



Lack of access or crowded markets? Towards a better understanding of microfinance market penetration

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ABSTRACT

“Market penetration” is often used as a criterion for microfinance funders, particularly investors, in microfinance asset allocation and portfolio construction. For years, low global market penetration has served as an argument of why investing in microfinance was advisable, often without sufficient differentiation between countries. Precise measures are, however, needed in order to better differentiate between those markets that are deeply penetrated and those with significant potential for expansion. This paper proposes a new set of indicators to measure market penetration in microfinance markets. It presents a unique dataset of microfinance market penetration rates for loans and deposits for a large set of countries, and implements refined measurements for a smaller selection of countries.

Keywords: microfinance, market penetration, market saturation, over-indebtedness

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List of Indicators

Dep1PenNat	general market penetration rate for deposits based on number of deposit accounts and national poverty line definition
Dep2PenNat	general market penetration rate for deposits based on number of depositors and national poverty line definition
LoanPenCC1	refined market penetration rate for loans (based on LoanPenNat) accounting for consumer loans
LoanPenCC2	refined market penetration rate for loans (based on LoanPenNat) accounting for consumer loans adjusted for multiple borrowing
LoanPenDemandHigh	refined market penetration rate for loans (based on LoanPenNat) for a reduction in demand on the upper bound
LoanPenDemandLow	refined market penetration rate for loans (based on LoanPenNat) for a reduction in demand on the lower bound
LoanPenHHLow	refined market penetration rate for loans (based on LoanPenNat) for households instead of individuals, lower boundary
LoanPenHHHigh	refined market penetration rate for loans (based on LoanPenNat) for households instead of individuals, upper boundary
LoanPenMultiple	refined market penetration rate for loans (based on LoanPenNat) accounting for multiple borrowing
LoanPenNat	general market penetration rate for loans based on national poverty line definition
LoanPen2	general market penetration rate for loans based on USD2 per day PPP poverty definition

1. Background and objectives

With the increasing age of microfinance in many countries, some national microfinance markets are considered more mature than others. Aspects of maturing include the increasing profitability, professionalization and growth of individual service providers, or the increasing inflow of commercial investment in these markets. Last but not least, in maturing microfinance markets, outreach is growing, i.e. the number of people reached with financial services is increasing. In these maturing markets, the essential question is whether or when the microfinance market segment of the financial services retail market is “saturated”, i.e. when “market penetration” is so high that a further increase of supply may become more difficult or create problems that affect the financial and / or social performance of suppliers.

Market penetration is used more and more often as a criterion for microfinance funders, particularly investors, in microfinance asset allocation and portfolio construction. For years, low global market penetration has been used as an argument of why investing in microfinance was advisable (see for example Dieckmann 2007, DiLeo/Fitzherbert 2007, Fitch Ratings 2008), often without sufficient differentiation between countries. However, doubts about the volume of demand for microcredit have been raised as early as in 2008 (Anand/Rosenberg 2008). In recent crises of widespread over-indebtedness of borrowers in single countries or markets, overly market penetration has been cited as a possible cause contributing to clients’ over-indebtedness beyond their debt capacity, thus affecting the social performance of microfinance (Kappel et al. 2010, Maurer/Pytkowska 2010).

Only few serious attempts have been made to come up with exact measures of market penetration in microfinance. There is a trade-off between easily determined back-of-the-envelope estimates and more precise measures. The latter are, however, needed in order to avoid overinvestment in specific markets and to ensure the sustainability of microfinance clients, local service providers as well as microfinance investments.

Exact measurements of market penetration are particularly important for microcredit services. They may also become more relevant for microsavings in the future. Both types of services are the object of this paper. It proposes a refined measure for market penetration and implements this measure for country-wide microfinance markets. In particular, we argue that a narrow definition of the potential clients is needed in microcredit markets. All microfinance services, particularly microcredit services, have typically been developed for self-employed “microentrepreneurs” with short-term cash flows. As long as loan product differentiation is limited in this way to a relatively small range of products designed for specific customer groups, such a narrow definition of the potential clients reflects conservative sound practices of microcredit allocation decisions that do not exceed the debt capacity of borrowers (for a definition see Von Pischke 1991, 277).

The paper proceeds as follows. Section 2 reviews how market penetration is defined and used in the literature. Section 3 develops a refined standard measurement of microfinance market penetration. Section 4 examines data sources and the selection of countries for an empirical application of the measurement. A particular focus is on data needed to refine the

standard measurement further. Section 5 summarizes and discusses results for the refined standard measurement for a large selection of countries, and further refinements for smaller selection of countries. While it does not assess causes, it discusses some factors that may be associated with for higher or lower market penetration. Section 6 concludes and shows further implications of the market penetration measurements.

2. Market penetration in the literature

Microfinance, are financial services for those individuals who are without access to formal financial institutions based on their socio-economic status. Microfinance is oftentimes portrayed as field or an industry with a considerable potential to achieve growth in total loan portfolios and total assets, and to expand to new customers. Many sources point to a significant gap between actual supply (measured in total assets or combined loan portfolios, or in the aggregate number of customers reached by microfinance suppliers) and potential demand, as measured in the potential numbers of customers or in a projected loan portfolio to serve these customers (see for example Helms 2006). From a normative view, the “breadth of outreach” (number of customers reached or growth in number of customers reached) is often considered a core performance indicator for the state of the microfinance industry (e.g. Ahlin et al. 2009, Vanroose 2008). As investment in the industry increases, differences in market penetration rates between countries are used to show the need for further investment and to assess the growth potential of the industry (Rhyne/Otero 2006, Dieckmann 2007).

Rhyne/Otero (2006) determine a potential upper boundary of investment based on the assumption that the empirically observed market penetration in Bangladesh in year 2006 (9%) can be used as such an upper boundary. This is regardless the fact that the microfinance market in Bangladesh differs from that in other countries, for example, in the very large number of small NGO-MFIs that are supported by a wholesale financing organization called PKSF, and the large size of the three biggest MFIs, reporting each more than 4 million customers.

Nevertheless, they give one of the first attempts to calculate different penetration rates for different countries. The heterogeneity of microfinance markets with respect to the type, size and structure of demand for microfinance services, their supply, and the institutional and macro conditions of these markets make it indeed necessary to differentiate microfinance markets. Some but not all countries will have increasing need for financing. Others may not be able to absorb more foreign investment without substantial innovations. A quantitative market penetration indicator cannot cover qualitative aspects such as product innovations, or macroeconomic and institutional (sometimes called “meso”) factors that may be correlated with current microfinance market penetration rates, if not causally related. It is nevertheless increasingly important to use good measures of market penetration as a good proxy to describe current market results from three angles: it measures in how far supply meets demand given the specific set of framework conditions in each market. Better data on market penetration will then allow us for further testing of qualitative, macro and institutional factors in further research.

Management and economics literature uses the term “market penetration” in a range of definitions; no standard definition has been adapted. The most common perspective in the management literature sees market penetration as the decision of a supplier to enter a particular existing market (Allen 1966), or as a specific strategy to increase a supplier’s share in a given market with an already existing product (Ansoff 1965). Here, the market penetration rate refers to a measurement of the current sales (measured in turnover) of one firm compared to total actual sales in that market. Obviously, the existence of competitors and their market share matters for the degree of penetration a single firm can achieve (Allen 1966, 23). An example for such a definition of market penetration used in the banking sector can be found in Yeyati/Micco (2003), where the total assets of a specific type of bank are compared to the total assets in the entire banking sector available at a given point in time. The concept implies that there is a maximum volume or quantity of sales at which a market is “saturated” and even at a price of zero, no further demand exists.

