for estimating the above econometric models has been extracted from HIES 2010 conducted by Bangladesh Bureau of Statistics. The data represents the individuals who borrowed microcredit from various sources.

5. Results and Analyses

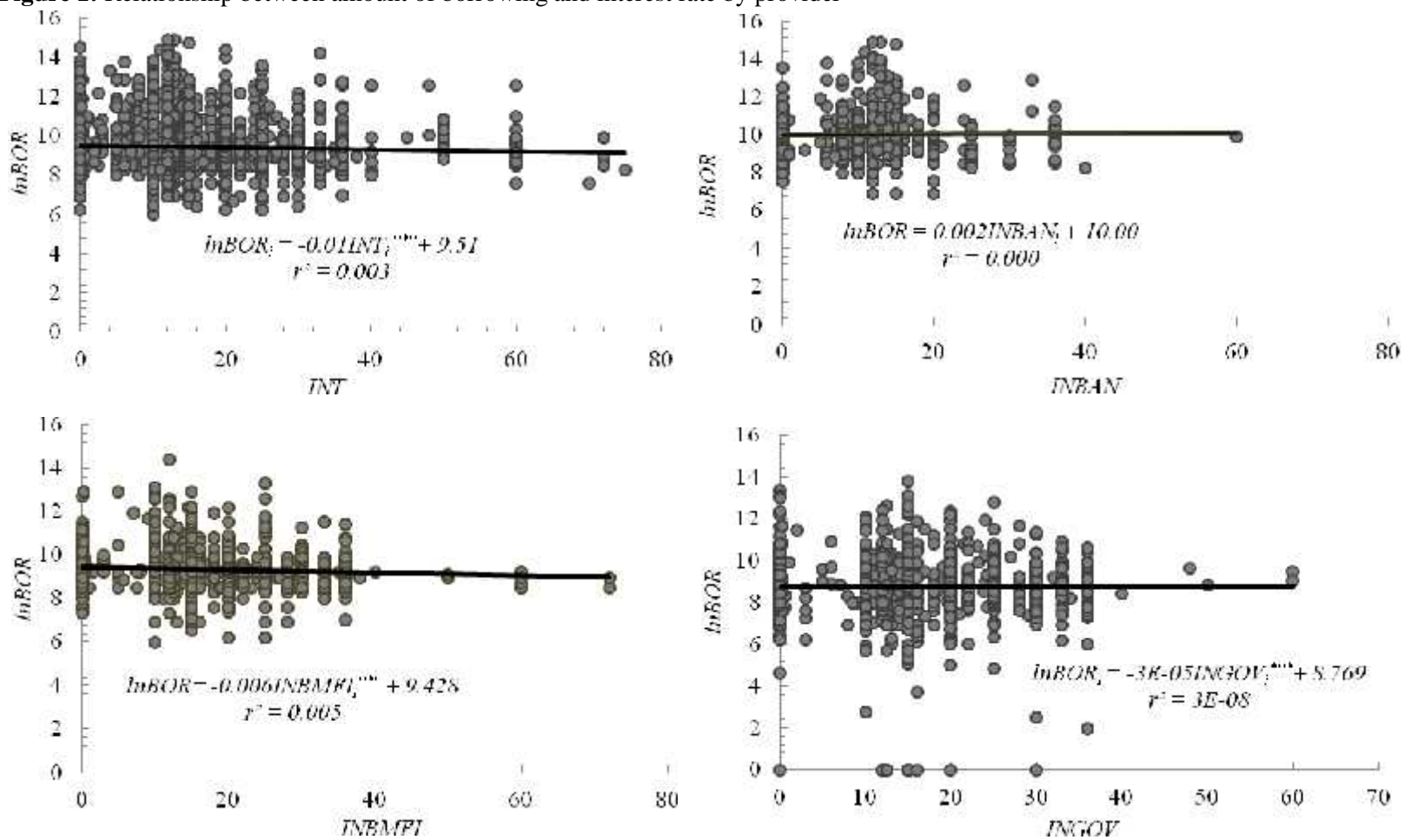
The factors affecting demand for microcredit have been analysed in four stages. In the first stage correlations were tested between the amount of borrowing and its determinants including interest rate (Figures 1 and 2; Table 4). It is revealed that interest rate has a negative correlation with amount of borrowing with a statistically significant regression coefficient at 1 per cent level. It indicates that the interest rates charged by various institutions and providers have a generally negative impact on amount of borrowing, although it does not tell anything about the relationship between variation of interest rate within the group of providers (*e.g.*, banks) and variation in the amount of loan taken by the borrowers.

