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Over-indebtedness and Microfinance Constructing an Early Warning Index



Council of Microfinance Equity Funds

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Preface

Microfinance has grown rapidly in recent years and provides access to financial services to millions of poor people worldwide. It is a powerful tool for the poor that helps address life's opportunities and challenges. As in any growing market, the success of microfinance has attracted new entrants.

In many countries, microfinance clients therefore not only have access to credit from one single institution, but can choose from a number of lenders. Many clients also have access to (micro-)deposits and general payment services. Building an inclusive financial system has always been at the core of the microfinance initiative. As of today, the disbursement of microcredit is however the most prominent element of microfinance.

A key to the success of microcredit is the thorough assessment of microcredit borrowers' repayment willingness and capacity, resulting in high repayment rates. However, some microfinance markets have become overheated. Borrowers have taken on too much credit that they eventually cannot repay. Such borrowers may end up "over-indebted". Possible drivers of over-indebtedness in a microfinance market are the facts that informal sources of financing as well as consumer lenders are widespread, credit bureaus are not in place or not functioning well and some microfinance institutions (MFIs) follow aggressive growth or do not customize their products to actual demand.

The phenomenon of over-indebtedness is not new to microfinance as the risk is, to a certain extent, linked to market development itself. Over-indebtedness of microcredit borrowers however can, in the first place, be detrimental due to the material psychological and social consequences of being unable to respond to repayment obligations. Second, over-indebtedness can hamper financial sector development by harming the trust relationship between (financially inexperienced) microcredit borrowers and MFIs. Third, over-indebtedness is a great risk to the quality of the loan portfolio of MFIs, and subsequently constitutes a risk for investors in microfinance. Due to the detrimental impact over-indebtedness can have, all possible efforts should be undertaken to prevent markets from overheating, without holding back the desired market development in general. This is a key challenge to the entire industry.

The microfinance industry is still in its adolescence and as it matures will have to address its challenges in a balanced manner. With microfinance increasingly becoming part of the local and international financial system, it also faces problems of the finance industry in general, and responsible investors will need to have an honest discussion about the challenges in microfinance in order to contribute to a sustainable development of the industry.

As responsible investors, we have always placed great importance on reducing the risk of over-indebtedness. For example, we select MFIs that comply with the Client Protection

Principles and apply responsible underwriting practices. In an ideal world, an accurate early warning system would signal critical market developments early enough so that the most devastating impacts could be avoided. To date, over-indebtedness crises that shook an entire country's microfinance sector often became evident only at the moment over-indebtedness of individual borrowers was already quite prevalent. Often-quoted examples include Bolivia (1999), Bosnia and Herzegovina and Morocco (2008). These cases of over-indebtedness urge for the construction of an early warning system: with the lessons learnt from the past, we actively approach the risks of the future. This study provides the first comprehensive and consistent academic exercise to establish a methodology towards an early warning index for over-indebtedness in microfinance, with the goal to support the industry in preventing future crises.

The key outcome of this study is a set of 14 indicators that can potentially signal a growing risk for over-indebtedness in any given microfinance market. Another key finding is the lack of available, accurate and consistent data, making a thorough quantitative analysis of the past crises impossible.

As a consequence, the results of this study must be treated with great caution. It is important to understand that a country with a high index score will not necessarily experience an over-indebtedness crisis. The study by no means suggests that MFIs in countries with a higher score are over-indebting their borrowers nor that lending to MFIs in these countries should be stopped. Instead, based on what we learnt from past crises as presented in this study, we can say that some markets show stronger signals for an increased risk of over-indebtedness.

The index presented as part of the study does not include possible preventive measures or policy responses to crises outbreaks. It is of course possible that a country associated with a higher risk can preempt an over-indebtedness crisis by reacting early. The results of this study indicate, however, that there are early warning signs in some markets that should be taken seriously and preventive measures should be looked at to prevent the market from the detrimental effects of a possible full crisis. This is the main purpose of trying to establish an Over-Indebtedness Early Warning Index.

As responsible investors, we believe it is the responsibility of all stakeholders (including investors, regulators and MFIs) to take the signals described in the study seriously and adopt necessary steps to reduce the risk of future over-indebtedness crises. We will continue to take actions to develop self-regulatory mechanisms, support policy makers in improving regulation, encourage more efficient credit information systems and foster the development of a sustainable microfinance sector.

We would like to stress the need for continued research, and recommend that in a further stage, research will concentrate on collection of comprehensive data, further development and refinement of indicators, and testing and validating the resulting early warning index.

Ideally, the available data would be complemented by systematic household surveys. Also, the index should be applied to more countries and, for some countries, applied to different regions within a country.

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Over-Indebtedness and Microfinance –
Constructing an Early Warning Index

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Abstract

This study examines a method to collect and explore data on the conditions that could lead to crises due to microfinance clients' over-indebtedness. A simplified version of one of the main approaches to early warning systems, the "signaling approach", is proposed to construct a composite index for predicting over-indebtedness crises in the microfinance industry. The index is built for a sample of 13 countries, among them countries where over-indebtedness crises and other repayment occurred in the past. Data stems from a triangulation of primary and secondary data sources. The sample results in a preliminary classification of the countries according to their current risk for an over-indebtedness crisis. The study suggests the proposed preliminary composition of the index and makes recommendations on the data collection for further validation of the index before it is expanded to a larger set of countries.

Keywords: microfinance, early warning index, indebtedness, multiple borrowing

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Table of Contents

- 1 Introduction and Motivation for the Study..... 7**
- 1.1 A Definition of Over-Indebtedness 7
- 1.2 Research Objective 8
- 2 Literature Review 10**
- 3 Research Methodology and Data..... 13**
- 3.1 Methodology 13
- 3.2 Data Sources 16
- 3.3 Selection of Countries 17
- 4 Description of Index Variables 19**
- 4.1 Measurement for Over-Indebtedness 19
- 4.2 Categories of Indicators 20
- 4.3 Macro-Level Indicator 22
- 4.4 Industry-Level Indicator 26
- 4.5 Firm-Level Indicator 32
- 4.6 Household-Level Indicator 37
- 5 Index Construction and Results..... 38**
- 6 Further Research 44**
- 7 Conclusions and Outlook 46**
- 8 Appendix 47**
- 8.1 References 47
- 8.2 Data Sources 50

Figures

Figure 1: Penetration Rate (Using National Poverty Line) and PAR 30 Values for Bosnia and Herzegovina	29
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Tables

Table 1: Pilot Countries for the Over-Indebtedness Index Construction	18
Table 2: Variables Analyzed for Possible Use in the OID Index	22
Table 3: Market Penetration Rates for Sample Countries in the Year 2009	28
Table 4: Composition of Qualitative Variables Drawn from the Survey.....	33
Table 5: Leading Indicators Used in the OID Index	39
Table 6: An Application of the OID Early Warning Index	41

1 Introduction and Motivation for the Study

In the last few years, microfinance has increasingly attracted the interest of the financial sector, academic research and the general public (Dieckmann 2007, Leleux et al. 2008, EIU 2010). It has evolved from donor-and charity-driven microcredit to the provision of a wide range of small-scale financial services to those segments of the population suffering from access barriers to the formal financial sector, and has matured as an industry and as an integral part of the formal financial sector in many countries.

Globally, microfinance is maturing, and it seems less prone to crisis than the formal financial sector, although microfinance service providers have been experiencing some consequences of the global financial crisis of 2008 with a year lag (Stephens 2009). However, there may be numerous reasons causing a crisis in a local microfinance market. There is one particular type of crisis that different countries have been increasingly experiencing. While a clear-cut definition among industry experts and practitioners is still largely missing, there is mutual consent that over-indebtedness of microcredit borrowers is a growing risk in microfinance and sometimes even considered one of the most serious risks. It is considered detrimental to borrowers due to the material, psychological and social consequences of being unable to respond to repayment obligations (Schicks 2010). From the point of view of any lender, over-indebtedness is detrimental once it affects the lender's portfolio quality, whereas socially oriented lenders will also aim at avoiding over-indebtedness for the above-mentioned material, psychological and social damages to their customers.

1.1 A Definition of Over-Indebtedness

While a number of definitions list potential reasons for over-indebtedness (such as multiple lending), focus on measurement of over-indebtedness, or do not distinguish between over-indebtedness and repayment crises, this study follows a more stringent definition. Over-indebtedness of individuals or households can be defined as the inability "to repay all debts fully and on time" (Haas 2006, 3). First of all, a household is over-indebted if they cannot cover all payment obligations arising from all debt contracts in a given period by the excess cash, i.e. periodic cash income not used to cover all periodic expenses of the debtor, during that period (Maurer/Pytkowska 2010, Wisniwski 2010). It should be noted that this definition still misses a dynamic perspective. Over-indebtedness only occurs if this situation occurs chronically, i.e. in several periods in a row (see Wisniwski 2010) and against the borrowers' will (Schicks 2010). Also Haas (2006) states a dynamic relationship between over-indebtedness and characteristics of borrowers and credit markets, similarly Gonzalez (2008b) and Vogelsang (2003).

Both the static one-period and the more dynamic multi-period definition immediately lead to the most direct way of measuring risks of over-indebtedness. A regular household survey or frequent census data on microfinance clients' household and enterprise finances, in particular its obligations from outstanding debt and its periodic cash flows related to income and expenses, would allow the calculation of growing debt burdens. This would uncover over-indebtedness of survey subjects and estimates of its prevalence in the underlying population. However, those surveys are missing in most microfinance contexts, in particular for previous (pre-crisis) years. The recent pilot studies on global access to financial services measure supply of financial services from bank sector databases (Beck et al. 2007, 2008) and household demand for services by counting accounts (World Bank 2010, Honohan 2008).

Recent attempts to record the finances of typical microfinance clients in "financial diaries" (Collins et al. 2009) have shown the complexity of information gathering on household finances and thus, the limitations of large-scale quantitative surveys in these contexts. In the absence of household data the study needs to take a more indirect route towards measuring over-indebtedness and, in particular, early signs that such a situation could occur in the near future on a large scale.