Ansoff’s presentation of market penetration within a “product/market matrix” shows the limitations of this concept in so far as it is the most static strategy a supplier can chose. More dynamic strategies include the development of further products or / and further customer segments (Ansoff 1965). In other words, market penetration in Ansoff’s sense is limited to a well-defined and well-known market segment, and does not include strategies to reach out to new customers with existing or new products.

The microfinance literature adapts the assumption that there is a maximum potential market size, i.e. it acknowledges the possibility of market saturation. It expands Ansoff’s static view beyond the “penetration” strategy to reaching out to new customers and offering new products: Most commonly, microfinance sources refer to market penetration not for a single supplier but for an entire market within geographical boundaries. The concept of market penetration is used to determine how much aggregated supply from all firms is already offered in comparison to the potential demand. This is possible through a crucial change in the measurement unit: instead of focusing on total sales turnover or total assets in the financial service industry, the microfinance literature considers numbers of users of services, i.e. the number of actual customers, and the total population or a subgroup of people who are considered potential customers. Moreover, typically, penetration is calculated for microcredit products only and then extrapolated to the entire microfinance product range.

For example, Rhyne/Otero (2006, 12) use such a headcount ratio and compare total borrowers served at a given time with potential borrowers, equaled to the total population in a country, to define market penetration for microfinance. The widely quoted document by Dieckmann (2007, 12) contains a graphical representation of "market penetration" based on calculations comparing MIX supply-side data of actual borrowers with the poor population (measured using the national poverty line definition), resulting in penetration rates between 35% (Bangladesh) and less than 3% (Brasil). Gonzalez (2008) also compares the number of borrowers served in a given country with the entire population and with a share of the population defined as “poor”. Similarly, the global microfinance data collector Microfinance Information eXchange, Inc. (MIX) calculates penetration rates as “total borrowers served by known MFIs relative to the total poor population” (MIX 2010a, 2). Following the same

approach, Gonzalez/Javoy (2011, 4) identify only six countries with “high” penetration rates of 10% or more. Rozas (2009) differentiates more by adjusting the potential borrowers for gender and age in addition to income level respectively poverty.

Intellectap (2009) estimates market penetration in volume of sales (microcredits), not number of customers. However, this ratio does not provide more information than the headcount ratio because its denominator is still based on estimates of the poor population. The authors refine the measurement by using number of households, not individuals, in the microfinance income bracket, and assume that a share of 1/3 of a household’s income delineates the upper boundary of demand for credit of the household.

The “access to finance”-literature focuses on measuring current access to financial services in developing countries and comparing them not to a theoretical measure of maximum access but to access measures in developed economies. However, most access to finance-studies do not focus on microfinance customers or products only. This literature measures, on the one hand, the supply of financial retail services in different markets (defined geographically using country boundaries) by looking at number of people served (see for instance Beck/Demirgüç-Kunt 2008, 386). On the other hand, following Kumar (2005) and Claessens (2006), it distinguishes between the supply of services and their “use”, i.e. where supply meets demand. In one of the first studies on access to finance, Honohan (2004) compares total number of borrowers with the total population and with the total poor population (defined as living with a per capita purchasing power parity (PPP) of below USD2 per day), regardless their age. He uses datasets provided by the Microfinance Summit Report (Daley-Harris 2003), and CGAP (Christen et al. 2004), both of which cover more institutions than the studies above that rely on supply data from the MIX data base. Daley-Harris’ report uses survey results of 2572 institutions, among them credit cooperatives, credit unions and small development banks. Christen’s study encompasses all institutions considered „alternative finance institutions“, which include postal savings banks and large development banks, both of which do not focus on microcredit.

More recently, in collecting primary data from bank regulators around the world, Beck et al. (2008) measure access to finance in counting supply-side factors such as the number of bank branch locations per country, the fees to open and maintain deposit, checking or loan accounts, or the number of documents needed. This pioneering study, however, is of limited relevance for the microfinance market because it focuses on the five largest commercial retail banks in every country. In contrast, Honohan (2008) measures the use of financial services by customers by counting numbers of accounts offered. In an extension of Honohan’s work, Chaia et al. (2009) mention refined measures for 12 countries. Building on these studies, a practitioner-led pilot to collect annual access to finance-data (CGAP/World Bank, 2009, 2010, Pinar Ardic et al. 2012) broadly covers all regulated formal financial institutions including commercial banks, cooperatives, credit unions, mutual, specialized state financial institutions, and microfinance institutions (CGAP/World Bank 2010, 45). Data are collected through surveys among financial sector regulators, with the consequence of understating supply of unregulated credit services. Similar to Honohan’s (2008) approach, indicators are based on number of accounts, thus double-counting customers with more than one account

and treating inactive deposit accounts differently across countries (CGAP/World Bank 2010, 46). This is avoided in demand-side household surveys conducted to establish the Global Findex Database on the use of financial services (Demirguc-Kunt/Klapper 2012).

For the purpose of the present paper, however, a more important limiting factor of this “use of finance” and the access to finance-data lies in their inclusion of the entire or a large portion of the population. CGAP/World Bank (2010) defines “loan penetration” as number of loan accounts per 1000 adult population, and “deposit penetration” accordingly as the number of deposit accounts per 1000 adults. It is not possible to deduct a penetration rate for the microfinance market segment of low-income customers based on the aggregate indicators available in the financial access reports. The CGAP/World Bank (2010) takes a first step in the direction of segmenting data according to customer types in examining the definitions, availability and comparability of data on SME financing. It uses regression estimates to come to rough estimates of SME lending shares in the total of commercial bank loans to individuals and businesses, for all countries. An equivalent approach for microfinance customers, however, may be even more difficult because of the presumably higher share of non-regulated suppliers operating in the microfinance market segment. The Global Findex Database includes access to finance data for the 40% lowest income bracket of the population. This does not correspond to the microfinance market segment in most countries.

3. A refined concept to measure market penetration in microfinance

3.1 General description of market penetration indicators

In a dynamic view, we measure microfinance market penetration in one of the following ratios:

$$(1) \text{ MF Penetration }_1 = \text{Number of current customers} / \text{Number of potential customers}$$

Or

$$(2) \text{ MF Penetration }_2 = \text{Current volume of financial services in the microfinance market segment} / \text{Potential volume of financial services in the microfinance market segment}$$

This dynamic measurement of comparing total customers (or sales) of all known suppliers with potential customers or sales covers all four areas of the Ansoff matrix. It is indeed more appropriate in microfinance markets than a traditional static comparison of given (and known) product sales (or customers) among different well-defined suppliers. Reaching out to customers who have not yet access to financial services is at the core of the innovative capacities and a key objective of microfinance suppliers (Armendáriz/Labie 2011). Even if no normative target such as a market penetration of x% is typically used, both academic literature and practitioners emphasize the need to further “expand the frontier” of reaching new customers through product innovations (see for instance Von Pischke 1991, Karlan/Murdoch 2009).

Nevertheless, such a dynamic measurement faces challenges when applied to the microfinance market segment and needs a series of refinements. In practice, this implies a trade-off: Simple and feasible measures are more biased due to strong assumptions, whereas more complex measurements avoid traps such as overestimating demand or underestimating actual penetration, but are more difficult to calculate and need a more comprehensive database. For practitioners and investors using “market penetration” as a criterion to assess the current state and growth potential of a specific microfinance market, a more complex measurement may be needed. For overall strategy and marketing purposes of the global microfinance industry, a simpler measure may be deemed sufficient to indicate how much outreach to poor customers the microfinance industry has achieved.

