uals are granted the possibility to access local financial markets and to invest in small businesses. This approach is also interesting to encounter the often assumed insufficient creditworthiness of the poor, which is one of the main arguments to explain why contracts between standard banking institutions and poor people are often said to be not feasible. Yunus argues that "[o]ne major institution that needs to be redesigned is the financial institution", and in fact criticises that poor people are often not assumed to be credit-worthy (Romanes Lecture, 2008).

The design of group-lending by Grameen Bank described above can be formalized by means of a game-theoretical approach. In fact, the design involves a trigger strategy. All players (hence, the MFI and a group of five borrowers) cooperate, until one group member defaults. The result is that the MFI denies any further loan to any group member, which is the trigger here.

I assume that lending is made simultaneously to all group members. Player 1 is the microfinance institution, player 2 is the group.[3] The basic play resembles a prisonner's dilemma: the social optimum is achieved if both players cooperate, that is, if the microfinance institution grants credit and all group members eventually repay. However, one or more group members may defect and use the loan to invest in too risky projects that bear higher profit, but are also more likely to fail. In the latter case, I assume that the exclusion from further loans is the only sanction, but no repayment claims on the part of the MFI are made.

Figure 1 shows the normal form for a 2×2 payoff matrix in a repeated game.

		Player 2 (group)	
		cooperate	defect
Player 1 (MFI)	cooperate	a_1, a_2	b_1, b_2
	defect	c_1, c_2	d_1, d_2

Figure 1: *Payoff matrix for group-lending (microfinance game)*

To ensure long-term cooperation on the part of the group and continuous repayment of loans, the sum of discounted profits in every period for cooperating for player 2 (and in fact, for every group member) has to exceed the sum of discounted profits from defecting

[3] To keep structures simple, the group of m players is perceived as one single player, as no member ever receives credit again if one of them ever defaults and all group members share common characteristics in behaviour.

of s being a function of k as the "saving trap" (see Figure 3 in Sachs et al., 2004). Accelerated convergence towards $\tilde{k}_{SS} = 0$ in case of high population growth rates have been referred to as the "demographic trap" (see Figure 4 in Sachs et al., 2004).

Based on a study of the Bank of Uganda where the saving and borrowing behaviour of more than 300 Ugandan households was analysed, Musinguzi and Smith (2000) found that 76.2 % of rural Ugandan households did not save at all, compared to 64.6 % in urban areas. On average, 85.4 % claimed low income as the main reason, another part indicated difficulties in accessing financial institutions as a binding constraint (p. 9). Low income is likely to remain low if individuals do not have the opportunity to access financial institutions — in order to save at least a minor part of income with positive interest yield, or to obtain credit of minor scale to start small businesses, for example. But this is exactly the point where the idea of microfinancial institutions applies. By providing the opportunity to save and borrow in smallest scales, the vicious circle of low income, low saving, and poor growth can be intermitted at microeconomic levels. If the poverty trap model applies in a given country, then the presence of well functioning microfinance institutions may not only enhance aggregate growth by supporting the poor with credit, but it can also increase confidence of foreign investors, for instance. They may be attracted by a sound base for development and take advantage of increasing returns to scale for low levels of capital accumulation in developing areas. This, in turn, can reinforce complementary industrial growth. Honohan (2004) argues that the existance and functioning of sound financial institutions may further poverty reduction especially well compared to alternative mechanisms (p. 43). Microfinance may be one such promising mechanism alleviating poverty and contributing to aggregate growth at the same time.

3.3 From Macro- to Microeconomic Levels

Economic problems are often categorised in either merely microeconomic or merely macroeconomic issues and analysed accordingly. Poverty is, however, a phenemenon that requires the involvement of both perspectives to be studied in all detail and to be understood comprehensively.

Yunus (2007) addresses the issue that intermediary systems of all kind, notably governments, non-profit organisations, and multilateral institutions such as the World Bank, with the aim to eradicate poverty, in fact fail to do so in an efficient and comprehensive