1.2 Research Objective

To date, over-indebtedness crises that shook an entire country's microfinance sector became known only when over-indebtedness of individual borrowers was already quite prevalent. Often-quoted examples include Bolivia after 1999, Bosnia and Herzegovina since 2008, and Morocco since 2008 (Chen et al. 2010). Over-indebtedness is deemed detrimental from both the social and the financial point of view, and therefore several studies have tried to disentangle this phenomenon from other crises, and to develop a better understanding of the reasons underlying over-indebtedness. There seems a suspicion that, despite the idiosyncratic manifestation of the known over-indebtedness crises to date, there might be endogenous factors, homegrown in microfinance markets, and possibly even caused by certain evolutions of the microfinance service providers, which can be traced in all crises. If this is the case, then early information and an early warning system about a potential next crisis seem to be an important diagnostic tool for market participants and policy makers (Edison 2003).

However, even the information on the open crises is almost surprisingly sparse and often based on expert opinions and scattered data. Some crises that affected portfolio-at-risk and repayment indicators in individual microfinance markets were due to problems other than over-indebtedness. What is missing are more systematic data on the conditions that led to crises of over-indebtedness, and systematic information to predict when over-indebtedness of microfinance clients becomes a structural problem. Several recent contributions delineate which elements should be included in such a system (KfW 2010, Wisniwski 2010). This study develops and pilots a methodology for an early warning system to signal a problem with over-

indebtedness in a microfinance market. The objective is to identify elements of an early warning index and a feasible method to build this index, based on a pilot sample of a limited number of countries. Given the severe data limitations identified during the course of the research, the study further demonstrates what data are needed to continue building, testing and validating the early warning index indicator more systematically.

The study is following a quantitative approach by measuring a range of variables suspected to react before the onset of an over-indebtedness crisis, in the pilot countries. Based on a measurement and weighting of these lagged reactions to a leading indicator, an index composed of indicators and sub-indicators is constructed and measured for the sample countries. Details and limitations of this method are discussed in more detail below.

The study is organized as follows: Section II reviews findings on over-indebtedness of borrowers as well as the reviews of past crises of microfinance over-indebtedness in the literature. In Section III, we explain the data and research methodology to construct the early warning indicator. Section IV presents the choice of variables included in the indicator and the choice of countries in the sample. Section V describes the construction of the index and discusses results. The need for further research to validate preliminary results is discussed in Section VI, and Section VII presents a brief conclusion and outlook on the method chosen.

2 Literature Review

Most definitions and analyses of households' over-indebtedness are from developed economies with a tradition of legal and industry rules on consumer protection (see for example Korczak 2003). These analyses emphasize a relationship between poverty status, critical indebtedness and the costs and quality of financial services (Caplovitz 1967 and 1974, quoted in Haas 2006). In this view, even in developed economies, poverty leads to sub-prime lending conditions further aggravating debt burdens. Over-indebtedness has thus a dynamic aspect and is not isolated from features of the credit markets.

Over-indebtedness of microfinance clients has been studied in several settings. To date and to the authors' knowledge, no quantitative comparative cross-country studies have been undertaken. The existing qualitative and in-depth studies help selecting the range of variables to be included in the data collection for the index.

Based on a cross-country analysis of MFI ratings from the MicroFinanza rating agency, Guarneri/Spaggiari (2009) list a number of factors that may contribute to over-indebtedness, among them multi-borrowing from different, in particular informal lenders, aggressive growth targets of MFIs, "weak" policies and practices of assessing customer repayment capacities, and the absence of effective credit information systems. However, they do not differentiate findings by country. Duquet (2006) equally emphasizes the need for credit information sharing but also for consumer protection through increased transparency on loan conditions to reduce over-indebtedness dangers.

In a qualitative cross-country analysis of recent microfinance over-indebtedness crises in Nicaragua, Morocco, Bosnia and Herzegovina (BiH), and Pakistan, Chen et al. (2010) list as main causes (1) a concentrated market, which is manifested through competition and the existence of multiple borrowing, (2) overstretched MFI systems and controls, and (3) an erosion of MFI lending discipline. Aggravating factors, but not root causes of crises, are the global economic crisis of 2008 and "non-repayment movements" (such as in Nicaragua and Pakistan). Arguably, such politically motivated movements differentiate the crises in Nicaragua and Pakistan from those in BiH and Morocco. Gonzalez (2010) analyzes the relationship between growth rates of MFIs' number of borrowers and borrowers per branch of individual institutions on portfolio quality. While not specifically focusing on over-indebtedness, he finds that strong growth of borrowers per branch ("local growth") and market conditions ("country context") such as aggregate country growth levels in number of borrowers are associated with deterioration of portfolio quality. The study also shows the importance of differentiating market conditions within a country, in particular more and less penetrated markets. Most commonly, such differences exist between urban and rural markets.

Single-country or single-market studies provide further information on possible relationships between industry- and firm-level factors and the chain of events of over-indebtedness crises or other repayment crisis. The European Fund for Southeast Europe (EFSE) identifies multiple borrowing (i.e. borrowing from different sources during the same period) and an overuse of salaried (i.e. wage-earning) individual guarantors who are borrowing themselves, as some of the major factors contributing to over-indebtedness in Bosnia and Herzegovina (Maurer/Pytkowska 2010).

Multiple borrowing, also termed cross-borrowing, together with lenders' restriction of loan sizes, is also cited as a major factor for over-indebtedness in the case of Ghana (ProCredit 2009, Pollio/Obuobie 2010). Even more recently, a report on Peru for a total of around 2.5 million customers estimates that multiple lending is an important feature in the domestic market with as much as 20% of microfinance clients having loans from more than one institution (Copeme Microfinanzas 2010), a number even considered low by some experts. However, the operational definition of over-indebtedness below supports the view that multiple borrowing is not necessarily a problem as long as debt service of borrowers is not affected.

The use of salaried guarantors is an example of a lending methodology typically found in consumer lending. Indeed, the inflow of consumer lenders offering products similar to microfinance products in terms of loan amounts, terms and prices but using consumer lending techniques is cited as one of the major reasons for the first known over-indebtedness crisis in microfinance in Bolivia erupting in 1999 (Rhyne 2001). Other reasons include the sharp rise in loan supply and multiple borrowing from different lenders (Vogelsang 2003) and yet others show a dynamic of microfinance over-indebtedness and macroeconomic factors (Marconi/Mosley 2005, see also Gonzalez 2008b).

It has been widely recognized that microfinance services should include loans for other than micro-enterprise investment purposes (see for example Helms 2006, Collins et al. 2009, Schicks 2010). However, several aspects of consumer lending seem to affect microfinance clients as shown in several studies. A study on wage earners' credit in urban financial markets in South Africa also indicates that in this context, over-indebtedness is typically due to consumer loans accessible mostly to the regularly employed (Hurwitz/Luis 2007). Similarly, Puja Campos (2008) identifies high levels of consumption of fast moving consumer goods combined with low levels of financial literacy as one of the main factors contributing to over-indebtedness of commercial bank customers in Chile.

Not only the case of Bolivia but also the examples of South Africa and Chile thus show that it is important to explore to what extent (1) microfinance lenders, typically targeting self-employed and micro-entrepreneurs, adapt lending techniques (such as the overuse of salaried guarantors and scoring techniques) and target markets of consumer lending, and (2) consumer lenders market their products to typical microfinance clients.

Yet another situation is presented for several regions in India since 2008 (see for instance Guerin (2008) and Economist (2010) for an overview), because of the much less clear diffusion of typical microfinance products offered by microfinance lenders in the widest sense, as compared to products of other lenders, including in particular government and informal sector lenders. Moreover, with the crisis manifested in some states of India only, the Indian context is too heterogenous and different enough not to be included it in this study.

The case of Morocco shows that, besides the introduction of consumer lending techniques or products, other ways of relaxing microfinance credit policies during periods of strong outreach and institutional growth can lead to client over-indebtedness if governance, management information systems and internal controls of microfinance service providers do not counteract such a slackening (Reille 2009). Similar factors are quoted as contributing to over-indebtedness in Punjab/Pakistan (Burki 2009), where microfinance suppliers expanded quickly while adapting aggressive marketing strategies and relaxing internal controls of the credit allocation process. A clear example of relaxing standards of loan officers' responsibilities is evident in the case of Zambia (Dixon et al. 2007). It is therefore important to include institutional factors in an analysis of early warning signs for over-indebtedness.

3 Research Methodology and Data

3.1 Methodology

The concept of over-indebtedness suggests a direct measurement of household-related factors to identify early signs that over-indebtedness could become a general phenomenon of a significant share of microfinance clients. Following the dynamic definition and findings on earlier crises of over-indebtedness discussed above, the study proposes, however, that there exists a broad range of country-, industry- and firm-level variables that indirectly influence the level of over-indebtedness of microfinance borrowers. Although this influence cannot yet be tested statistically, this paper suggests that a combination of those relevant factors can thus be considered a feasible approach to establish an early warning system.

Early warning systems (EWS) have been discussed intensively in the economics literature, in particular with regard to predicting currency crises (for a comprehensive review see Berg et al. 2004). Basically, there exist two different methodological approaches for constructing EWS models. The first is the "signaling approach" pioneered by Kaminsky et al. (1998). The idea is to evaluate and define a set of indicators that tend to behave differently prior to a crisis and determine threshold values that (according to historical crisis episodes) have shown to be *associated with* the onset of a crisis. Second, "logit and probit" models are used to empirically determine the main factors that *explain* currency crises. While the latter approach usually requires large samples, the signaling approach works also with small samples (Zhuang and Dowling 2002).

In this study, an adjusted version of the signaling approach is used to construct a composite index for predicting over-indebtedness crises in the microfinance industry.

The reason for this adjustment is the size of the sample for which the indicators that can be used as early signals for over-indebtedness are evaluated. The empirical evaluation is based on the countries that have experienced over-indebtedness. Industry experts agree that to date the following three countries have undergone a serious over-indebtedness crisis: Bolivia (1999), Bosnia and Herzegovina (late 2008) and Morocco (early 2008). Moreover, a repayment crisis occurred in Nicaragua in 2008 and 2009. Given that data from the MIX Market database are available only for the years since 1996, the identification of early warning signals for the case of Bolivia is limited. The low number of crisis countries may critically restrict the significance of the findings.

The signaling approach comes along with some specific requirements. First, a distinct definition of the term "crisis" within the particular context must be provided. Since there is no precise definition of the term "microfinance over-indebtedness crisis" in the literature, we use crisis episodes from the past (i.e. Bolivia, Bosnia and Herzegovina, Morocco and, to some

extent, Nicaragua) to establish a crisis definition, based on the literature and on interviews with various leading industry experts.