Following the market penetration measurement developed in our previous paper (Kappel et al. 2010), we show how to operationalize the nominator and the denominator of the formula through a series of refinements, moving from a simpler to more complex measurements. We apply the best measurement of market penetration, which combines several refinements, to a small selection of countries and show how the refinements (such as urban versus rural customers, multiple borrowing, the size and double-counting of households, etc.) change the basic result drastically. We mainly use the headcount approach (number of customers) as shown in formula (1). Operational measurements based on volumes of loans and portfolios instead of headcounts of clients as shown in formula (2) can be applied accordingly.

3.2 Refinements and measurement issues

To apply the market penetration formula requires a series of specifications and refinements.

The numerator, current customers (or current volume of services) should count customers of all relevant suppliers of the microfinance market segment. These are commercial banks and microfinance institutions but also other financial service providers active in microfinance markets such as government-owned credit and savings institutions, cooperatives, and consumer finance companies. In a risk-management perspective, to avoid that high market penetration contributes to widespread over-indebtedness of customers (see Kappel et al. 2010), even informal financial service providers with significant market share need to be included. In practice, however, it may be difficult to include sales or customer numbers of all these types of suppliers.

A problem related to using supplier data when using headcounts of customers as a measurement unit, is the issue of double-counting. As soon as customers practice “multiple borrowing” or “cross borrowing”, aggregate numbers of customers from all suppliers need to be revised on the downside, since the same individual has multiple deposit or loan accounts whether within a single intermediary or with many intermediaries (Honohan 2005). Theoretical analyses and case studies of demand, supply and market environment shed light on why and with which consequences customers engage in multiple borrowing (see for instance the distinction between distress and opportunity borrowing by Chaudhury/Matin 2002; see also Burki 2010, Schicks 2010). It is thus necessary to adjust the current number of

microcredit customers. A high extent of multiple borrowing leads to an upward bias in the number of current customers.

The denominator, a measurement of the potential demand or potential customers, needs to be limited to the relevant market segment for microfinance services. Estimates for the potential demand typically rely on large-scale consumer surveys, which are relatively rare in microfinance and expensive to conduct. In the absence of such large-scale surveys, a series of steps is needed to reduce the largest possible estimate of demand, i.e. the entire population of a country, to a narrower and more appropriate measure.

The denominator needs to be reduced by demographic and socio-economic factors. As shown above, examples for this method are used in the microfinance literature when e.g. only the population counted as “poor” in official statistics is used, or only the female part of the population. Following this literature, we argue that there is a close correlation of the demand for microfinance services and income levels of the customers. Therefore, the first adjustment is to include only those who are commonly defined as “poor” according to income or poverty statistics. Moreover, Kappel et al. (2010) show that there is a difference in market penetration depending on the poverty definition used, national poverty lines or the absolute international standard measure of USD 2 PPP per head per day. A mid-income country in south-eastern Europe such as Bosnia and Herzegovina shows the obvious need for differentiating the poverty rates. The percentage of the population living from 2\$ a day was only 0.19% in 2007, whereas the poor population was 14% according to the national poverty line. Obviously using these two poverty definitions leads to drastically different outcomes of penetration estimates. Kappel et al. (2010) also limit the relevant population to the “economically active” poor population. This is done by focusing on the working age population bracket, with working age defined as age 15 – 64 following WDI statistics.

Measurements of market penetration in microfinance typically focus on microcredit services. Only the access to finance literature includes deposits (and partly, insurance or checking account services) in their surveys. This study follows the access to finance literature insofar as it includes not only “microcredit” but also “microsavings” in the measurement of market penetration. The differentiation is important from a normative point of view: credit is a service that lenders supply only to those customers that are deemed creditworthy (in economic models, those who have investment projects with marginal rate of returns at least equal the cost of borrowed capital); market forces should exclude those with insufficient “debt capacity”. Savings services, on the other hand, are considered a good that should be offered to everyone. Accordingly, different penetration rates for deposits and loan services need to be calculated.

Building on this approach, the denominator needs to be adjusted further in order to not overestimate demand for services. In particular for loans, the number should be adjusted to only include measurements of potential clients who “do want a loan”.

Moreover, including households instead of individual clients further affects the potential demand but may be more realistic depending on socio-economic and demographic factors.

In particular, borrowers may be part of a complex informal network of financing relationships and obligations within and possibly even beyond their core family, the so-called “portfolio” (Collins et al. 2009, 14). Adjusting the number of potential borrowers by an average household size also reflects the approach of many conservative microfinance lenders to consider all household finances in an individual borrower’s cash flow analysis, not only the individual borrower’s finances.

Last but not least, both denominator and numerator need to be differentiated between different geographical areas within a country, in particular rural versus urban financial markets. The reason for this distinction is the traditional focus of most microfinance suppliers on either urban or rural but non-agricultural products and customers (Morvant-Roux 2011, 422) and the ensuing assumption that market penetration may differ substantially between urban and rural market segments.

In section 4 of this paper, we discuss how these adjustments can be applied in practice. Depending on data availability, the paper shows simple adjusted measures for a larger number of countries and more complex adjustments for a smaller number of countries.

4. Data sources and country selection

4.1 Data sources for a simple measure for a large sample of countries

General loan market penetration

The main data sources underlying the simple measure of market penetration for microloans (LoanPenNat) are the Microfinance Information eXchange (MIX) data and the World Development Indicators (WDI) from 2002 to 2010. It must be noted that the MIX database consists of institutions that consider themselves microfinance suppliers and expect a benefit from voluntary reporting to this global database. It is therefore most likely biased towards an underrepresentation of certain legal forms, in particular commercial banks, non-microfinance focused consumer lending companies and government-owned institutions. These biases may be stronger in some markets than in others. However, the MIX database is less likely to understate microfinance market penetration than other available data of financial supply, such as the Microcredit Summit database (Reed 2011), which has a strong focus on institutions targeting very or extreme poor clients, or surveys among financial sector regulators used in the access-to-finance literature, which typically do not include all unregulated institutions (CGAP/Worldbank 2010).

The current number of customers is approximated by the total number of active borrowers reported to the MIX in the respective country in year 2010. The working population is approximated by the population aged 15-65 years using the WDI data. The paper applies three types of poverty lines provided by the WDI to the estimated working population (poverty headcount ratio at national poverty line, poverty headcount ratio at \$2 a day (purchasing power parity, PPP), and poverty headcount ratio at \$1.25 a day (PPP)).

Whenever the poverty headcount data are not available for the year in question the paper uses the most recent poverty data available in the period 2002-2010 as a proxy. It should be noted that this may lead to some smoothing of poverty values used for those countries with incomplete annual WDI data.¹

General deposit market penetration

To determine the general market penetration for deposits (DepositPenNat), we use the actual number of depositors and the number of deposit accounts in year 2010 as supplied by the MIX. Two counteracting biases can occur. On the one hand, this number may be downward biased because a large share of deposits, even small scale deposits, are handled by financial institutions that to a large extent do not report to the MIX, such as public or postal savings banks (Christen et al. 2004). On the other hand, Johnson/Meka (2010) point out that it is not uncommon to increase the number of savings accounts through policy measures such as temporary reductions of account opening fees. They claim that the number of accounts needs to be adjusted by eliminating dormant accounts, i.e. those accounts below threshold levels of deposit volume and account movements. In the simple general measure, we rely on the MIX data only, thus assuming that both biases tend to offset each other. More likely, the numerator of the general deposit market penetration is understated.

The potential number of depositors (for the denominator) equals the potential number of borrowers as used in the general penetration rate calculation. Again, the potential number of depositors may be overstated, as there may be individuals who do not want a savings account. Johnson/Meka (2010, 24) report that in rural Andhra Pradesh, 24.1% of the surveyed households do not want or need a savings account. However, as this finding from Andhra Pradesh may not simply be generalized to other regions and countries, we do not correct our potential number of depositors for individuals who do not want a savings account.