The relationship of higher payment period (months) and frequency of payment (installments) with bigger loan size was positive having coefficients significant at 1 per cent level. We were also interested to see whether the borrowers are trapped into loans by examining the correlation between previous loans and amount of credit taken in the present period. Quite surprisingly, no such statistically significant relationship was observed.

At the second stage, the effects of interest rate and conditions of loan have been examined by using the simple OLS regression and that with White's variance-covariance estimates for robust

standard errors. It reveals that the interest rate coefficient is negative and statistically significant at 1 per cent level for all specifications, which strongly supports the findings of Karlan and Zinman (2008) of interest rate elasticity of microcredit as expected, but contradicts Balogun and Yusuf (2011).

Figure 1: Relationship between amount of borrowing and interest rate by provider



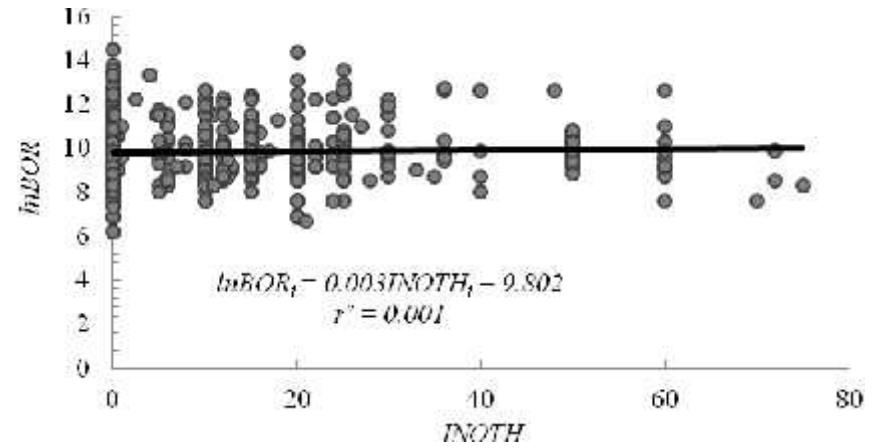
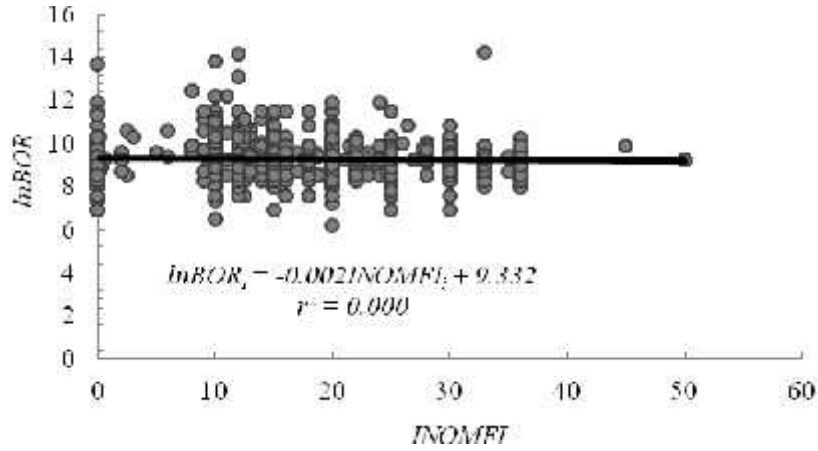
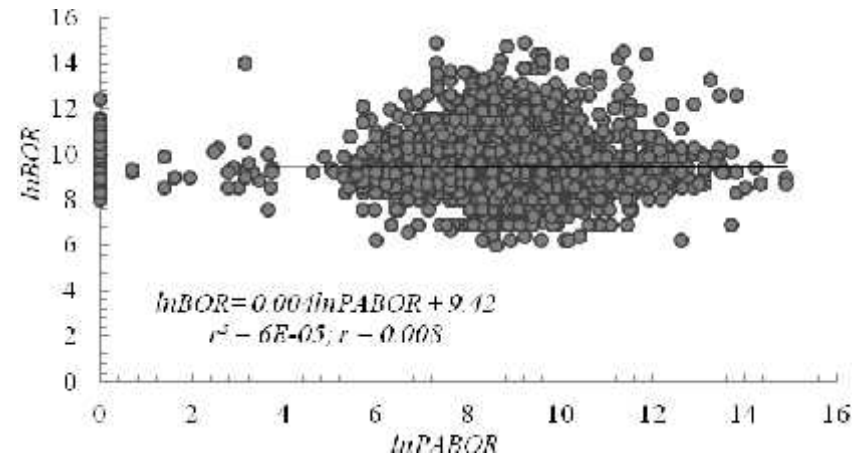
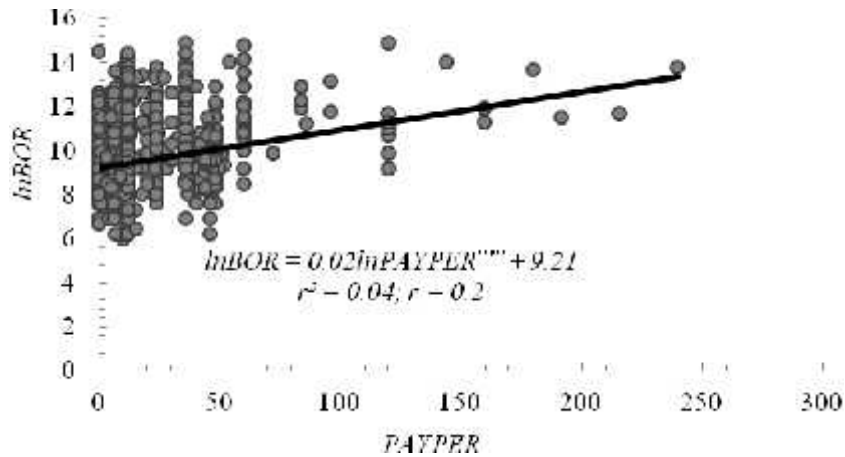