Second, the choice of indicators requires theoretical considerations as well as the verification of data availability. Indicators are defined using standard definitions from the data sources used (see below). Third, the "signaling horizon" must be defined. The signaling horizon is the period within which the indicators are expected to anticipate crises. An indicator is said to issue a signal whenever it departs from its mean beyond a given threshold level. If a signal is followed by a crisis within the signaling horizon, the signal is called a good signal, while it is called a false signal or noise in case there is no crisis after the signal is issued (Kaminsky et al. 1998).

As described in Zhuang and Dowling (2002), the following five steps are necessary to develop an early warning system:

1. Identifying historical crisis episodes
2. Selecting leading indicators as predictors of crisis episodes
3. Setting leading indicators' thresholds
4. Constructing composite leading indices
5. Predicting crises

The choice of potential leading indicators is based on a carefully conducted literature analysis. From a total of 57 variables initially considered for leading indicators, 14 household-level variables had to be dropped since they would require a distinct survey of household data. In a second step, a number of variables have to be left out since (1) MIX Market and other available data sources do not provide data on these variables and/or (2) data are not representative due to a too low response rate of the conducted survey. The final list of potential leading indicators includes 21 variables.

In order to determine whether a potential indicator serves as leading indicator, Kaminsky et al. (1998) recommend a signaling analysis. This means a check as to whether the values of a variable at any period prior to the crisis deviates by more than two standard deviations from its mean for a crisis country. If they do, it may mean that this variable in this period may serve as a signal and that it may indicate a higher risk for an over-indebtedness crisis.

Then, correlation coefficients between a potential indicator and the indicators determining the outbreak of a crisis should be calculated. Since it is the objective of this study to develop an early warning system, correlations have to be calculated using values of, for example, the PAR 30 during a particular crisis year/episode and the *lagged* values of a potential leading indicator.

This study uses portfolio-at-risk over 30 or 90 days (PAR 30/PAR 90) and write-off ratio (WOR) or loan loss rates (LLR), drawn from MIX Market and following standard definitions of the MIX, to measure the outbreak of an over-indebtedness crisis. The PAR 30/PAR 90 ratios and/or the WOR/LLR represent valid proxies for crisis episodes, with rising values of PAR typically preceding the rising values of write-offs. PARs represent measures of risk of default, while loan loss rate and write-off ratio are measures of default (Gonzalez 2007). A rise in PAR and defaults do not necessarily indicate over-indebtedness as the cause (Maurer/Pytkowska 2010) and can be due to other factors as well, such as external shocks (for instance related to climate or politically motivated repayment refusals) and can be underestimated in times of strong portfolio growth, as it was the case during Morocco's early crisis (Reille 2010). However, the studies reviewed do report that crises in the microfinance market are usually associated with a considerable increase in one of these measures. Thus, while the chosen empirical method cannot apply the conceptual difference that exists between any given risk of default and the risk of default due to borrowers' over-indebtedness, the open manifestation of an over-indebtedness crisis (its outbreak) can indeed be measured through a significant increase in the risk of default (PAR ratios), the further course of the crisis through the significant increase in event of default (loan loss rates and write-off ratios).

It should be noted that a regression analysis would be the most appropriate procedure to empirically analyze the relevance of particular variables for explaining over-indebtedness. It is important to remember that correlations are not indications of causal relationships between the variables.

The correlation coefficient should give an indication of the weight for the respective variable in the final index, the "Over-Indebtedness Early Warning Sign Index" (OID index). Due to the small sample size, a simplified version of the signaling approach is used to construct the composite leading index.

After compiling and using the available data, the signaling analysis was performed as described above. In addition, more sophisticated empirical analyses, in particular correlation analyses, were tried in order to determine whether the variables should indeed be used as leading indicators.

However, due to a number of reasons related to the existing data, the envisaged approach does not lead to statistically robust, significant results. One of the main problems is that for most of the relevant variables too few quantitative data points are available. Data go back 11 years at maximum and are available on an annual basis only. They are therefore not able to capture the ongoing movement in the variables. The result is that the signaling analysis by itself does not give a strong enough indication which of the variables should be a leading indicator. Moreover, the correlation analysis proves not reliable enough given the small amount of data available, in particular because we expect the lagged values to serve as better signals for the increased over-indebtedness risk. Furthermore, the correlation analysis

assumes a linear relationship between potential leading variables and the crisis variables, which may not always be the case in reality.

Another major problem is that even slight modifications in the definitions and scaling used for individual variables, based on literature and expert feedback, show how sensitive the measured quantitative variables are, depending on the definitions used and on the information included. Therefore, even some of the available quantitative data had to be adjusted manually to fit the specific problem of over-indebtedness. The description of the index variables below gives specific examples of these problems encountered. The study also describes what could be done to enable a more robust empirical analysis to give the OID index a more thorough foundation. For the reasons mentioned above, the construction of the composite leading index for this set pilot study differs from the standard signaling approach suggested above. While correlations from crisis countries at a significance level of 5% were used to determine the initial set of leading variables, their relevance is compared with earlier findings in the literature. Moreover, the chosen empirical approach differs with regard to the weights used for individual variables. The study uses exogenous weights of the variables considered leading indicators, determined by evaluating past crisis episodes and by using expert opinions. Two weighting systems were tested, (1) using equal weights for all variables and (2) emphasizing those variables that are considered factors influencing over-indebtedness in the literature and by experts. The index could thus be modeled to illustrate how the composite index changes when particular weights are adjusted.

The composite index and a preliminary application to predict crisis likelihood in the sample countries are presented in Section V.

3.2 Data Sources

This section describes the main sources that are used for this study. Data stem from a triangulation of data sources. First, macroeconomic and other country-level variables are drawn from existing data repositories. The most important databases used are the World Bank's Governance Matters data, the Doing Business reports and the World Development Indicators (WDI).

Second, data on the microfinance services in a country are drawn from MIX Market, an online data repository for microfinance service providers. The choice of MIX Market as platform for voluntary self-reporting of annual results leads to certain biases: the data do not exclude material errors or omissions in reporting, and suffer from a self-selection of those financial service providers that are able and willing to report their performance and follow minimum financial reporting standards (Gonzalez 2007, 3). Among those will likely be institutions searching for international recognition and funding, may have less access to standard financial sector funding (so that, most notably, commercial banks are underrepresented), and may have better than industry-average results. However, as of to

date, MIX Market is the most comprehensive and comparable database on microfinance services worldwide, and selection biases may be even stronger in alternative data sources such as microfinance investment vehicles or microfinance rating agencies. An additional source for country-level microfinance data are the Global Microscope reports by the EIU (2010).

Third, the study relies on primary data collected through a large-scale survey among microfinance service providers. All institutions reporting on the MIX in a range of 22 countries were requested to participate in an anonymous online survey, with a total of 368 institutions contacted. The main contact person was the CEO, managing director or other person listed in a leading position in the respective company profile on the MIX Market. Follow-up phone calls were made to identify alternative persons in institutions and increase the response rate. The survey generated usable responses by 119 institutions. However, response rates per country varied widely between 0 and 80%, which led to a smaller selection of 13 countries included in the final study. The survey included a mix of closed, semi-closed and open questions. More importantly, the survey differentiated between different time periods, going back in time to two years before the outbreak of the first known crisis of client over-indebtedness in microfinance, which occurred in Bolivia in 1999. It therefore contains some elements of subjective opinion and memory, a method that is also widely used in, for example, non-experimental microfinance impact assessment studies, by assuming respondents did not go back to their files to reconstruct a detailed objective response.

3.3 Selection of Countries

Although microfinance market conditions are not necessarily homogenous within a country and conditions of over-indebtedness may vary within a country, for simplicity reasons the study represents countries with individual microfinance markets. In reality, microfinance markets within a country may vary, in particular between rural and urban areas and even between different urban areas in large countries. However, many macroeconomic and industry data are currently available only on country level. For this reason, the study focuses on small countries, complemented by countries with larger microfinance markets.

Priority is given to countries that have experienced well-known problems with over-indebtedness in the past. Other countries have been particularly affected by the financial or food price crises of 2008/2009, or have had no indication for an over-indebtedness problem. The sample of countries included in the final study fulfills the following requirements: they were shortlisted for the study based on the above considerations of relevance, secondary data on relevant variables are sufficiently available, the response rate to the survey was deemed adequate (set at above 30%), and expert interviews added additional information.

On this basis, the study examines over-indebtedness and establishes a preliminary early warning measure for the following 13 countries: Armenia, Bolivia, Bosnia and Herzegovina,

Cambodia, Colombia, Georgia, Ecuador, El Salvador, Ghana, Kosovo, Paraguay, Peru and Tajikistan. Table 1 gives a summary of sample countries included in this pilot. Note that penetration rates shown in the table are explained in the description of index variables below.

Table 1: Pilot Countries for the Over-Indebtedness Index Construction

Country ⁽⁰⁾	Microfinance market penetration rate USD 2 ⁽¹⁾	Microfinance market penetration NPL ⁽²⁾	Total population	Weighted mean of PAR 30 ⁽³⁾
Armenia	0.49	0.20	3,082,951	3.51
Bolivia	0.68	0.39	9,862,860	2.13
Bosnia and Herzegovina	7.30	0.74	3,766,579	8.31
Cambodia	0.20	0.39	14,800,000	2.65
Colombia	0.26	0.16	45,700,000	8.19
Ecuador	0.59	0.19	13,600,000	3.39
El Salvador	0.36	0.15	6,163,050	10.89
Georgia	0.16	0.09	4,260,333	3.40
Ghana	0.02	0.04	23,800,000	3.55
Kosovo	5.50	0.24	1,805,000	4.43
Paraguay	0.73	0.31	6,348,917	8.83
Peru	0.91	0.31	29,200,000	6.89
Tajikistan	0.04	0.04	6,952,223	4.91

Notes:

- (0) Data are for 2009
- (1) Using the USD 2 per day poverty definition
- (2) Using the national poverty line definition
- (3) Weighted with the number of borrowers of the institutions

4 Description of Index Variables

In this section, the indicators that are considered for the final overall OID index are presented and discussed. In particular, the theoretical explanations (“hypotheses” discussed in the literature) regarding how these indicators may be related to microfinance over-indebtedness are described in a nutshell. (For details, please refer to the indicated literature.)