The WDI distinguish the number of deposit accounts from four different sources: commercial banks, cooperatives, MFIs and other financial institutions. The WDI data suffer from two major drawbacks when used for our purposes. First, a lot of data are missing and second, the deposit accounts do not exclusively focus on (potential) microfinance clients. It is therefore critical to extract only those deposit accounts belonging to the target group of MFIs. Moreover, it is important to take the overlap of the MIX and WDI data into account.

¹ Data on the population aged 15 - 65 in Kosovo are not available from the WDI and therefore replaced by the 2011 value reported by the Kosovo Agency of Statistics Kosovo Census 2011 (Kosovo Agency of Statistics).

4.2 Data sources for a refined measure for a small selection of countries

Refinement: excluding those who do not request a loan

There are only a few estimates available that report the actual willingness of individuals to borrow from a microfinance institution. Johnston/Morduch (2007), who surveyed 1438 households in Indonesia in 2002, find that less than 25 percent of creditworthy poor households had borrowed from a microfinance institution or another formal lender in the 3 years prior to the survey. This statement (similarly in other studies) does, however, not imply that the other 75 percent of creditworthy individuals do not want a loan. Not borrowing from a microfinance institution could be caused by other factors. As Navajas/Tejerina (2006) mention, it is important to keep in mind that potential borrowers may indicate not to want a loan because the current portfolio of loans offered by MFIs does not suit their needs. Designing new loan products may attract new customers. Their own study therefore explicitly refers to the percentage of individuals who do not request a loan once it is offered.

Magill/Meyer (2005) find that roughly 49 percent of the micro-entrepreneurs interviewed in Ecuador were interested in obtaining a loan. Of the remaining 51 percent, 14.2 percent were not interested in obtaining a loan as they did not need one, and 36.6 percent stated that they simply did not want to be indebted. Navajas/Tejerina (2006) summarize several household surveys in Latin America. Their estimates for a reduction in demand range between 25 percent and 52 percent. Our values used to adjust for the percentage of borrowers not requesting a loan are based on these estimates. The upper bound assumes a reduction in the demand of 51% while the lower bound reflects a reduction in demand of 25%.

The numbers used for the estimations may not hold for all countries. Johnson/Meka (2010) report that only 7% of households in rural Andhra Pradesh have a loan neither from a formal source nor from an informal source. From their analysis it remains unclear whether these 7% do not want a loan, or do not have access to loans.

As discussed in Anand/Rosenberg (2008), even if individuals would like to apply for a loan and borrow money, some of them will not be deemed creditworthy. Johnston/Morduch's (2008) study in Indonesia shows that around 40% of their sampled individuals were deemed creditworthy in the assessment of the largest microfinance bank in the country (BRI). Even if the loan allocation decisions may have changed since the date of the survey (2002), or, as the authors point out, alternative lending techniques by other lenders or different prices charged to loans may change results, this share is relatively low. The survey included households regardless of whether they had applied for a loan so that the share might be higher if the same sampling technique as in Navajas/Tejerina (2006) had been used.

Table 1: Empirical estimates of actual microloan demand

Country	Estimate of actual demand for loans	Year	Author
Dominican Republic	71%	2003	Navajas and Tejerina (2006)
Ecuador	52%	1999	Navajas and Tejerina (2006)
Ecuador	49%	2004	Magill and Meyer (2005)
Guatemala	61%	2000	Navajas and Tejerina (2006)
Nicaragua	75%	1998	Navajas and Tejerina (2006)
Panama	72%	2003	Navajas and Tejerina (2006)

Table 1 summarizes the most relevant empirical findings on the actual demand for microloans. We use the values for Nicaragua as our lower bound and for Ecuador (from Magill/Meyer (2004)) as the upper bound for a refined loan penetration rate that takes into account only those who want a loan when it is offered.

Refinement: multiple borrowing

At this point there are no data available that permit a comparison of multiple borrowing across a large number of countries. Therefore we adjust for multiple borrowing on a case-by-case basis. It is obvious that we cannot apply a general estimate of multiple borrowing to all countries, as the extent of multiple borrowing varies heavily between, possibly also within countries. Whenever possible, the refined measure of the penetration rate for multiple borrowing also takes into account that multiple borrowers do not only have two loans but may also have more loans.

The MIX interviewed 139 MFIs in 15 countries in Latin America in 2009 on “cross-indebtedness” (MIX 2010b). The refined measure of the penetration rate uses their estimate for cross-indebtedness in Peru and Ecuador. The refined penetration rate of Bosnia and Herzegovina is based on the estimates of Maurer/Pytkowska (2011). The case of Bosnia and Herzegovina shows that it is important to take into account that quite a large number of multiple borrowers have more than two loans. Neglecting this effect would overestimate the actual number of borrowers by a substantial amount. The authors find that an astonishing 58 percent of borrowers in their sample had more than one loan. Simply assuming that they had two loans would reduce the number of borrowers reported by the MIX by 37 percent. Taking into account the actual number of loans that the borrowers held, leads in fact to a reduction of 54 percent.

Pytkowska/Spannuth (2011) interviewed 1200 microborrowers from seven institutions in Kosovo in 2010. According to the results of the study, we reduce the number of borrowers by 24 percent in Kosovo. Two studies, Diaz/ Ledesma (2011) and Diaz et al. (2011), focus on urban borrowers in the Philippines. Based on their results, estimates for the number of

borrowers in the Philippines are therefore reduced by 30 percent in the calculations. Assuming that the extent of multiple borrowing is less widespread in rural areas due to a lower density of formal or semi-formal lenders, it seems reasonable to regard this number as the upper bound of multiple borrowing.

Not all countries have a high incidence of multiple borrowing. Schicks (2011) finds that only 8 percent of the surveyed clients in urban Ghana are multiple borrowers. Taking into account the number of loans of these multiple borrowers lowers the current number of borrowers in Ghana by 7.5 percent.

Only institution-level data on multiple borrowing are available for Morocco in Chen et al. (2010). Based on central bank and credit information system data for the five largest MFIs in 2008, they estimate that 40% of the clients of the five largest MFIs had more than one loan in 2007; this share dropped to 39% in 2008 and 29% in 2009. Using these estimates and assuming that all multiple borrowers had only two loans, the total number of borrowers of these institutions would drop by 29% in 2007, 28% in 2008, and 22% in 2009. Given that the top five institutions reach both urban and rural areas, we extrapolate this adjustment to the entire Moroccan market.

Srinivasan's (2010, 2) report on the state of the microfinance sector in India mentions that depending on the density of suppliers (microfinance institutions, self-help groups, informal lenders), the number of borrowers would need to be reduced by up to one third "in competitive locations". However, available data on multiple borrowing vary widely for different states of India (Srinivasan 2010, 38pp). For overall India, we should thus rather use an average including his more conservative adjustment for other locations in the amount of 21%.

The regional disparities in India require a more disaggregated breakdown of the data. We calculate penetration rates for the sub-region Andhra Pradesh. According to Johnson/Meka (2010), multiple borrowing is widespread in rural Andhra Pradesh. According to their survey, 83.7 percent of households have two or more loans. This estimate seems to be one of the most exhaustive estimates as it includes not only MFI loans but also loans from banks, self-help groups and informal sources, and is not limited to areas suspected to have a high incidence of multiple borrowing (Johnson/Meka 2010, 32). In addition to the widespread extent of multiple borrowing, the number of loans of these multiple borrowers is also quite high. "The surveyed households reported a median of four loans outstanding from all sources". As the study does not explicitly show the distribution of borrowers with two, three and more loans from all sources, we use the median of four loans for our estimation.