Figure 2: Relationship between amount of borrowing and other variables



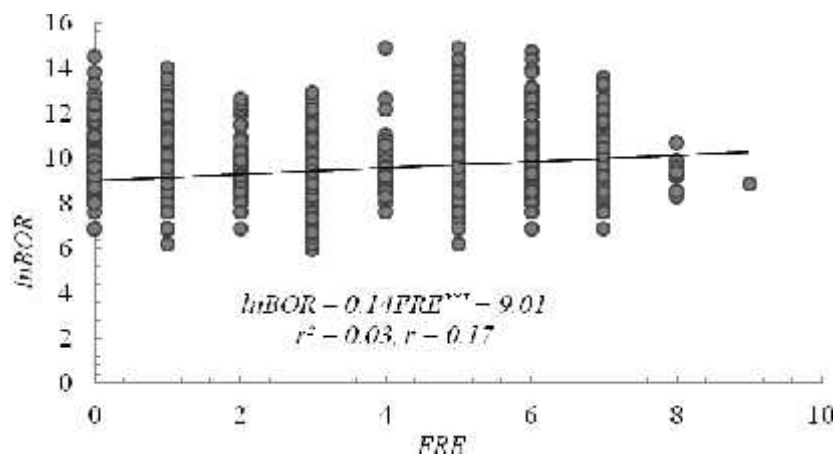


Table 1: Correlation Matrix

	lnBOR	lnPABOR	PAYPER	INT	FRE	INBAN	INBMFI	INGOV	INOMFI	INOTH
lnBOR	1.000									
lnPABOR	0.008	1.000								
PAYPER	0.209	0.009	1.000							
INT	-0.062	0.001	-0.021	1.000						
FRE	0.176	0.010	0.172	-0.050	1.000					
INBAN	0.176	0.033	0.096	0.055	0.157	1.000				
INBMFI	-0.140	0.006	-0.048	0.552	-0.090	-0.226	1.000			
INGOV	0.034	-0.001	0.086	0.057	0.036	-0.042	-0.100	1.000		
INOMFI	-0.082	-0.013	-0.031	0.278	-0.038	-0.135	-0.324	-0.060	1.000	
INOTH	0.091	-0.017	-0.019	0.352	-0.014	-0.062	-0.150	-0.028	-0.089	1.000