4.1 Measurement for Over-Indebtedness

Based on the above definition of over-indebtedness, an operational definition is deduced as follows, following the net indebtedness index by Maurer/Pytkowska (2010). Indebtedness is defined as the ratio of a household’s monthly repayments divided by its monthly net income, i.e. total monthly gross income minus total monthly expenses:

$$\text{Indebtedness} = \frac{\text{total monthly installments on household debt}}{(\text{total monthly gross income of the household} - \text{total monthly expenses of the household})}$$

While Maurer/Pytkowska do not specify the denominator further, this paper includes all expenses except for debt-related expenses in the total monthly expenses so that a ratio of 100% would mean that the total monthly net income is used for installments on household debt. As soon as this ratio exceeds a certain threshold, indebtedness turns into over-indebtedness. This may occur if either repayments increase while net income does not increase at the same rate, or net income decreases while repayments do not simultaneously decrease at the same rate.

In a direct measurement of indebtedness based on household data, the definition of the threshold level would be critical for the measurement of over-indebtedness. For instance, Maurer/Pytkowska (2010) and Wisniwski (2010) use a threshold of 100% in the context of Southeast Europe. This would most closely reflect the practice of (personal) bankruptcy proceedings in many countries (see Schicks 2010). Given the high level of volatility of typical microfinance clients’ income and expense flows, this threshold seems rather high for the majority of developing countries, and a more conservative (lower) level of the threshold is deemed more appropriate.

It should be noted that according to this definition, multiple loans and therefore higher obligations from loan installments do not necessarily enhance the risk of over-indebtedness. The ratio only increases if net income does not increase at the same rate as installments do. This means that if clients have multiple loans which are productively invested and yield a return high enough to enhance net income by the same rate as installments do, then the household’s indebtedness level remains unaltered. This is also highlighted in the 2010 Global Microscope report (EIU 2010): “As long as the economy is doing well and most people are

gainfully employed, multiple borrowing is not a problem; loans are generally paid on time, keeping non-payment rates low and microfinance portfolios strong. But when a business-sector slump leads to job losses and a decline in wages, borrowers often have little choice but to default. The inability to identify and curb indebtedness increases the risk of non-repayments, non-performing loans and deteriorating portfolios." (EIU 2010, 62). Moreover, multiple loans may be a sign for market inefficiencies when an increase in loan supply does not lead to lower rates, better quality or more differentiated products but just an increase in more of the same type of loans to the same type of borrowers. The definition corroborates the view that over-indebtedness is a dynamic phenomenon and interdependent with credit market and macroeconomic features (see also Maurer/Pytkowska 2010). In other words, this view immediately implies that the risk of households to become over-indebted is determined by factors that affect either the amount of repayments and/or a household's net income.

4.2 Categories of Indicators

To comprehend the dynamic aspect of over-indebtedness and to accordingly cover a broad range of possible early warning signs, the study distinguishes four categories (or indicators) of variables, namely:

- Macro-level indicator
- Microfinance market indicator
- Firm-level indicator
- Household-level indicator

The first indicator contains variables on a macroeconomic level, such as macroeconomic indicators in the narrow sense (macroeconomic stability, income data during booms and recessions) and political (in)stability, corruption, and changes in the ease of doing business.

The second indicator comprises information on the microfinance segment of the financial market. There, the penetration rate of the market and growth rates of the portfolio of the industry and of the total number of clients are key variables. An investigation of all three variables can indicate whether there is a significant change in the supply of loans. The supply of consumer loans and the existence and effectiveness of a credit information sharing system and additional aggregated MFI information are taken into account as much as possible. Additional important variables are the perceived relevance of consumer lending, perceived levels of commercial bank activities and of competition in the microfinance market segment, and of investment inflows into microfinance. This last variable is compared with average MFI liquidity data.

The third indicator includes variables on the level of organizations supplying microfinance services (“firm level”). Note that the study uses the term “microfinance institution” (MFI) in its widest sense, i.e. it comprises *all* formal and semi-formal financial sector organizations that are active in retailing microfinance services. Data are based on weighted averages of MIX Market data per country, corrected where possible with further information on the banking sector. Variables in this indicator include qualitative variables drawn from the survey that measure certain organizational characteristics of MFIs, loan requirements and lending methodologies, the presence of multiple lending and consumer lending, and loan- and borrower-specific variables. Further MFI-specific variables are related to growth and expansion of the institution.

The last indicator summarizes information on the client level. Though data on individual households certainly reveal key aspects of why a household finally runs into over-indebtedness, this kind of information requires extensive field work, sophisticated surveys and personal interviews.

Data are therefore gathered merely on the industry and firm levels, and proxies for a number of variables are needed. Data on other variables such as the standard of living (life expectancy, HIV/AIDS prevalence rate, education, etc.), gender of the borrowers, the lending methodology (individual versus group lending or a combination), the percentage of the rural clients and the operating expense per loan were gathered but do not directly enter the index as either the data are insufficient or the effect on over-indebtedness is unclear.

Table 2 summarizes the main variables in the four categories (indicators) analyzed to construct the final OID index.

Table 2: Variables Analyzed for Possible Use in the OID Index

Variable	Data source	Included in the OID index
Macro-level indicator		
GDP per capita growth	WDI database	no
Remittances	WDI database	yes
Inflation	IMF's WEO	no
Political/economic stability	World Bank's World Governance Indicators	no
Corruption	World Bank's World Governance Indicators	no
Industry-level indicator		
Market penetration	MIX Market, WDI database	yes
Number of microfinance service providers	MIX Market	no
Growth rate of total loan portfolios	MIX Market	yes
Total numbers of loans outstanding and of borrowers	MIX Market	no
Quality and use of credit information system	Global Microscope, Doing Business, Brown et al. (2009), Survey	yes
Perceived commercial bank involvement	Survey	yes
Perceived level and trends in competition	Survey	yes
Perceived investment flows	Survey	yes
MFI liquidity	MIX Market	yes
Firm-level indicator		
Average loan balance per borrower	MIX Market	yes
Loan requirements and lending methodologies	Survey	yes
Productivity (borrowers per staff member)	MIX Market	yes
Growth and market targets	Survey	yes
Multiple lending	Survey	yes
Supervision	Survey	no
Consumer lending	Survey	yes
Household-level indicator		
None	n/a	n/a

4.3 Macro-Level Indicator

4.3.1 GDP Per Capita Growth

The reasoning of including this indicator is that growth of national income levels (aggregated and, in particular, per capita) may affect the risk of microfinance clients becoming over-indebted. Overall economic downturn (reduced growth of per capita income) is usually accompanied by a decrease in demand for goods and services, reducing firms' and entrepreneurs' profits or revenue. Given that costs of living and installments from any kind of loan are not reduced, it may be that clients experience repayment problems, which enhances the risk of becoming over-indebted in the long run. Furthermore, if – due to a lower income and repayment problems– clients start to take out loans from other lenders, the risk of over-indebtedness is even higher. However, Gonzalez (2007) emphasizes that the general

conclusion from earlier case studies (e.g. Benoit-Calderon 2007 for Latin America, McGuire 1998 for Asia) is that microfinance institutions are rather resilient to macroeconomic shocks, and corroborates these results based on an analysis of MIX Market data: microfinance portfolio quality, measured through both the risk of default (PAR ratios) and the event of default (loan loss and write-offs) have high resilience to economic shocks. Similar results are found in Ahlin/Lin (2006), and in Llanto/Badiola (2009). On the other hand, based on scattered empirical evidence, the EFSE study identifies economic downturn as a major factor contributing to over-indebtedness in the three crisis countries (Wisniwski 2010).

This study measures the annual growth rates of GDP per capita, drawn from the World Bank's World Development Indicators (WDI) database. Whereas historical evidence from Bolivia suggests a relationship between macroeconomic deteriorations and an over-indebtedness crisis, data analysis for this study supports Gonzalez' view and therefore does not suggest the growth rate of GDP per capita as a leading indicator for the OID index.

4.3.2 Remittances

The inflow of remittances (regular payments from employees' and workers' compensations abroad towards their relatives) is a typical income source of large parts of the population in developing economies. The relationship to loan repayment and over-indebtedness can go either way: access to remittances smoothens income flows and can thus facilitate regular payment of debt obligations; on the other hand, access to remittances may reduce the dependence on local lenders and the need to maintain a positive credit standing, and contribute to lowering willingness to repay. Strong volatility of remittances (measured in its growth rates) as for example occurred during the global financial crisis 2008/2009 (see Littlefield/Kneiding 2009) can further hamper loan repayment and contribute to raising PAR and loan losses/write-offs of local microfinance lenders.

This study uses data from the World Bank's WDI database to account for remittances in the sample countries. While the study cannot rely on the signaling and correlation calculations due to the small data set, remittances show a strong movement before the crisis. Particularly the growth rates of remittances and in per capita levels of remittances measured in USD seem suitable to be included in the index construction. We therefore include the variable remittances (measured in USD per capita) in the OID index; higher values implying a higher dependency on remittances and therefore more OID risk.

4.3.3 Inflation

High or volatile inflation is considered an important hindrance in the economics literature. Conceptually, the overall effect of inflation on microfinance default measures and the OID risk is unclear. On the one hand, the real value of debt decreases, which might reduce the risk of late repayment by the client. Pricing of relatively short-term loans such as microfinance loans will follow with short lags, whilst rises in deposit rates will be stalled as long as possible. Also,

if price increases benefit the income streams of the client (higher revenues), the risk of over-indebtedness might decrease. On the other hand, inflation lowers real value of income (consumption gets more expensive), which might enhance the risk of multiple lending and/or late repayment. During inflation periods, consumer goods prices tend to rise faster than even flexible wages, such as those in the informal sector, and small- and micro-enterprise earnings. Comparative empirical studies of inflation effects on microfinance are rare, given the relative stability of most currencies during the last decade. Findings from Pakistan show that high inflation overall did not affect microfinance borrowers (Intellectap 2008, Zaidi et al. 2009); however, this may only be due to the short-term analysis of the study (Littlefield/Kneiding 2009, 1). Indeed, Ahlin/Lin (2006) confirm a negative relationship between inflation and PAR for a cross-country sample of MFIs.

Since microfinance clients typically do not have large amounts of fixed assets, only a single indicator, consumer price inflation, using percentage changes from the IMF's WEO database is used. Data analysis suggests not to include OID index construction.