Johnson/Meka (2010) moreover confirm our assumption that multiple borrowing from informal lenders is more widespread than from MFIs. In the case of rural Andhra Pradesh "3% of all households have two or more loans outstanding from MFIs, while 70% of them have at least two loans outstanding from informal sources". Although rural Andhra Pradesh may be one of the extreme cases with respect to multiple borrowing, quantitative evidence from other countries suggests similar patterns. Cano et al. (2007, 48) conducted a large-scale quantitative survey in Colombia and find that 69% of households and 50% of the microenterprises use both formal and informal credit. Moreover, Collins et al. (2009) give

plenty of qualitative evidence that adding loans from informal sources to the financing portfolio seems more widespread than multiple borrowing from several formal and semi-formal lenders. Not all of the studies that are used for our multiple borrowing calculations capture multiple borrowing from informal sources. Our penetration rate estimates adjusted for multiple borrowing are therefore slightly (downward) biased and do not necessarily reflect the whole extent of multiple borrowing.

The estimates for the penetration rates adjusted for multiple borrowing have to be treated with caution, as there are some drawbacks in the underlying data. The different studies from which we have drawn our data each have a different focus of the sampled (MFI) clients and use different methodologies. Nevertheless, we assume that the sampled data can be used to extrapolate to the overall market in each country. The available quantitative evidence leads us to conclude that our estimates on the extent of multiple borrowing are rather underestimated.

Refinement: households instead of individuals

We assume that the actual demand for a loan is determined more realistically at the household level and not individually. This holds particularly for people living and working in the informal economy, where household and business accounts are rarely completely separated. Even when individuals need money to finance their business or entrepreneurial activity, one can assume that they will only borrow from formal sources in case the entire household is in need of money. We therefore express a refined penetration rate in terms of households instead of individuals. Using household survey data from Bongaarts (2001), we assume the average household size to consist of five individuals.² The denominator thus represents the potential number of poor households that could borrow a loan. In order to correct the current number of borrowers for the household size, we use an upper and a lower estimate for the numerator. The upper estimate assumes that on average every second household has two individuals who borrow a microfinance loan. The lower estimate assumes that each borrower lives in a different household. Both corrections present extreme cases. The reality should lie somewhere in the middle.

Refinement: adjusting for loan (and deposit) volume

It is possible to express the penetration rate in terms of total loan (and deposit) volumes instead of number of borrowers (and depositors). For instance, the “loan penetration” and “deposit penetration” expressed in the financial access literature (CGAP/World Bank 2010) use volumes based on financial data received from financial sector regulators. One problem with volume data is double-counting of customers with more than one account or overstating deposit penetration due to dormant accounts (Honohan 2008). But even when we

²This is a lower bound; selected survey evidence shows that household sizes go up even further, the lower the per capita income (Poor Economics Database 2012).

use our general market penetration rate based on number of customers, we need more detailed data to obtain estimates that are different from our general penetration rate. The MIX provides the gross loan portfolio (total deposits). We need to make rather strong assumptions when estimating the potential loan volume for the denominator. The potential number of borrowers (as calculated before) has to be multiplied by the (expected) loan size. Currently, only the average loan size is available from the MIX. The distribution underlying the current size of loans is missing. We therefore take a simple approach and calculate the potential loan volume using the (weighted) average loan size.

Refinement: the rural-urban divide

In many countries it is not enough to calculate one general penetration rate for the whole country. Countries are diverse and microfinance is not equally widespread, in particular in geographically large countries. The most obvious diversity arises from the urban-rural divide.

We use data on the number of urban and rural MFI customers to distinguish the urban and rural penetration rates. Unfortunately, the MIX data do not give a complete picture of the rural and urban outreach to borrowers. Many MFIs do not report the geographic distinction between their borrowers to the MIX. The total number of urban and rural borrowers is not equal to the overall number of active borrowers reported in the MIX data and used in our general penetration estimations. Therefore, we have to rely on rough estimations for the number of rural and urban borrowers. The share of rural customers is extrapolated from those MFIs that report their rural vs. urban customers to all MFIs in the country sample. We are aware of the limitations of this approach. One could assume that the data give rise to a bias as the MFIs who report their rural-urban distinction of borrowers to the MIX may be more rural-oriented and report their data for social performance reasons.

The World Development Indicators provide estimates on the rural and urban population, as well as on the rural and urban poverty rates. Just as with the national poverty rates, in case the value of a certain year was unavailable, we used the lagged value as a proxy. We replace missing values for the Philippines in 2006 by the urban and rural poverty rates from the Asian Development Bank (2009). Moreover, we use the urban and rural population estimates from the World Bank (2010) for Kosovo in 2006.

Refinement: consumer lenders

Consumer loans can be structured similar to microfinance loans in terms of loan size, installments and even prices.³ Anecdotal evidence from several countries shows an overlap

³ Consumer loans are typically defined as loans to individuals or households to finance consumer goods or services (Vandone 2009), whereas in the microfinance literature, they are sometimes not defined by loan purpose but by type of recipient and related practice of credit risk management, i.e. loans to salaried customers, as opposed to self-employed customers (Marandula 2006, Rosales 2006).

of consumer loans or consumer lending practices and microfinance loans supplied to typical microfinance customers. For these countries, adjusting market penetration rate by consumer lending to the microfinance market segment is crucial as to not underestimate loan penetration.

A prominent example is South Africa (Bertrand et al. 2005), for which the National Credit Regulator provides data on consumer credit. According to the Consumer Credit Market Report (September 2011) there were 2 072 827 number of agreements⁴ granted to individuals with a gross monthly income of up to R 10 000 (approx. US\$ 1245), the poverty line for South Africa used by the OECD (Leibbrandt et al. 2010). This includes unsecured credit agreements as well as store credit. Adding this to the total number of borrowers of the MIX is a first attempt to augment the numerator and include clients currently served by MFIs as well as by consumer lenders. This approximation has to be considered with caution as it overestimates the numerator: First, there is an overlap of clients from MFIs and consumer lenders. Second, there is an overlap within each category of consumer credits, i.e. consumer loan borrowers may have more than one unsecured credit and more than one credit facility. Third, both consumer credit groups may overlap; clients may borrow unsecured credit and may have store credit as well. In fact, even in the MIX data there is a small overlap of loans apparent. The ratio of loans outstanding to number of borrowers is 1.1. We apply a factor of 2 to the penetration calculations, thus assuming that every individual has 2 consumer loans agreements.

Refinement: additional lenders

As discussed above, MIX data do not cover all financial institutions active in the microfinance market segment. The World Development Indicators offer data on the number of loans, distinguishing loans from commercial banks, cooperatives, MFIs and from other financial institutions. Additional possible data sources are the World Council of Credit Unions (WOCCU, 2010) about the penetration of credit unions (both affiliated and not affiliated with WOCCU), and individual institutional data from large suppliers that report partial or no data in the MIX. However, most of these data, for the example the WDI data, are usually not available according to different income or poverty groups of customers, and are thus not limited to the microfinance market segment. We can use these data only if we avoid double-counting or including customers that are not in the microfinance market segment.

⁴ In line with the Consumer Credit Market Report (Table 4.3, p. 12) we assume that 71.72% of the 1 791 051 store credit agreements is granted to individuals with income below R 10 000 in the last quarter of 2010.

4.3 Country selection

This paper calculates a simple measure of microfinance market penetration for a large number of countries, and refined measurements for smaller selections of countries. The large sample of countries consisting of 88 countries is based on the database of the MIX. It includes all those countries for which at least some MFIs report their data to the MIX, and for which one or both poverty population data, according to the national poverty line (NPL) or the international poverty definition of US\$ 2 per capita per day purchasing power parity (PPP) are available. We discuss separately in the results section countries for which the MIX database has obvious gaps or errors that cannot be adjusted easily. Due to limited data availability the refined measures for market penetration are calculated for a smaller sample of countries.