Conversely, frequency of payment, *i.e.*, times of installment during the loan period, has been found to be positive and statistically significant for all specifications. It indicates that higher frequency of payment invariably encourages taking greater amount of loan by the microcredit borrowers from all providers. Surprisingly, higher payment period shows negative impact on the size of loan, which is statistically significant at 1 per cent level when frequency of payment is not considered, which contradicts our expectation as longer payment period relaxes burden of credit on the borrowers. Nevertheless, the sign of the coefficient reverses when empirical specification includes frequency of payment.

Table 2: Estimation Results

	Model 1		Model 2		Model 3	
	OLS	OLS (Robust)	OLS	OLS (Robust)	OLS	OLS (Robust)
<i>INT</i>	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
<i>FRE</i>	0.134*** (0.010)	0.134*** (0.015)			0.110*** (0.011)	0.110*** (0.011)
<i>PAYPER</i>			-0.017*** (0.001)	-0.017*** (0.002)	0.015*** (0.001)	0.015*** (0.002)
<i>Constant</i>	9.093*** (0.042)	9.093*** (0.055)	9.292*** (0.028)	9.293*** (0.031)	8.950*** (0.043)	8.950*** (0.057)
No. of Observations = 5,137						
R^2	0.0339	0.034	0.0469	0.0469	0.066	0.065
<i>Adj R</i> ²	0.0336		0.0465		0.065	

$F(3, 5133)$	90.16***	51.67***	126.23***	73.42***	121.79***	66.40***
Heteroscedasticity [$\chi^2(1)$]	129.34***		180.06***		183.52***	
Multicollinearity(VIF)	1.00		1.00		1.02	
Normality (u_i) [$\chi^2(12)$]	1505.03***		28108.99***		28545.3***	

Note: Numbers in the parentheses are standard errors.

*** indicates that the coefficients/statistics are significant at 1 per cent level.

Doornik-Hansen test was performed for normality in the u_i terms.

In the third stage the demand equation has been estimated by disaggregating the interest rates charged by various providers along with other determinants. At the outset, the impact of various interest rates on variation of loan size was examined. It has been found that interest rate charged by big MFIs and other providers had negative impact on loan size at one per cent level of significance, while interest rate charged by banks had positive impact on loan size at the same level of significance. It clearly indicates that even though microfinance was revolutionized by big MFIs, they charge interest rates that act as disincentives for the borrowers after such a long period of time of their operations and having bulk of the market share. On the other hand, interest rate charged by banks was found to have positive impact on the loan size.

Later, the other factors were added with different interest rate by groups. It was revealed that the interest rates changed by MFIs as a whole have negative and statistically significant impact over size of loan taken by the borrowers. This result is quite surprising and raises policy question regarding transaction cost of microcredit by them as they are specialised providers and innovators of this product. Interest rate charged by government providers had positive but statistically insignificant effect on the loan size.

Table 3: Does Variation of Interest Rate Determines Demand for Microcredit

	Model 1		Model 2	
	OLS	OLS (Robust)	OLS	OLS (Robust)
<i>INBAN</i>	0.031*** (0.003)	0.031*** (0.004)	0.024*** (0.003)	0.024*** (0.004)
<i>INBMFI</i>	-0.012*** (0.001)	-0.012*** (0.001)	-0.011*** (0.001)	-0.011*** (0.001)
<i>INGOV</i>	0.009* (0.005)	0.009 (0.006)	0.002 (0.005)	0.002 (0.005)
<i>INOMFI</i>	0.012*** (0.002)	0.012*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)
<i>INOTH</i>	-0.011*** (0.002)	-0.011*** (0.002)	0.012 (0.002)	0.012 (0.002)
<i>lnPABOR</i>			0.001 (0.008)	0.001 (0.009)
<i>FRE</i>			0.091*** (0.011)	0.091*** (0.012)
<i>PAYPER</i>			0.014*** (0.001)	0.014*** (0.002)
<i>Constant</i>	9.539*** (0.023)	9.539*** (0.025)	9.021*** (0.080)	9.021*** (0.087)
No. of Observations = 5,137				
R^2	0.058	0.057	0.11	0.10
Adj R^2	0.057		0.10	
$F(3, 5133)$	62.81***	50.04***	75.81***	48.71***

<i>Heteroscedasticity</i> [$\chi^2(1)$]	402.90***	449.79***
<i>Multicollinearity</i> (VIF)	1.16	1.12
<i>Normality</i> (u_i) [$\chi^2(12)$]	3.17e+05***	3.43e+05***

Note: Numbers in the parentheses are standard errors.