4.3.4 Political/Economic Stability

Economically more unstable or risky countries, i.e. countries with high volatility of GDP growth rates, are expected to be more prone to and easily hit by an over-indebtedness crisis. Political instability may shorten planning horizons and affect borrowers' ability and capacity to repay, while economic instability may lead to increased need for debt financing of consumption. Moreover, it may increase moral hazard problems affecting credit repayment (Gonzalez 2008b, 6). Short-term effects of crises may be compensated through withdrawal of savings or postponing of consumption decisions, medium-term effects in particular of longer crises seem stronger. Short-term findings on microfinance during the global financial crisis of 2008 seem to corroborate these findings (Littlefield/Kneiding 2009). It must be noted, however, that the assumed negative link between over-indebtedness and economic stability is notably weaker than the assumed and confirmed negative link between PAR as a measure for MFI asset quality and economic stability (Chen et al. 2010). Therefore, the study limits this variable to political instability. Data for the sample countries stem from the World Bank's Governance Matters database, namely the indicators on "Political stability/no violence", "Government effectiveness" and "Regulatory quality". For the crisis countries in the sample, they do not conclusively confirm a significant correlation between default and default risk measures and lagged values of periods of decreased political or economic stability. This may be due to the data that show little variation for most countries over time. More detailed data on political instability with respect to financial markets may be needed.

4.3.5 Corruption

Higher levels of corruption may be correlated with higher levels of over-indebtedness due to lower adherence to MFIs' lending policies, loan officers and loan committees tend to grant

more exceptions not based on sound credit decisions. In particular, higher levels of corruption (in particular also in government bodies) may indicate that microfinance clients also are more prone to arrears in payments. To the authors' knowledge there are no studies examining this link empirically.

Out of the different data sets measuring or ranking corruption by countries, again the World Bank's Governance Matters indicators are chosen because of their large set of data used. Again, the analysis does not allow to include a general measure of corruption in the OID index. Rather, a measure of corruption or irregularities in the microfinance market may be needed.

4.3.6 Other Variables

An additional variable that could be considered in a more comprehensive study and may have become increasingly important since increasing commercial financing of MFIs and the global financial crisis of 2008 is *foreign exchange risk*, measured for example in exchange rate volatility. If MFIs transfer the foreign exchange risk to borrowers through indexed loans, this could be an indicator of higher risk of becoming over-indebted in case of local currency depreciations. Moreover, remittances expressed in local currency change with currency volatility. Note that the general "*Ease of doing business*" indicator based on World Bank data collections (World Bank 2010) was not included in the data set because the only indicator components deemed immediately relevant for this study are in the "getting credit" measures of this indicator. Those measures are included in the industry-level indicator below under "Credit information sharing system".

Moreover, theoretical analysis and expert opinion recommends to include an index for the *state of microfinance policies and regulations* in the countries. The more conducive the policy framework and the higher the regulatory quality, the higher is the possibility to effectively implement consumer protection, for instance. Hartaska/Nadolnyak (2007) find for a large sample of countries that there is no robust relationship between the state of microfinance regulations and financial performance or outreach of MFIs. However, there are no historical cross-country data available for this qualitative measure that could be used for this study. The Global Microscope data cover only the last two years and are thus not sufficient to calculate correlations with past crisis years (EIU 2010). Using values on the general level of "regulatory quality" from the World Bank Governance Matters database as proxies does not lead to significant results, the reason being the overall low volatility of this index for most countries. It is strongly recommended, however, to include the Global Microscope variable "Regulatory framework" (consisting of four indicators) in the future construction of an OID Early Warning Index as data become available.

4.4 Industry-Level Indicator

Variables included in this indicator should help in estimating the relationship between supply of and demand for financial services, in particular loans, from customers in the microfinance market segments, and levels of “competition” in this market segment.

4.4.1 Market Penetration

This study defines market penetration as the number of clients served relative to potential clients, and develops a detailed measurement method building on the approach by Rozas (2009) and Intellectap (2009, 22–24). The ratio indicates the diffusion of suppliers (MFIs) in the market and is a proxy for market saturation: the higher the ratio, the more saturated the market. While no standardized and generally accepted definition of penetration rates exists, earlier approaches also relate total borrowers to total potential borrowers (see Gonzalez 2008a and Rhyne/Otero 2006). In the case that lenders do not adjust product quality, product specifications or prices as they would do in a perfectly competitive market, a higher degree of market penetration could lead to lower quality of the lending process. This may result in increased pressure to serve riskier borrowers or offer more loans to the better-known and less risky borrowers.

Data sources for the current borrowers are country-level aggregated customer (borrower) numbers from MIX Market. Note that these numbers include to some extent consumer loans as offered by microfinance service providers reporting to MIX Market. Additional estimates for the number of consumer borrowers not included in the MIX Market data are not available as of to date. Moreover, while this is a variable that could show significant differences for urban and rural areas within one country, a consistent differentiation between urban and rural markets within a country is not possible, using the available data sources. It should be noted that the nominator tends to overstate current borrowers in countries where multiple borrowing exists. The higher the share of customers with multiple borrowing, the larger the upward bias of the nominator tends to be. Accounting for multi-indebtedness can significantly alter the penetration rate. Maurer/Pytkowska (2010) report that 58% of the borrowers in Bosnia and Herzegovina have more than one loan. This would reduce the penetration rate of BiH considerably. However, consistent numbers measuring multi-indebtedness are not readily available, in particular data that are comparable across countries. The above-quoted study by Copeme Microfinanzas (2010) reports that about 20.5% of the borrowers in the study sample in Peru have more than one loan. This already shows the wide range of multi-indebtedness across countries. Depending on the studies at hand (and the number of borrowers that they look at), it is very difficult to compare the extent of multi-indebtedness. Data comparable across countries are urgently needed in order to adjust the penetration rates for multi-indebtedness.

More importantly, measurement of the market penetration critically depends on the definition of the denominator. In this study, a country's total population is adjusted for age by including only the working-age population (between 15 and 65 years following the World Bank's definition) because microfinance loans typically target the "economically active" population. The population is, however, not limited by gender criteria because globally, microfinance has less focus on female clients than in South Asia, the object of Rozas' (2009) study. It is adjusted for income by including the people defined as "poor". Two poverty definitions are used, the poverty headcount at USD 2 a day and the national poverty line. Adjusted population data were calculated based on the population data drawn from the World Bank's World Development Indicators database. It should be noted that this value may be reduced by a further factor due to the fact that not every individual and not even every household demands credit at any given time. However, this factor is difficult to determine. A survey conducted by Navajas/Tejerina (2006, 13) for five Latin American countries give values varying as much as from 25 to 50% of households who stated that the household did not request a loan because it was "not needed". Given this broad range we therefore do not further reduce the denominator used in our index but keep in mind that market penetration rates as calculated are biased to the upper end.

In order to give an indication of how sensitive the penetration rate is to definitions used, Table 3 shows how the penetration rate for the countries in the study sample changes depending on the definitions of the numerator and denominator of the penetration rate. It is striking to see that this detailed calculation of penetration rates shows rather high penetration rates for most sample countries, with levels above 10% for all countries except Ghana and Tajikistan even if the broadest of the denominator is used, the entire poor population according to either poverty definition (columns 1 and 5). As expected, the values increase further if narrower definitions of the denominator are used, for example limiting the ratio to the poor working population (columns 2 and 6) or extrapolating the percentage of people who "do not need a loan" from Ecuador (48%, columns 3 and 7) or from Nicaragua (25%, columns 4 and 8) to all countries. While the "ranking" of countries according to their penetration rate does not change depending on the reduction of the nominator (columns 1 to 4 and 5 to 8 respectively), the countries score differently depending on the poverty definition used. This is mainly due to the fact that the definition using the USD 2 (PPP) per day headcount is less appropriate to determine poverty levels in countries like BiH and Kosovo. The study therefore uses the poverty definition of national poverty lines and the values reported in column 6.

Table 3: Market Penetration Rates for Sample Countries in the Year 2009

Market penetration = number of borrowers served/number of potential borrowers among poor population

Poverty definition	Poverty headcount ratio at USD 2 (PPP) ⁽¹⁾				Poverty headcount ratio at NPL ⁽²⁾			
	Poor population	Poor working population	Assuming that 52% of the poor working population want a loan	Assuming that 75% of the poor working population want a loan	Poor population	Poor working population	Assuming that 52% of the poor working population want a loan	Assuming that 75% of the poor working population want a loan
Armenia	0.34	0.49	0.95	0.66	0.14	0.20	0.27	0.39
Bolivia	0.40	0.68	1.31	0.91	0.23	0.40	0.53	0.76
BiH	5.17	7.31	14.05	9.74	0.53	0.75	1.00	1.44
Cambodia	0.13	0.21	0.39	0.27	0.25	0.39	0.52	0.76
Colombia	0.17	0.27	0.51	0.36	0.11	0.16	0.22	0.32
Ecuador	0.37	0.60	1.15	0.79	0.12	0.20	0.27	0.38
El Salvador	0.22	0.36	0.70	0.48	0.09	0.16	0.21	0.30
Ghana	0.01	0.02	0.04	0.03	0.03	0.04	0.06	0.08
Kosovo ⁽³⁾	3.89	5.50	10.58	7.33	0.17	0.24	0.33	0.47
Morocco	0.21	0.31	0.60	0.41	0.15	0.23	0.30	0.44
Nicaragua	0.18	0.30	0.58	0.40	0.13	0.21	0.28	0.40
Paraguay	0.45	0.74	1.41	0.98	0.31	0.51	0.68	0.98
Peru	0.58	0.91	1.74	1.21	0.20	0.31	0.42	0.60
Tajikistan	0.03	0.05	0.09	0.06	0.03	0.04	0.06	0.08
Georgia	0.12	0.17	0.33	0.23	0.07	0.09	0.13	0.18

Notes:

(1) (% of population)