5. Results

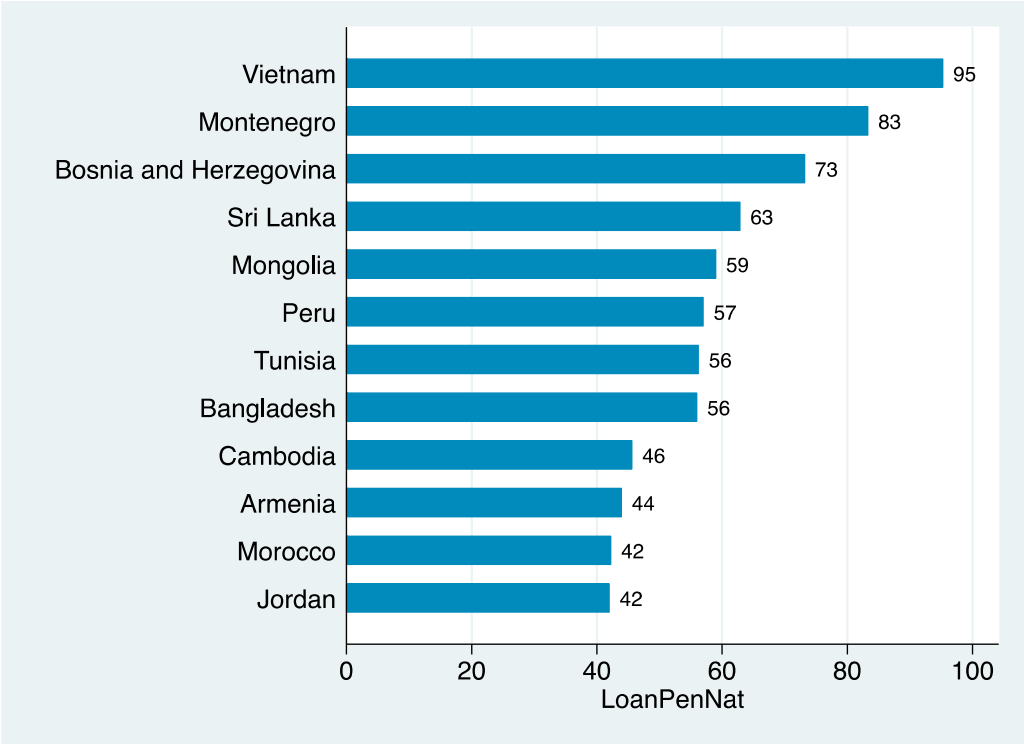
5.1 General measurement of market penetration for large sample of countries

Loan market penetration for people below the national poverty line

We first present results for the general market penetration in microcredit markets (shortly LoanPenNat). The spread in penetration rates when comparing all countries is enormous. In 2010, it ranges from 0.2% (Central African Republic) to 95% (Vietnam) when using the national poverty line as the poverty definition. Note that these numbers change drastically when other poverty definitions are applied (see below). For instance, using the 2\$ poverty headcount the estimate for Vietnam drops to a mere 36%; Bosnia and Herzegovina show the highest penetration rate (5393%) and Laos the lowest (0.3%).

Only twelve countries show a LoanPenNat of more than 40% in 2010, see figure 1. Bosnia and Herzegovina between 2007 and 2009, Montenegro between 2007 and 2010, and Vietnam between 2008 and 2010 showed a market penetration of more than 80% using the national poverty line definition. These results seem to be in line with available reports on these markets. For instance, the numbers for Bosnia are in line with reported developments in the microcredit market in Bosnia and Herzegovina (Maurer/Pytowska 2010, Reille et al. 2010). The results for Montenegro are due to both a strong annual increase in the number of borrowers reported in the MIX until 2008, and a strong decrease in the poverty rate reported in the WDI. Both trends together cause the LoanPenNat to increase until 2008 but fall afterwards. A closer look at Montenegro reveals that the strong decline in borrowers after 2008 reported in the MIX reflects indeed the most important event in the microcredit market in this country, namely the discontinuation of the largest supplier to operate in the microcredit market segment after a crisis. The results for Vietnam reflect that the largest supplier, VSBP, a government-owned bank with the mission to maximize outreach, is reporting to the MIX, thus boosting LoanPenNat.

Figure 1 : General loan penetration rate (national poverty line) of the top 12 countries in 2010



Other countries with strong LoanPenNat above 50% at some point between 2007 and 2010 include Armenia (2008), Bangladesh (all years), Mongolia (2007 - 2010), Morocco (nevertheless with a strong decline after a peak of almost 73% in 2007), as well as Peru, Sri Lanka and Tunisia all in 2010. Cross-checking for robustness with individual country data shows that these results are indeed in line with major trends in these national microcredit markets.

Some countries with a well-documented experience in microfinance are notably absent of the list of high microloan market penetration rates in 2010. For instance Bolivia reaches a mid-level LoanPenNat, not higher than 26% in 2010, the strongest year, and shows only moderate increases. Cambodia reaches around 46% in 2010, Jordan 42% in 2010. Other countries are even further from showing high penetration rates, for instance India (peaking at 15% in 2010), Kenya (15% in 2009), Uganda (11% in 2009), and South Africa (peaking at 12% in 2009, dropping to 1% in 2010). The low rate for South Africa is partly explained by the absence of South African consumer lenders reporting to the MIX. Numbers for India, Kenya and Uganda confirm the need to refine the general LoanPenNat in order to differentiate between regions within each country.

Other countries with loan penetration rates above 20% in 2010 include Albania, Azerbaijan, Colombia, Ecuador, Kyrgyzstan, Malaysia, Nicaragua, Paraguay, the Philippines, and Serbia.

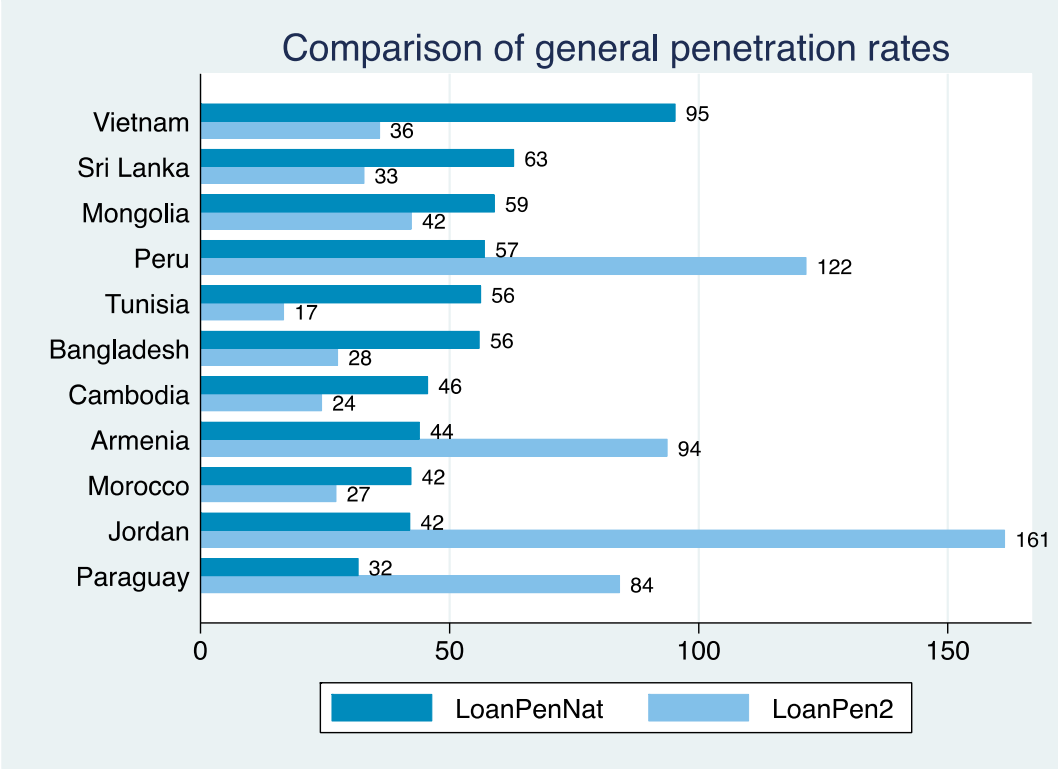
Another group of countries shows an amazingly persistent low absolute LoanPenNat that dimples around 8% in all years: Guatemala, Mali, Pakistan, Senegal, Togo have not experienced a breakthrough growth. These findings confirm the threshold observed by others (see above) yet on a higher level. In some countries (Guatemala, Senegal, Togo), the low penetration rates may also be biased downwards due to an incomplete coverage of credit unions in the MIX data.