*** and * indicate that the coefficients/statistics are significant at 1 and 10 per cent levels, respectively.

Doornik-Hansen test was performed for normality in the u_i terms.

At the final stage, a Probit model for demand equation of microcredit was estimated to comprehend whether the factors affecting variation of loan size are sensitive to providers. It was revealed that interest rate impacts negatively on microcredit taken from banks with 1 per cent level of significance, while it shows positive and significant impacts on loan taken from MFIs and other providers. Frequency and period of payment had positive impact on credit taken from banks and government departments but negative impact for other providers. However, past borrowing shows no effect on either of the providers, which rejects the popular “loan trap” hypothesis.

Table 4: Determinants of Microcredit by Providers (Probit model)

	Bank	Big MFI	Government Departments	Other MFI	Other Sources
<i>INT</i>	-0.016*** (0.002)	0.012*** (0.001)	0.000 (0.003)	0.007*** (0.002)	0.019*** (0.002)
<i>FRE</i>	0.156*** (0.002)	-0.101*** (0.013)	0.089*** (0.029)	-0.031* (0.016)	-0.016 (0.015)
<i>PAYPER</i>	0.010*** (0.002)	-0.003** (0.001)	0.009*** (0.002)	-0.004** (0.001)	-0.012*** (0.002)
<i>lnPBOR</i>	0.018 (0.014)	0.009 (0.010)	0.011 (0.023)	-0.018 (0.011)	-0.012 (0.013)
<i>Constant</i>	-1.817** (0.139)	0.147 (0.106)	-2.517*** (0.243)	-0.573*** (0.118)	-0.573*** (0.118)
<i>Likelihood Ratio</i> [$\chi^2(4)$]	214.95***	124.08***	36.68***	31.95***	115.97***
<i>Pseudo R²</i>	0.0569	0.0174	0.031	0.006	0.029

Note: Numbers in the parentheses are standard errors.

***, **, and * indicate that the coefficients/statistics are significant at 1, 5 and 10 per cent levels, respectively.

6. Conclusion

The present study tries to estimate a simple demand equation of microcredit for Bangladesh with large observation taken from the latest HIES data. It provides powerful insights to the interest rate debate in microfinance discourse. It is popularly argued that MFIs charge higher effective interest rate on their members, which is seen as unfair and considerable burden on the borrowing members. They members are traditionally excluded from the formal financial institutions that drive them to resort to the MFIs. The present study reveals that even though general interest rate has positive impact on the loan size taken from MFIs, the interest rate charged by them work as disincentive to increase loan size by the borrowers. This poses a threat to achieve the overarching objective of microcredit towards fighting poverty and economic emancipation of the borrowing members, which should be looked into by appropriate policy measure. However, the popular “loan trap” hypothesis was found to be void by the study for overall borrowing and loan taken at disaggregated group of providers. The finding is still tentative based on the cross-section data of HIES 2010, which may be tested further for time series and longitudinal data in future studies.

Appendix

Table 1: Top Ten MFIs in Bangladesh (as of December 2012)

Sl.	Organisation	Active Members	Organisation	Loan Disbursement (million Tk)
1.	Grameen Bank	8,373,893	Grameen Bank	118,608.80
2.	BRAC	5,835,861	BRAC	104,221.99
3.	ASA	4,735,545	ASA	95,576.03
4.	Proshika	1,219,709	BURO Bangladesh	15,812.99
5.	BURO Bangladesh	1,083,564	TMSS	13,161.09
6.	TMSS	733,414	SSS	10,989.04
7.	Society for Social Service (SSS)	474,000	UDDIPAN	6,060.64
8.	Shakti Foundation for Disadvantaged Women (SFDW)	436,037	SFDW	5,198.41
9.	UDDIPAN	367,905	Proshika	4,500.70
10.	RDRS Bangladesh	303,166	RDRS Bangladesh	3,658.31
Top 50		27,637,449	Top 50	445,509.31

Source: Credit and Development Forum, *Bangladesh Microfinance Statistics 2012*.