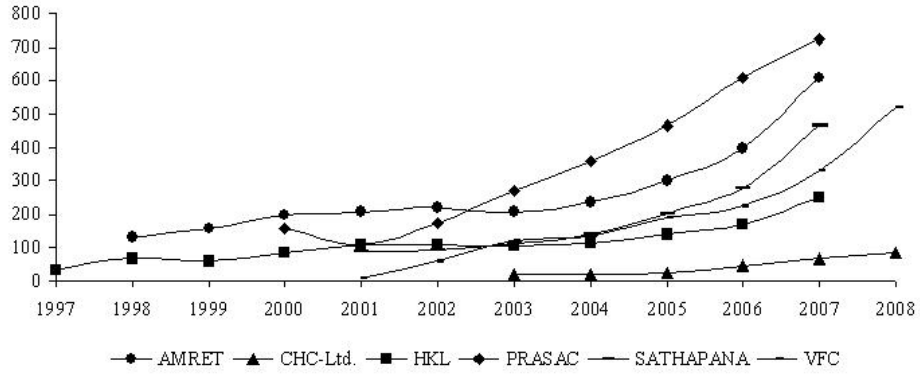
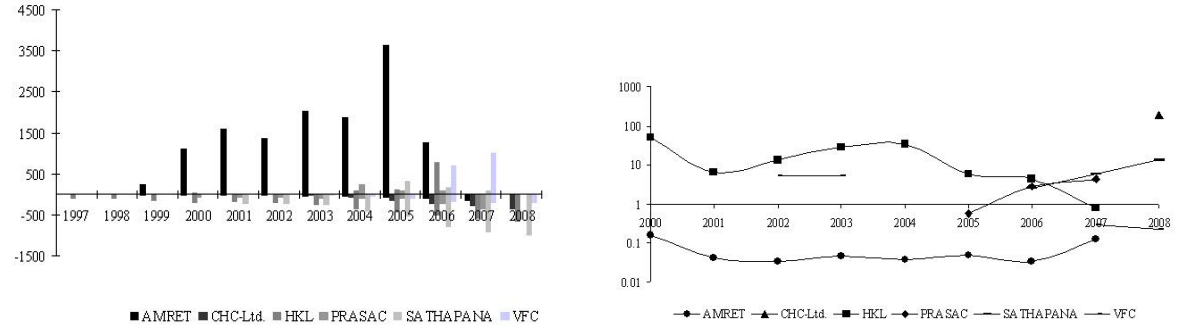


Figure 9: *Personnel working with microfinance institutions in Cambodia*

more heterogenous here (see Figure 10). While high volatility can be observed for HKL and PRASAC, VFC's percentage of female borrowers is, for example, mostly stable. SATHAPANA initially served female borrowers only, but accepted men since 2006, such that the ratio reached 2.7 women per male borrower in 2008. While AMRET shows a slightly positive development, CHC-Ltd. shows a negative trend.

AMRET obviously occupies a special position as it comes to the relation of average credit to savings. Here, savings are clearly higher than loans by factors up to 29.9 (2002). The lowest ratio of credit to savings was reached in the year 2000, when an average of 6.26 USD of saving deposits per dollar of granted loan was obtained. While VFC used to reveal the typical pattern of loans exceeding savings, this trend has inverted in recent years. HKL shows a convergence towards one. For CHC-Ltd. and SATHAPANA, however, the trend seems such that the ratio of loans to savings still increases over time.

For the microfinance institution SATHAPANA, data on the percentage of clients starting a microenterprise for the first time and on percentages of clients living in moderate poverty were published for the period from 2001 and 2004. 60–65% of the MFI's clients disposed of less than 2 USD per day, and up to 50% lived in the bottom half below this poverty line. Nevertheless, a fairly high percentage of around 40% of the poor started small businesses for the first time. Despite living in deep poverty, microfinance incentives seem to encourage great part of the poor to start their own small businesses. Indeed, Yunus (2007) argues that enhancing private entrepreneurship contributes more to poverty reduction than standard employment does (p. 85), supporting selfhelp on local levels. This is based on the belief that every human being may act as potential



(a) Average loan/savings balance per borrower/saver

(b) Loan to savings ratio

Figure 11: *Average loans and savings in Cambodian MFIs (in USD)*

display a convergence to 100% female debtors over time. As the focus on female clients is especially obvious here, one should also note the discussion on gender inequality to which attention was drawn by Barsoum (2006), for instance. If a woman occupied the position of an intermediary between an MFI granting credit to her and her male relatives actually having the loan at command, she would not benefit — which would be counterproductive. Excluding microfinance services are hence regarded as not sustainable in the long run.