Nevertheless, there are countries with persistently very low penetration rates below 4% in 8 or all 9 examined years. Those are mainly upper middle and high-income countries such as Brazil (reaching the 6% mark though in 2010), Costa Rica, Kazakhstan, Poland, Romania, Russia, Thailand, Uruguay, Venezuela, but also some countries where persistent macroeconomic, financial sector or political conditions perpetuate the low microfinance market penetration. These include countries as diverse as Cote d'Ivoire, Haiti, Madagascar, Rwanda, Sierra Leone, Tanzania, and Yemen.

Loan market penetration for poor people according to the 2\$ PPP poverty definition

How do results differ if we refer to the population defined as poor by one of the international poverty lines such as living below \$ 2 PPP per day? Much more countries have a penetration rate LoanPen2 above 80% when the 2\$ poverty line is applied. In many, in particular middle and high income-countries, this is due to a lower poverty rate when measured with the 2\$ threshold. In these countries, applying the 2\$ poverty definition and calculating LoanPen2 does not make much sense. Vice versa, poorer countries may even have a lower poverty rate in their national definition than according to the international 2\$ threshold. Reconsidering the list of top countries from above (Figure 1), the poorer countries drop indeed off the list when applying the 2\$ poverty definition (see Figure 2): Vietnam, Sri Lanka, Bangladesh, Mongolia, Cambodia, all have rates below 45%; the top 10 countries with LoanPen2 above 65% are (in descending order) Bosnia and Herzegovina, Montenegro, Serbia, Jordan, Peru, Albania, Armenia, Paraguay, Mexico, Azerbaijan, Russia and Bolivia.

Figure 2: Comparing loan market penetration by poverty definition applied



Not intuitive are the results for Tunisia and Morocco, for which LoanPen2 is higher than LoanPenNat. In both cases, the explanation may be related to the definition of the national poverty line: WDI data show a much higher poverty headcount ratio at \$2 than at the national poverty line for all years, which, thus, seem to be set extraordinarily low for these middle-income countries. Indeed, applying the alternative lower poverty definition of US \$1.25 PPP per day, the market penetration for both countries rises significantly to 152% and 94% respectively.

In only few countries, the loan penetration with the international 2\$ threshold remains high despite a relatively high poverty incidence (above 12%) when measured this way: notably, this includes only Armenia, Paraguay, and Peru in 2010. In sum, the microfinance market penetration for loans is defined more appropriately for most countries using the national poverty line definitions.

Rises and crises

Beside the levels, growth rates of the loan market penetration matter. Has the microfinance industry been shrinking with or after the global financial crisis? Simple global average data of the microfinance market penetration seem to confirm this: Considering the simple (unweighted) average of LoanPenNat across countries, market penetration rose from less than 3.5% in 2002 to 18% in 2008, but dropped slightly to 15.8% in 2009 and 15.7% in 2010. That means that in 2009 and 2010, slightly less people have been reached than in 2008. Nonetheless, we need to look at country-level growth rates of market penetration. It should be noted that low penetration rates in earlier years may be due to the fact that MFIs did not report to the MIX market. This may produce a bias in the first years and we therefore investigate growth rates starting after 2005 only. Some countries' growth rates in later years are nevertheless striking.

Bolivia and eleven other countries (Dominican Republic, India, Jordan, Kyrgyzstan, Mexico, Nepal, Peru, Tunisia, and Turkey) recorded positive growth in microloan market penetration in all years 2006 to 2010.

Some prominent yet relatively small "crises countries" had a steep rise in their loan penetration rate before the years associated with the respective crises, and strong negative growth in two or more years since the crises. The penetration rate in Morocco (based on the national poverty line) jumped from 33% in 2006 to 74% in 2007. In Bosnia and Herzegovina, the same rate rose from 51% in 2006 to 97% in 2007 to 118% in 2008. Subsequently, both countries experienced a drop in their penetration rates (mainly due to decreased number of borrowers. For both countries the penetration is higher than before the crisis, but significantly lower than at the peak. In 2010, LoanPenNat was 73% in Bosnia and Herzegovina, and 42% in Morocco. Nicaragua also experienced a repayment crises starting in 2008. The persistence of this crisis is reflected in the strong negative growth rates since 2008 and LoanPenNat of merely 20% (compared to 35% in 2007). Finally, Pakistan, which experienced a repayment crisis concentrated in Punjab, shows a strong negative growth rate (minus 23%) in 2009 only, the year after the crisis' outbreak. Indeed, the accumulated

numbers of active borrowers of institutions reporting in the MIX shrank between 2007 and 2008 but recovered since then.

In contrast to these crises countries, India is among the twelve with continuing positive growth in loan market penetration, despite the frequently reported yet localized crisis in Andhra Pradesh in 2010/2011. Given that there are very large regional disparities in the country, using the general loan penetration rate is questionable. Therefore the case of India will be discussed later on.

Data adjustments for the general loan penetration rate

Some LoanPenNat data need to be taken with caution. Because both the numerator and the denominator rely on secondary data sources, a strong movement in the ratio between several years can be due to strong changes in either, the actual borrowers or the potential borrowers reported. In several instances, inconsistencies in numerator or denominator data can justify a correction of the LoanPenNat or an omission of the country from the list.

An obvious case in point is Mongolia. The originally calculated penetration rate with WDI data increases drastically between 2007 and 2008 (from around 32% to 61%) and remains on a high level after 2008. This is not caused by a steep increase in actual borrowers but a drop in the poverty headcount ratio reported in the WDI, which declined by more than 40% from 2002 (used for 2002 to 2007) and 2008 (used for 2008 to 2010). The Mongolian Statistical Office (2008) reports different poverty headcount ratios between 2002 and 2007. Using these data instead of the WDI data, the LoanPenNat for Mongolia shows a more steady increase until 2008 and declines slightly starting in 2009.

Another category of data issues is present in Indonesia and Uganda. LoanPenNat for Indonesia shows a strong variation over the years because of reporting inconsistencies of the largest supplier, BRI. BRI reports the number of active borrowers to the MIX only for the years 2002, 2005, 2006 and 2008, boosting the ratio drastically in these years. For Uganda in 2010, the results changed after MIX data were updated to include the previously omitted 2010 number of actual borrowers for one of the largest Ugandan microlenders, Centenary Bank.

In general, a bias due to the number and kind of institutions choosing to start reporting their key performance indicators to the MIX cannot be ruled out. For instance Bangladesh: it ranked first in 2002 with the highest penetration rate measured in that year but had only the fifth highest LoanPenNat in 2010. It showed moderate growth rates during all years and reflects the drop of the fifth largest MFI from the MIX data after 2007 but also the tendency of many small MFIs to stop reporting to the MIX after 2004. Arguably, in most cases the bias caused by the voluntary reporting mechanism to the MIX is likely to go down over time. We therefore use market penetration rates starting with 2004 data only. For the earlier years, we compare (in table 2) our LoanPenNat with the results reported in Honohan (2004) based on the Microcredit summit data for 2002 (Daley-Harris 2003) and on a compilation of data sources on "alternative financial institutions" (AFI) for 1997 onwards (Christen et al. 2004).