Table 2: Annual Loan Disbursement (million Tk) and Recovery Rate

	Loan Disbursement, 2012	Change in Loan Disbursement over 2011	Recovery Rate 2012 (%)	Recovery Rate 2011 (%)
Wholesale Lending by PKSF	23,649.41	9.24	98.16	98.00
Retail Lending:	518,171.23	14.01		
(1) MF-NGOs	379,493.08	14.39	98.21	97.58
(2) Grameen Bank	118,608.80	9.28	98.31	97.17
(3) PDBF	5,539.60	14.96	98.00	98.00
(4) RDS (IBBL)	14,529.75	54.88	100.00	100.00

Source: CDF Survey 2011 and 2012

Table 3: Interest Rate (per cent)

Sl.	Flat rates	Non-licensed MFIs			Licensed MFIs			All		
		2010	2011	2012	2010	2011	2012	2010	2011	2012
1	Not Follow	1.15	13.01	17.59	1.89	60.8	67.82	1.55	43.88	57.8
2	8	-	0.41	0.00	0.24	0.22	0.00	0.13	0.29	0
3	8-11	0.57	1.22	0.93	0.24	-	0.00	0.39	0.43	0.19
4	11-12.5	5.44	4.47	20.37	4.25	1.11	14.12	4.79	2.3	15.4
5	12.5	21.5	23.58	17.59	52.1	18.3	12.73	38.3	20.14	13.7
6	12.5-15	0.86	4.47	76.85	2.83	10.5	30.79	1.94	8.35	40
7	15	69.6	50.41	50.00	38.4	7.8	3.70	52.5	22.88	13
8	15-20	0.29	0.81	50.93	-	-	3.70	0.13	0.43	13.2
9	20	0.57	1.22	0.93	-	0.22	0.00	0.26	0.43	0.19
10	Above 20	-	0.41	0.00	-	1.11	0.00	-	0.86	0

Source: CDF annual survey 2010 to 2012.

Data: The data for estimating microcredit demand function is copyrighted by Bangladesh Bureau of Statistics. It is, however, 120 pages in 9 font size in TNR single space. The soft copy can be supplied upon request for academic exercise only.

References

- Armendáriz, B. and Morduch, J. 2010. *The Economics of Microfinance*, Second Edition, Cambridge, Massachusetts: MIT Press.
- Balogun, O.L. and Yusuf, S.A. 2011. Determinants of Demand for Microcredit among the Rural Households in South-Western States, Nigeria. *Journal of Agriculture & Social Sciences* 7: 41-48.
- Bernanke, B.S. and Blinder, A.S. 1988. Credit, Money, and Aggregate Demand. *American Economic Review Papers and Proceedings* 78(2): 435-439.
- Conroy, J.D. 2008. Financial Inclusion: A New Microfinance Initiative for APEC. Paper presented at *Microfinance Workshop*, The APEC Business Advisory Council, Grand Hyatt, Jakarta, 23 January.
- Cull, R., Demirgüç-Kunt, A. and Morduch, J. 2008. Microfinance Meets the Market. *Policy Research Working Paper 4630*, Washington, D.C.: World Bank.
- Cuong, N.V. 2008. Is a Governmental Micro-Credit Program for the Poor Really Pro-Poor? Evidence from Vietnam. *The Developing Economies* 46(2): 151-187.
- Dehejia, R., Montgomery, H. and Morduch, J. 2012. Do Interest Rates Matter? Credit Demand in the Dhaka Slums. *Journal of Development Economics* 97: 437-449.
- Faruqee, R. 2010. Microfinance for Agriculture in Bangladesh: Current Status and Future Potential. *Working Paper No. 8*, Dhaka: Institute of Microfinance.
- Faruqee, R. and Badruddoza, S. 2011. *Microfinance in Bangladesh: Past, Present and Future*, Dhaka: Institute of Microfinance.
- Gross, D.B. and Souleles, N.S. 2002. Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data. *Quarterly Journal of Economics* 117(1): 149-185.
- Karlan, D.S. and Zinman, J. 2008. Credit Elasticities in Less-Developed Economies: Implications for Microfinance. *American Economic Review* 98(3): 1040-1068.
- Khandker, S.R. and Samad, H.A. 2013. Are Microcredit Participants in Bangladesh Trapped in Poverty and Debt?. *Policy Research Working Paper No. 6404*. Washington, D.C.: World Bank.
- Khandker, S.R. and Samad, H.A. 2012. *Microfinance Growth and Poverty Reduction in Bangladesh: What Does the Longitudinal Data Say?* Washington, D.C.: World Bank.
- Khandker, S.R. 2005. Microfinance and Poverty: Evidence Using Panel Data from Bangladesh. *World Bank Economic Review* 19(2): 263-286.
- Khalily, M.A.B. Khaleque, M.A. 2013. Access to Credit and Productivity of Enterprises in Bangladesh: Is there Causality? *Working Paper No. 20*, Dhaka: Institute of Microfinance.
- Khandker, S.R. and Pitt. M.M. 2003. *The Impact of Group-Based Credit on Poor Households: An Analysis of Panel Data from Bangladesh*, Washington, DC: World Bank.
- Mersland, R. and Strøm, R. Ø. 2010. Microfinance Mission Drift? *World Development* 38: 28-36.
- Mpuga, P., 2008. Constraints in Access to and Demand for Rural Credit: Evidence in Uganda. A Paper for Presentation during the African Economic Conference (AEC), 12-14 November, 2008, Tunis, Tunisia.
- Mpuga, P., 2004. Demand for Credit in Rural Uganda: Who Cares for the Peasants? A Paper Presented at the Conference on Growth, Poverty Reduction and Human Development in Africa Centre for the Study of African Economies, March 21-22. http://www.worldbank.org/wbp/impact/practice/annex1_2.pdf.