Although Life Bank and NWTF have shown positive developments in the number of savers since 2002 at about the same absolute level as with borrowers, the actual amounts being saved always remained below 10 USD, while granted loans ranged between 50 and 290 USD over time and institution. The focus on microcredit is especially clear here, which might either be due to the fact that the economic situation of microfinance clients does not yet allow for higher saving deposits, or that the institutions's focus really is on lending. Also, large numbers of borrowers and relatively large amounts of average credit compared to savings may again be traced back to stable outcomes of group-lending schemes as discussed in the setting of the microfinance game.

4.4 Econometric Analysis

In order to assess the impact of microfinance institutions econometrically, one has to consider several aspects which directly affect the value of empirical results. First, a response variable that represents a suitable proxy for development within a country must be specified and its justification, advantages and disadvantages should be discussed

Obtaining microcredit can enable borrowers to initiate small projects and engage in productive economic activities, which in turn can increase disposable income and the opportunity to save part of it. A number of clients also start microenterprises. In order to examine if granted loans affect savings (within the same microfinance institution where loans were obtained), the variables b and FME have to be considered, where b is the average loan balance per active borrower and FME denotes the percentage of clients who established a microenterprise for the first time. An interaction term ($b \times FME$) captures a possible dependence between the decision to establish a small business and the average loan that is granted by the microfinance institution.

Microfinance institutions are associated with targeting poor parts of a population. The range of granted loans' size should reflect the actually targeted group. The percentage of loans below 300 USD granted on microlevel can mirror the income development of especially poor segments: if a considerable part of small amounts of credit is observable, savings of the very poorest individuals can be enhanced. In this regard, the image of the concerned microfinance institution can contribute to poor people's affirmative attitude towards savings. The smaller the available loan, the more likely poorest individuals can start productive economic activities.

Country-specific factors can result in possible differences between an MFI's impact on development, as well. Analysing countries in Africa and Asia, a continent dummy A should be considered, where $A = 1$ if an MFI operates in Africa and $A = 0$ if it operates in Asia. Instead, a set C_i of country dummies could be employed in case it is reasonable to assume significant differences in country-specific impacts. As there are more than two countries to be studied, an appropriate dummy variable would have to be constructed such that perfect multicollinearity is avoided. By defining a separate dummy for each country, that is

$$C_i = \begin{cases} 1 & \text{if MFI is operating in country } i \\ 0 & \text{otherwise} \end{cases}$$

($\forall i \in [0, 1, 2, 3]$) and including C_1, C_2, and C_3 into the regression equation, the problem of perfect multicollinearity would not occur (Carter Hill, Griffiths, & Judge, 2001, pp. 206–207). Ethiopia (for $i = 0$) would appear as reference group here. However, it is more sensible to to presume significant differences in a broader geographical dimension, as the economic environment of selected African respectively Asian countries are similar.

5 Conclusions

Yunus argues that "[w]hen the time is right, a new idea is capable of transforming the world" (Grameen Foundation), implying that an idea implemented at convenient time may be a key element of poverty reduction. The empirical analyses carried out in this paper suggest that microfinance institutions have in fact a positive influence on development in the developing world.

Based on descriptive analyses of selected microfinance institutions, it is striking that the numbers of employees as well as clients have been strongly increasing during the past decade, implying increasing demand for microfinance services. Women are especially encouraged in engaging in microfinance businesses. Augmented loan portfolios may also be evoked by the success of group-lending schemes where a trigger strategy in repeated microfinance games is responsible for well functioning repayment systems despite the lack of standard collateral requirements.

Modelled after the idea of a poverty trap adjusted Solow model, average savings per saver as development indicator prove very suitable in 2006. This approach is also the most self-consistent and moreover theoretically well founded concept. According to a cross-sectional estimation of the linear model, an increase in microcredit by 1 USD results in an increase in savings by 0.47 USD on average. A microfinance institution's experience strongly affects average amounts of granted credit.

The perspectives for microfinance institutions in the future can thus be gauged as fairly positive. Their contribution to development of the poor functions in their continent of origin, Asia, as well as in African countries. The concept therefore is most likely independent from differences in economic, political, and cultural factors. Particularly against the background of great heterogeneity in the roots of weak development and the lack of theories to explain them comprehensively, microfinance institutions are a good mechanism to enhance development despite imperfect knowledge of the interdependence of underlying reasons.

Further studies on this topic should focus on gathering more encompassing data on microfinance institutions, inlcuding longer time series, and use them to conduct panel studies, for instance. The main task here is to collect data from microfinance institutions that have not been published yet and to compare results with respect to significance and robustness.

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