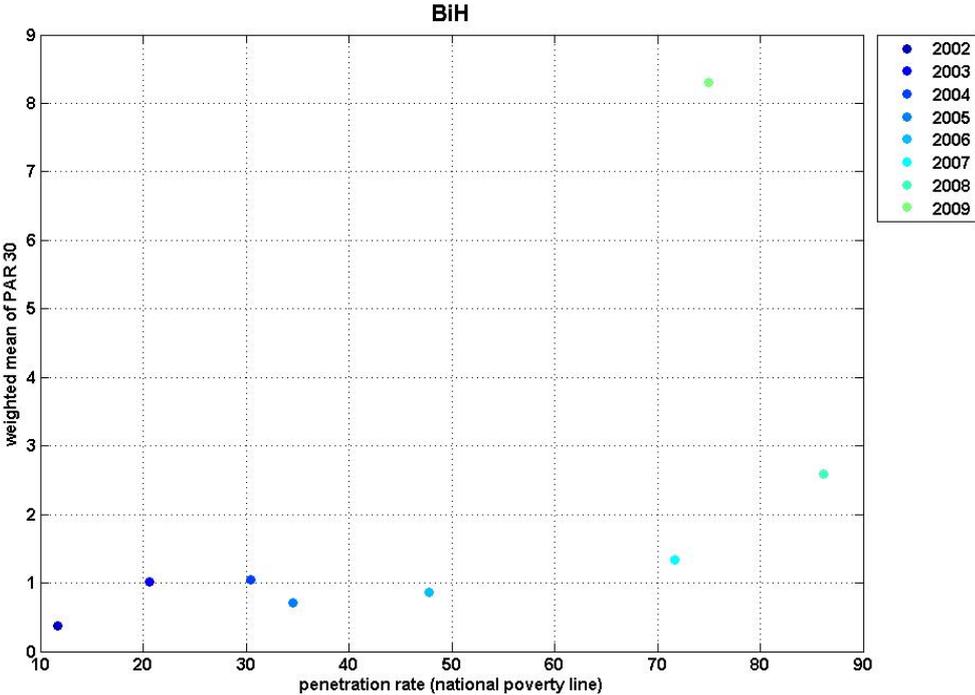
(2) National poverty line (% of population)

(3) Poverty data for Kosovo n/a, data are from BiH

Sources: Own calculations based on MIX Market, WDI database, Navajas/Tejerina (2006)

While the study does not rely on the signaling and correlation calculations due to the small data set, Figure 1 shows the market penetration rate (using national poverty lines) in relation to the PAR 30 values for Bosnia and Herzegovina, showing a strong jump in market penetration markedly before the crisis. Also literature and expert opinions suggest that the penetration rate should be considered in the OID Early Warning Index, in particular since it is a quantitative proxy for the often-quoted lax credit standards that are more difficult to measure.

Figure 1: Penetration Rate (Using National Poverty Line) and PAR 30 Values for Bosnia and Herzegovina



4.4.2 Number of Microfinance Service Providers, Volume and Growth Rate of Loan Portfolios and Loans Outstanding, and Total Number of Borrowers

These four variables are by nature correlated and are therefore listed together. Intuitively, strong growth rates of the number of microfinance service providers (including formal and semi-formal providers) indicate a market considered attractive by lenders, and strong growth rates of loan portfolio volumes or numbers of loans outstanding show how suppliers are capturing that market. On the other hand, strong growth rates could lead to market overheating, of which large-scale client over-indebtedness would be considered a consequence. Besides illustrative evidence from crisis countries, few studies are available. According to Gonzalez' (2007) analysis of more than 800 institutions reporting to MIX Market, the quality of the loan portfolio depends, among other things, on the size of the institution (gross loan portfolio or number of borrowers).

Data for these variables are drawn from MIX Market. Disaggregated data for urban and rural contexts per country are not available but would probably reveal significant differences. In the absence of this differentiation, in this analysis, growth rates of local microfinance markets, measured in numbers of microfinance service providers in the sample, and in the volume of the total loan portfolio, showed early jumps before the outbreak of a crisis. Growth rates in the number of total borrowers were mostly following these jumps. However, data analysis shows that the growth rates of the number of microfinance suppliers do not move significantly with the PAR and write-off ratio variables. Weak correlations are positive,

tentatively supporting the overheating hypothesis. Growth rates of the loan portfolios, both in volume and number of loans, are also not significantly positively correlated with PAR and WO variables. This may be due to the fact that per definition, a fast growing loan portfolio reduces the PAR value, and confirms Gonzalez' (2010) findings. Growth rates of total volumes of loan portfolios, however, are also a crude approximation of the current market size. This last variable is therefore included in the OID index construction.

4.4.3 Quality and Use of Credit Information Sharing Systems

Information sharing on the indebtedness of borrowers is considered influential for credit supply but also, if the sharing device is known to the borrower, for borrowers' discipline (Jappelli/Pagano 2000). This is considered either due to better monitoring by the MFIs or due to a disciplinary effect on borrowers (EIU 2010, Padilla/Pagano 2000).

Where estimates of the effectiveness of a credit information system exist, they indicate a lagged improvement in portfolio quality (Luoto et al. 2004, for a case study on Guatemala). Unfortunately, data on credit information sharing systems in developing countries, whether private credit bureau or public credit registries, is often misleading because of any official system's limitations regarding informal and semi-formal financial sector loans (Jappelli/Pagano 2000, Luoto et al. 2004). Porteous (2006) discusses findings for a multitude of Latin American countries, based on the first Microscope data series, of a negative correlation between the concentration level in the microfinance industry (a proxy for "level of competition" – the higher the concentration level, the lower the competition) and the existence of credit information systems. Brown et al. (2009) show that credit information systems are more effective if both individuals and firms are covered, negative and positive information ("black or white data") is reported, the minimum loan size for reporting is low, the credit history stays in the system for an extended period, and the system is known to borrowers. For example, the "amnesty" granted to borrowers who pay off past due loans in Bolivia's public credit registry greatly limits its effectiveness (de Janvry et al. 2003). If the time it takes a lender to access borrower information is too long, the system's effectiveness is also greatly reduced; for instance, survey respondents in Peru quote that information at least from some of the providers is available after two months only, which is too long to be useful for a microfinance lender. Moreover, the literature emphasizes the incentives for repayment that a credit information system creates for borrowers (Padilla/Pagano 2000). As a result, if borrowers do not know about the existence of the system, the best system is to some extent obsolete.

To include the mentioned aspects of credit information systems in the analysis, this study combines the assessments of the credit information systems from the Global Microscope report (EIU 2010), the Getting Credit Indicator of the World Bank's Doing Business reports, which includes a "depth of information index covering those qualitative features", and additional information on countries in Eastern Europe and Central Asia drawn from Brown et

al. (2009). To better assess the actual use of credit information systems by lenders supplying microfinance loans, these data are compared with survey results on the knowledge, scope of provided information and use of any such system, to construct the final variable. In countries where survey respondents markedly differ in their view and use of such a system, the current (and, depending on responses, past) values given to the variable “credit information system” are lowered. The review of the literature and data analysis strongly suggests including the variable in the OID index construction.

4.4.4 Perceived Commercial Bank Involvement and Perceived Level and Trends in Competition

These variables are included to assess the degree and kind of competition in the microfinance market segment. The scope of commercial banks’ engagement in retail microfinance services is considered an important factor by many experts, and this “downscaling” by commercial banks has a long tradition but has recently reached higher levels worldwide (Boúúaert 2008). The literature finds a positive relationship between financial sector development in general and MFI efficiency even in the absence of downscaling (Hermes et al. 2009), but results for MFI profitability and outreach are less clear (Vanroose/D’Espalier 2009). On the other hand, the literature is less decisive on the influence of “competition” on microfinance market performance (see for example Schicks 2010 and McIntosh et al. 2005), pointing out the importance of credit information sharing when levels of competition are rising. Moreover, operational definitions of competitions differ between studies. To the authors’ knowledge, there are no systematic cross-country data on commercial banks’ retail engagement in microfinance. The role of commercial banks is thus captured through survey questions, as is the perceived level and trends in competition, including subjective aspects that are nonetheless relevant for the behavior of microfinance lenders.

The role of commercial banks as microfinance retailers seems higher in the years preceding the crisis in Bosnia and Herzegovina; however, this cannot be confirmed for Bolivia, where competition from other sources is and was deemed more important by survey respondents in particular during the first survey period going back until 1997. Nevertheless, the overall perceived level of competition seems significant in both crisis countries, and both variables are included in the OID index construction.

4.4.5 Perceived Investment Flows and MFI Liquidity

Strong increases in investment flows into microfinance leading to strong growth are often quoted as a major contributor to over-indebtedness (see above). Whilst eventually pushing portfolio growth, strong investment increases lead first to an increase in MFI liquidity. Over-liquid MFIs may be tempted to push for fast growth, in particular local growth at existing operating locations, which may seem easier than expansive (geographically expansive)

growth, following the growth definitions of Gonzalez (2010). Local growth may lead to more loans to a given stock of customers and thus to over-indebtedness.

Because of the apparent lack of cross-country quantitative data on investment flows into microfinance per country, this variable is captured in the survey through questions on the perceived level of investment inflows. It is combined with the quantitative analysis of country averages of liquidity indicators, using the values for total cash and cash equivalents (drawn from MIX Market). Data analysis suggests including both variables in the OID index construction.

4.5 Firm-Level Indicator

This indicator describes variables on the level of the MFI. The analysis uses some data drawn from the MIX Market database, aggregated per country. Moreover, qualitative and quantitative data for this indicator are drawn from the survey among microfinance service providers because other sources for comprehensive data on qualitative and some quantitative variables in this indicator category are not available. Respondents were asked to differentiate their responses for three multi-year periods going back as far as 1997 in order to cover pre-crisis conditions. Note that the variables drawn from the survey are composed based on responses to several survey questions. Table 4 shows the exact composition of those variables. Their details are discussed below for each variable.

Table 4: Composition of Qualitative Variables Drawn from the Survey

Variable	Aspects covered by survey results for periods 1997–2001, 2002–2006, 2007–2010, included in variable score			
Target market and growth	Growth targets of lenders above 25%?	Does target market include customers of other lenders?		
Multiple lending	Accepting new borrowers with other loans or continuing to lend to borrowers taking on new loans?	Stricter conditions for borrowers who take other loans?	Is it considered a reason for OID?	
Consumer lending	Weighted share of consumer lending in own portfolio % of loans?	Start year of consumer loans in own portfolio?	Availability of information on consumer loans from other (including informal) lenders?	
Lending methodology and loan requirements	Low frequency of loan officer/client meetings?	Eligibility criteria of clients: fixed incomes instead of typical microfinance criteria as listed in survey?	Loan officers' incentives depending on growth (only, mostly)?	Was frequency of installments reduced?
Perceived intensity and trends in competition	Are late payments penalized?	Existence of loan officer sensitivity training regarding OID?		
Perceived intensity and trends in competition	Increase during period?	Perceived level during period?	Open remarks by respondents	
Perceived intensity of commercial bank activities	Increase during period?	Perceived level during period?	Open remarks by respondents	
Perceived investment flows	Increase during period?	Perceived level during period?	Open remarks by respondents	

4.5.1 Average Loan Balance per Borrower

The average loan balance per borrower is often used as an absolute proxy for poverty outreach of an MFI, its ratio to GNI per capita being a standardized proxy. In theory, the relationship with repayment problems is unclear. The smaller the average loan balance, the poorer the customer and therefore the more prone to repayment problems he tends to be.