- Navajas, S., Schreiner, M., Meyer, R.L., Gonzalez-Vega, C. and Rodriguez-Meza, J. 2000. Microcredit and the Poorest of the Poor: Theory and Evidence from Bolivia. *World Development* 28: 333-346.
- Osmani, S.R. 2014. Has Microcredit Helped the Rural Poor of Bangladesh? An Analytical Review of the Evidence So Far. *Working Paper No. 23*, Dhaka: Institute of Microfinance.
- Osmani, S.R. 2012. Asset Accumulation and Poverty Dynamics in Rural Bangladesh: The Role of Microcredit. *Working Paper No. 11*. Dhaka: Institute of Microfinance.
- Pitt, M.M. and Khandker, S.R. 2003. The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy* 106(5): 958–996.
- Pitt, M.M. and Khandker, S.R. 2002. Credit Programmes for the Poor and Seasonality in Rural Bangladesh. *Journal of Development Studies* 39(2): 1-24.
- Rahman, A. and Kabir, M. 2004. Microfinance, Rural Power Structure and Empowerment: A Look into Changing Realities in Bangladesh. Microcredit Special article published on the occasion of Asia-Pacific Region Microcredit Summit in Dhaka, *The Daily Star*, 15 February 2004.
- Razzaque, M.A. 2010. Microfinance and Poverty Reduction: Evidence from a Longitudinal Household Panel Database. *Bangladesh Development Studies* 33(3).
- Razzaque, A. 2005. Microfinance and Women’s Empowerment: An Econometric Investigation. In: *The Follow-Up Monitoring and Evaluation System (MES) Study: Second Poverty Alleviation Microfinance Project*, study report prepared for the Palli Karma-Sahayak Foundation (PKSF), Dhaka.
- Roberts, P.W. 2013. The Profit Orientation of Microfinance Institutions and Effective Interest Rates. *World Development* 41: 120-131.
- Rosenberg, R., Gonzalez, A. and Narain, S. 2009. The New Moneylenders: Are the Poor Being Exploited by High Microcredit Interest Rates? *Occasional Paper No. 15*, Washington, D.C.: CGAP
- Tsukada, K., Higashikata, T. and Takahashi, K. 2010. Microfinance Penetration and Its Influence on Credit Choice in Indonesia: Evidence from a Household Panel Survey. *The Developing Economies* 48(1): 102–127.
- Yunus, M. 2011. Sacrificing Microcredit for Megaprofits. *New York Times*, January 14.