However, the larger the loan balance, the higher the risk that household cash flows are overextended. Indeed, Gonzalez (2007) finds no significant relationship between average loan balance and any of the four measures of portfolio quality.

This study calculates the average loan balance as the aggregated number of outstanding loans per aggregated gross loan portfolio. It uses weighted mean values of all MFIs per country reported in the MIX Market database. The data analysis shows that average loan sizes showed early upward jumps in crisis countries.

Despite these upward movements, overall the growth rates of average loan balances are not significant in the data. Therefore, the level of the average loan balance per borrower variable is used for the OID index construction.

4.5.2 Loan Requirements and Lending Methodologies, and Productivity

As shown in Table 4 above, the study examines qualitative data on criteria for borrower eligibility, installment frequencies, types of and late payment penalties, and changes in these areas over time. It also includes aspects of MFI human resources policies towards loan officers as they directly affect the effectiveness of loan requirements and lending methodologies, such as loan officer incentives and training.

The nature of the lending process, in particular the lending methodology (group loans or individual loans), and the quality of the lending process with respect to avoiding and managing delinquency as well as human resource policies were asked through a number of questions in the survey. Aspects considered include the eligibility criteria for borrowers used by the lenders (such as the cash flow analysis, existence of guarantors, character check, credit history with the institution or from an independent source) and the nature of loan officers' incentives (namely, their dependence on growth or quality of portfolio or number of new borrowers). Unfortunately, survey responses were not detailed enough to distinguish between group or individual lending methodologies since most respondents use both and did not differentiate answers according to methodology.

Notably, no significant countrywide differences were found with respect to delinquency management and follow-up on late payments. However, the most recent crisis countries seem to show common patterns. For instance, there is a clear tendency towards reducing the number of installments. Interestingly, in crisis countries and prior to crises, loan officer incentives seem to have been biased in favor of portfolio growth over portfolio quality. The qualitative rating of survey information indicates that the variable "loan requirements and lending methodologies" should be included in the overall OID index.

A variable on the institution's productivity of the lending process needs to complement this variable. Experience from crisis countries shows that besides possible overstretching of loan officers' capacities, insufficient oversight of loan officers contributes to a deterioration of the lending process. Since data on the productivity of "back-office" staff are not available, the

study tracks the productivity of overall staff (number of borrowers per staff) using MIX Market data. In crisis countries, productivity went up surprisingly early before crises. This variable is therefore included with a lag in the OID index construction.

4.5.3 Growth and Market Targets

Growth targets and information on the market segment that MFIs serve are important to examine because high growth objectives and targeting of markets already served by other suppliers can induce the MFIs to relax loan requirements and lending methodologies as discussed above. Gonzalez (2010) shows that in times of crises (“extreme situations”), there is a relationship between high portfolio growth rates and portfolio quality, and that this relationship is more distinct in markets that are already served through lenders’ branches. The survey therefore included questions on targeted growth rates and markets segments. In analyzing responses, targets above 25% expansion of portfolio or number of borrowers and a majority of institutions that explicitly target current customers of other institutions contributed to high ratings in this qualitative variable.

There seems to be a difference between responses from surveyed institutions in crisis or post-crisis countries and institutions in other countries regarding outreach targets of microfinance service providers. In several countries, the majority of institutions do not seem to systematically exclude borrowers who are already borrowing from other institutions.

4.5.4 Multiple Lending

Multiple lending or cross-lending is often listed as one of the key features of over-indebtedness, as indicated in the discussion of cases documented in the literature above and corroborated by expert interviews. While not a problem per se, it can be considered as a proxy for other flaws in the lending system, for example badly designed products or the lack of credit information systems. It is striking that little information on the extent of multiple lending is available. No comparative data are available for all countries, and only few individual country case studies are published. However in the crisis countries studied, multiple lending from various sources was present before the crisis outbreak.

Data for this analysis are therefore drawn from the survey among microfinance service providers. Questions focused on the acceptance of new or current borrowers with loans outstanding from other lenders, the conditions for such borrowers and, last but not least, the availability of information on these cases (cross-checking for the variable use of credit information systems).

Indeed, survey responses were inconsistent as to whether institutions adjusted loan conditions for such borrowers, but the absence of such discrimination in loan conditions seems to be a pattern prior to crises so that this variable is included in the construction of the OID index.

4.5.5 Supervision

It can be assumed that supervised microfinance service providers (mostly banks and non-bank financial institutions) need to comply with stricter regulations with regard to internal and external controls. However, conceptually it is not clear whether regulated and supervised MFIs have higher standards of delinquency management. Empirically, Cull et al. (2008) do not find a significant sign for MFIs' portfolio quality when controlling for non-random assignment of supervision (i.e. specific MFI types are supervised).

This seems to be confirmed by the survey data. The variable can thus be dropped from the list of OID index variables.

4.5.6 Consumer lending

As discussed above, microfinance lenders adapting consumer lending techniques and consumer lenders targeting microfinance clients were factors contributing to over-indebtedness crises in the past. To date, no comparative cross-country data on the scope and share of consumer lending differentiated by income groups in the population are available. This study therefore obtains data from the survey.

In a number of countries, and in particular crisis countries and those prior to crises, the majority of the providers that classify themselves as microfinance lenders offer consumer loans. In the absence of comprehensive data on consumer loans, this is a proxy for the relevance of consumer lending, assuming that microfinance service providers start to offer those loans when there is demand or competitive offers. Given the importance attributed to this variable in the literature but the lack of quantitative data that would allow the inclusion of consumer loans in the market penetration calculation above, it is included in the construction of the OID index as a qualitative variable drawn from the survey responses (see Table 4 above).

4.5.7 Other variables

Another important variable to be considered would be borrower dropout ratios, i.e. the number of actual borrowers at the end of a period with the number of potential borrowers at the end of the period (using M-CRIL's technical definition, M-CRIL 2007). An increase in dropouts can be considered an early warning signal for an increase in PAR values. Unfortunately, to the authors' knowledge dropout ratios are neither uniformly defined nor collected across institutions and countries.

4.6 Household-Level Indicator

To the authors' knowledge there are no comprehensive databases or studies available that allow the inclusion of data on the range of details the study would need to collect to directly measure the net over-indebtedness index as defined above.

The most comprehensive studies on household access to financial services to date that include MFIs (Honohan 2008, Financial Access Survey 2010) focus on access to deposit services or checking accounts. For example, Honohan (2008) constructs a composite measure of access to financial services based on numbers of deposit and checking accounts. Regarding data on borrowing, neither do they differentiate between loan purposes nor do they measure debt obligations from all sources including banks, specialized microfinance lenders, consumer lenders, and informal sector lenders. Bankscope data do not differentiate between "consumer loans" and other retail loans. It is thus not possible to compare such data to average household net income or, as a proxy, per capita income of the poorer segment of the population.

5 Index Construction and Results

The previous analysis of a wide range of variables leads to a selection of those indicators currently considered leading indicators for over-indebtedness. The selection takes into account those quantitative variables that showed significant lagged correlations with the indicators for the outbreak of a crisis proxied by PAR and LLR or WOR values, and all those qualitative variables from the survey that are considered influential in the literature and generated unambiguous responses with clear trends; i.e. the index includes all those variables that showed significant changes at some point in time prior to the outbreak of an over-indebtedness crisis:

- | | |
|--|---|
| 1. Remittances | 8. MFI liquidity |
| 2. Market penetration | 9. Average loan balance per borrower |
| 3. Growth rates of total volume of loan portfolios | 10. Loan requirements and lending methodologies |
| 4. Quality and use of credit information sharing systems | 11. Productivity |
| 5. Perceived commercial bank involvement | 12. Growth and market targets |
| 6. Perceived level and trends in competition | 13. Multiple lending |
| 7. Perceived investment flows | 14. Consumer lending |

The lags of one year were used to calculate variables 1 through 11 for the index construction because data were available for all variables and all countries given the one-year lag. For variables 12 through 14, which showed earlier reactions, longer lags were used. Table 5 shows the list of variables used and their weight in the two scenarios, (1) uniform weights and (2) stronger weights for some variables.

Table 5: Leading Indicators Used in the OID Index

Variable considered a leading indicator	Year	Coefficient using uniform weights	Coefficient using stronger weights for selected variables*
Remittances (in USD) per capita	2008	0.07	0.06
Market penetration	2009	0.07	0.06
Growth rate of total loan portfolio	2007	0.07	0.06
Quality and use of credit information system	2009	0.07	0.12
Perceived commercial bank involvement	2009	0.07	0.06
Perceived levels and trends in competition	2009	0.07	0.06
Perceived investment flows	2009	0.07	0.06
MFI liquidity	2007	0.07	0.06
Average loan balance per borrower	2009	0.07	0.06
Loan requirements and lending methodology	2009	0.07	0.12
Productivity (borrowers per staff member)	2006	0.07	0.06
Growth and market targets	2009	0.07	0.06
Multiple lending	2009	0.07	0.12
Consumer lending	2009	0.07	0.06

Note:

* Used for the OID index construction

Variables were scaled on a uniform scale from 1 to 10 to ensure comparability of weights given to individual variables. This transformation was a straightforward linear transformation for all quantitative variables drawn from databases with two exceptions: the values for staff productivity and for growth rates of MFIs' cash and cash equivalents were scaled in a U-shape, using an ideal value (such as the productivity industry benchmark from the MIX MicroBanking Bulletin for the year in question, and the growth rates of loan portfolios as best score and giving lower scores to deviations from this score on each side. Deviations do not need to be symmetric; for example, a very low productivity value (number of borrowers to

total staff) compared to the industry benchmark is not such a strong driver for over-indebtedness as a very high value could be.

Moreover, the OID Early Warning Index itself is scaled on a range from 1 (low levels of early warning signals for an over-indebtedness crisis) to 10 (high levels of early warning signals for an over-indebtedness crisis). Such a simple classification is used to emphasize the preliminary character of the index and avoid the impression that the index can provide exact measurements.

Based on the above analysis, the 14 variables shown in Table 5 are considered leading indicators. These are the subset of potential indicators in table 3 that were considered relevant and included in the index construction. The index composition and the weight of individual variables in the index are presented in Table 5 as well. The index itself adds up the scores of each individual indicator for each country. The weights were calculated (1) using uniform weights for all 14 variables, i.e. $1/14$ for each variable, and (2) giving higher weights to those three variables considered particularly important in the literature and by experts: multiple lending score from surveys, loan requirements and lending methodology score from surveys, and credit information measure. In the second calculation, these 3 variables received a weight of $2/17$ each versus $1/17$ for the other 11 variables. Given the limited data set and the small number of crises analyzed, it was decided not to rely on the correlation coefficients to determine the weights of indicators, as the original signaling approach suggests. Moreover, it was not possible to decide whether certain leading indicators would completely overrule others.

It should be noted that the small number of historical crises that could be analyzed may lead to a relatively large share of “noise” or false signals, i.e. variables that reacted prior to a crisis but will not necessarily do so in future crises. That means that the composition of the OID index is purely preliminary and may change when more data from actual crises can be added to the analysis. This is also the reason why the detailed list of variables that were considered but eventually not used in the index is included in this study.

The application of the index formula to the selected sample countries needs to be read with utmost caution given the high sensitivity of variable values and correlations to underlying assumptions. The variable measurements used in the index are based on a complex triangulation of data. In particular qualitative data sources and survey data have strong error margins. Small changes in assumptions or in data used may result in a reclassification of countries.

The study therefore presents an indicative list of OID Early Warning Index values for the 13 sample countries using 6 color-coded categories that are broader than the calculated index values and values for individual variables, which are scaled from 1 to 10: dark green (overall score below 3.5), light green (score from 3.5 to below 5.0), yellow (score from 5.0 to below 5.5), orange (score from 5.5 to below 6.0), light red (score from 6.0 to below 7.5) and dark

red (score at and above 7.5). Note that the score ranges for the colors at the ends of the spectrum are larger than in the middle of the spectrum, reflecting a narrower distribution and the need for finer differentiation in the middle range of the index.

An application of this rating, using unequal weights for the 14 index variables, allows a classification of the sample countries as follows. The index measures the current presence of early warning signs for future over-indebtedness crises in these countries.

Table 6: An Application of the OID Early Warning Index

OID Early Warning Sign Index value	Meaning	Countries
Dark green OID index	Lowest level of early warning signals for over-indebtedness	
Light green OID index	Relatively low level of early warning signals for over-indebtedness	Bolivia, Ecuador , El Salvador, Georgia
Yellow OID index	Medium level of early warning signals for over-indebtedness	Armenia, Paraguay, Tajikistan
Orange OID index	Medium to high level of early warning signals for over-indebtedness	Colombia, Ghana, Kosovo
Light red OID index	Relatively high level of early warning signals for over-indebtedness	Bosnia and Herzegovina, Cambodia, Peru
Dark red OID index	Highest level of early warning signals for over-indebtedness	

If alternatively uniform weights for the index variables were used, only a few changes in the classification of countries would occur. Notably, Ghana, Kosovo and Paraguay would be classified in the next better category (Ghana and Kosovo: yellow; Paraguay: light green). This is due to Ghana's absence of a credit information system and its relative low score on lending methodologies and loan requirements. Kosovo's and Paraguay's scores are just borderline so that even slightly below-average scores on one or more of the three variables emphasized in the weighted approach chosen in the study would lead to a reclassification in the uniform weight version of the index.

Other country classifications appear rather robust, regardless of the weight of index variables chosen.

Note that according to the OID index measurement, the fact that BiH appears in light red means that the over-indebtedness crisis is still ongoing. Main variables with high scores are the extremely high penetration rate combined with the presence of multiple lending and an elevated score for issues with the lending methodology and loan requirements. However, the recent introduction of a credit information system and a debt counseling service may lead to better scores in the near future. Cambodia's elevated risk to run into over-indebtedness problems results mainly from an absence of a well-functioning credit information system in a vibrant microfinance market sector. The latter manifests itself in elevated growth rates of the loan portfolio, high growth rates of cash and a perceived intense competition/investment inflow. The intense competition and high investment inflows are of course good signs for the Cambodian microfinance industry. However, combined with the absence of a well-functioning credit bureau, there is the risk that a looming over-indebtedness crisis might be undetected until it is too late. Also Peru shows a relatively elevated (light red) risk for over-indebtedness due to high scores on most "subjective" variables (perceived levels of competition, commercial bank involvement, investment inflows), combined with a high level of liquidity in the industry, the relatively strong presence of multiple lending and consumer lending.

In the middle of the spectrum, Colombia is classified as orange, showing elevated but not (yet) alarming scores in a range of variables. Tajikistan shows a medium risk (yellow), mainly due to strong increases in total loan portfolios, overstretched MFI staff (high productivity) and, again, the absence of a credit information system.

On the other end of the spectrum, El Salvador and in particular Ecuador show relatively lower risks of running into over-indebtedness crises, mainly due to the relative strength of the credit information system, lending methodologies and loan requirements, and, in the case of Ecuador, little evidence for the presence of multiple lending. However it must be noted that weighted aggregated PAR 30 values for Ecuador and Colombia are rather high (see Table 1 above), which is not fully consistent with their OID index score or which could indicate the existence of a repayment crisis due to other reasons than over-indebtedness. Georgia is classified as light green, mainly due to the low penetration rate and favorable scores on most indicators except liquidity and productivity, meaning that some pressure is on Georgian lenders and the risk may increase in the future. Bolivia shows a relatively low risk of encountering over-indebtedness problems because the perceived high levels of competition, the only high score of an index variable, seems to be embedded in a functioning market, as the values of most other variables show rather lower scores.

A few final remarks about these ratings: they present a merely ordinal scale, and so comparisons between countries remain difficult. Moreover, the early warning index is merely a predictor for a heightened level of over-indebtedness risk. Even a country with a high index score will not necessarily experience an over-indebtedness crisis. The index does not include

the possible preventive measures or policy responses to crisis outbreaks in the countries. It is therefore still possible that a country marked as associated with a higher risk can preempt an over-indebtedness crisis by reacting early. This is exactly the main purpose of trying to establish an OID Early Warning Index in the first place.

6 Further Research

The preliminary index construction reveals several weaknesses in data which currently make a complete application of the signaling methodology difficult. Further research would be needed first and foremost to improve the database for a more robust application of the signaling method.

One major problem with more sophisticated empirical analysis is that we can observe only three over-indebtedness crises in our data set. Currently, the only possibility to extend this data set would be to either include more countries, regions or subregions where crises happened, such as Punjab in Pakistan or Andhra Pradesh in India, or also to include repayment crises that, according to the literature, are not related to over-indebtedness. This approach would require, however, that data for all variables be available on disaggregated subregional levels, e.g. per states in India. Data for subregions in individual countries would also allow for the introduction of a distinction between urban and rural markets and more in general, between parts of countries where microfinance may be “overheating” versus others that are not.

Moreover, the application of the complete signaling approach would need many more data points to allow for the use of correlation coefficients. To resolve this, data would need to be available on a monthly (or at least quarterly) basis, in particular for the industry-level and firm-level data. For example, data for 3 years would give 36 periods to analyze with monthly data. These data would allow the capturing of ongoing movements in the data and the ability to see when things are really starting to change. For instance, the weighted mean of PAR 30 in BiH jumped to more than 8% in the year 2009, but data give no indication on the exact timing of this or of the earlier moves of other variables.

Enlarging the data set (monthly data/more crises) would also allow for the testing for multicollinearity between the different leading indicators. They may influence each other as well. (Some variables are highly correlated among each other, for example the number of borrowers and the gross loan portfolio. This is the reason why only of these, the gross loan portfolio is included in the OID index.)

Another problem is that data are often only collected for standard “microfinance institutions” not for all lenders that are active in the microfinance market segment. As long as the standardized definitions and indicators used by MIX Market are not consistently applied to reporting on microfinance operations of other lenders active in microfinance (such as commercial banks or consumer lenders) or MIX Market includes only some of these lenders, there is a bias towards MFIs and possible underestimation of variables such as perceived (or factual) investment inflows, liquidity, competition, consumer lending, and market penetration.

Some data are not available at all. Notably, the extent of consumer lending by non-MFIs that do not report in the MIX Market database is not known. Even experts are very hesitant to

offer an estimate, and survey responses on the use of consumer loan products or methods could be downwards biased. One explanation for the latter, offered by an expert, is that due to the widespread view consumer lending is not appropriate in the microfinance market segment and institutions may not want to report on their activities. The systematic collection on consumer lending activities and performance in the microfinance market segment would therefore improve the OID index and in particular, the calculation of penetration rates.

Once these data are available the indirect approach to measuring the risk for customer over-indebtedness through macro-level, industry-level and firm-level indicators could be tested and validated more robustly.

Last but not least, comparable household data would be needed to complement the firm-level and industry data. This would, however, require the design and application of a standardized survey tool for all countries.

7 Conclusions and Outlook

Customer over-indebtedness in microfinance should be measured by comparing periodic obligations from all types of debt with net periodic household income. Unfortunately, such data are not collected systematically for households or for the range of loan suppliers available to microfinance clients, for example non-bank consumer lenders and informal sector lenders. For this reason, this paper uses an indirect approach and examines a broad range of country-, industry- and firm-level data to identify influences on the numerator and denominator of the over-indebtedness formula.

A preliminary analysis of all variables collected for the country-, industry- and firm-level indicators results in a smaller selection of variables suspected to react earlier than the open manifestation of an over-indebtedness problem through raised PAR and loan loss rates or write-off ratios. The proposed index for the pilot countries uses this smaller selection of variables. Weights for the selected variables are based on the review of past crises in the literature and expert opinions.

However, for a range of variables there are no comparative databases even in the small selection of pilot countries in this study. Some values are thus based on strong additional assumptions (e.g. the number of potential microfinance borrowers in a country varies widely, depending on the poverty definitions and demand assumptions), on estimates and expert opinions. ***Therefore, the resulting index is merely a rough indication of the OID danger in any given country and highly sensitive to changes in variables' definitions and data sources used.***

As a result, further research would be indispensable to improve the database and the resulting index. The database would need to be built much more systematically for the pilot countries over the next years and possibly expanded to include more countries. Alternatively – and perhaps ideally – the indirect approach proposed in this pilot study should be complemented by systematic global household surveys of potential microfinance clients.

8 Appendix

8.1 References

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