Our penetration rates are mostly higher due to a more realistic refinement of the number of potential borrowers.

Table 2: Comparing loan penetration rates for top 12 countries in 2002

Country	Country rank and LoanPenNat 2002	Country rank and MFI penetration rate by Honohan (2004) based on Daley-Harris (2003)	Country rank and "AFI penetration rate" by Honohan (2004) based on Christen et al. (2004)
Bangladesh	1 (25%)	1 (13.1%)	3 (12.7%)
Benin	2 (17%)	9 (1.7%)	15 (3.6%)
Indonesia	3 (12%)	2 (6.7 %)	2 (13.6%)
Bosnia and Herzegovina	4 (12%)	n/a	n/a
Cambodia	5 (11%)	6 (3.0%)	8 (4.6%)
Sri Lanka	6 (11%)	3 (4.3 %)	1 (17.9%)
Mongolia	7 (10%)	n/a	n/a
Nicaragua	8 (10%)	17 (1.1%)	10 (4.2%)
Morocco	9 (8%)	n/a	n/a
Bolivia	10 (8%)	17 (1.1%)	6 (5.9%)
Peru	11 (7%)	n/a	n/a
Mali	12 (5%)	12(1.5%)	18 (3.6%)
Thailand	(0%)	3 (6.5%)	19 (3.5%)
Vietnam	(0.3%)	4 (4.3%)	4 (8.1%)
Guatemala	(1%)	n/a	5 (7.8%)

Moreover, some countries that ranked high in Honohan's (2004) calculations show persistently low general loan rates (LoanPenNat) because of a selection bias of types of institutions that report to the MIX. For instance, while the Vietnamese VSBP reports to the MIX, the Thai government-owned bank with a mission of rural poverty alleviation, BAAC and the Thai Government Savings Bank (that also issues loans) do not (and not even the Thai institutions that are registered in the MIX report numbers of active borrowers). LoanPenNat for Thailand is thus underestimated throughout all years. Similarly, the data for China include only some of the numerous rural credit cooperatives (RCCs), which can be considered microcredit suppliers (Buchmann 2010) so that LoanPenNat for China is much too low.

Other examples are countries with a strong presence of credit unions in the microfinance market segment. We show how to address these data issues in the refined measurements.

Deposit market penetration

Overall results for the microfinance market penetration rate for deposits based on number of deposit accounts (Dep1PenNat) are calculated for the years 2002 to 2010. We also determine microfinance market penetration rates for deposits based on number of depositors (Dep2PenNat). While data underlying Dep1PenNat are reported more consistently in the MIX, Dep2PenNat is easier to compare with LoanPenNat.

In 2010, deposit market penetration based on number of depositors (Dep2PenNat) is below loan market penetration in roughly 2/3 of all countries. Results of countries like Azerbaijan, Armenia, Bangladesh, Cambodia, and Peru, with relatively high rates for both deposits and loans, show that even mature microfinance markets often have a predominance of lending over deposit supply.

However, on average, deposit market penetration across countries was slightly higher than loan market penetration in most reported years, with the exception of 2004 and 2008. Over the years up to 2008, the gap widened (with an average deposit market penetration of 24% compared to an average loan penetration of 18% in 2008). The deposit market penetration dropped more strongly in 2009, to a mere 15.4% (slightly below the 2008 average loan market penetration of 15.8%). These numbers reflect that microfinance customers may have been drawing on savings to maintain consumption or loan repayments following the global financial market crises and the resulting local economic disturbances.

Looking at the countries with the highest deposit market penetration, one can see that this ratio is likely to be correlated with the legal status of major suppliers and the regulatory forms available to them. For instance, countries with a strong presence of credit unions include Benin, Burkina Faso, Cote d'Ivoire, Kenya, Mali, Senegal and Togo in Africa, and Ecuador, Guatemala and Honduras in Latin America (WOCCU 2010). The higher deposit penetration rates for most of these countries are consistent with the cooperative tradition to focus on deposits. Other countries are influenced by a strong presence of specialized deposit-taking institutions, such as Bolivia, Peru, and the Philippines. However, this is not necessarily so. Mexico, where one of the largest suppliers, Compartamos, transformed into a bank in 2006, still has a low deposit penetration, most likely due to Compartamos' low emphasis on microsavings.

Nevertheless, compared with the list of top twelve loan market penetration countries (figure 1 above), notably Vietnam, Montenegro, Bosnia and Herzegovina, Tunisia, Morocco and Jordan drop off the list. Tunisia, Morocco and Jordan have indeed a strong market share of non-deposit taking institutions. Results for Vietnam, Montenegro and Bosnia and Herzegovina need to be examined in more detail.

Dep2PenNat for Vietnam seems again influenced by the single largest provider VSBP that has a relatively smaller base of albeit large depositors. Dep2PenNat for Montenegro suffers from similar data inconsistencies but also reflects the discontinuation of the largest microfinance market supplier after 2008. Last but not least, Dep2PenNat for Bosnia and Herzegovina is persistently low because the MIX database includes the significant volume of deposits accounts but not the number of depositors of the largest supplier, ProCredit Bank.

Also the high but varying Dep2PenNat for Mongolia and Sri Lanka starting in 2008 deserve a closer examination. Results for Mongolia can be explained by the strong increase (and variations) in deposit activities by the two largest suppliers, Khan Bank and XAC Bank, alone. Sri Lanka data seem to be distorted due to omitted numbers of depositors in some years, which causes strong fluctuations of Dep2PenNat. In both cases, the penetration rate Dep1PenNat based on deposit volumes is more stable.

Using other data sources can lead to considerable changes in the penetration rates. We test this for the WDI data. The WDI offers data on the deposit accounts from MFIs. Although they refer to MFIs as a separate category, this does not render them comparable to the deposit accounts provided by the MIX. We use the estimates for Ecuador as an example to illustrate these difficulties. In 2009, the market penetration rate for deposit accounts from MFIs based on the WDI is 0.02% compared with a market penetration rate for deposit accounts based on the MIX of 49%. Adding the deposit accounts of cooperatives to the WDI measure increases the market penetration for deposits to 10%. This is still far less than the MIX measure, which also includes for instance deposit accounts from commercial banks. Once more, caution and precision are needed when comparing (or citing) penetration estimates.

Including the deposit accounts of commercial banks and other financial institutions from the WDI, however, typically overestimates the penetration rate, as it includes deposit accounts belonging to non-microfinance clients. For instance, Bosnia and Herzegovina has deposit a penetration of 28% according to the MIX data but 102% when using the WDI data. Even with this overestimation in the WDI data, some results are weird outliers: Bangladesh reports a general market penetration for deposit accounts of 77% according to MIX data, but only 1% according to the WDI data. A likely reason is the high share of (compulsory) deposits held by non-regulated institutions. Bolivia has a penetration of 56% according to the MIX, but only 17% according to the WDI.

5.2 Refined measurement of market penetration for small selection of countries

We recalculate the market penetration rate for loans based on LoanPenNat using different adjustments. These adjustments are only possible for a smaller selection of countries. Nevertheless, they indicate in how far the refinements impact the general market penetration rates calculated so far.

Refinement: do not request a loan

We apply a lower and upper bound of 25% and 51% reflecting the values for Nicaragua and Ecuador cited above, in order to exclude the share of individuals who do not want a loan at a given point in time, or who would be refused a loan based on a credit assessment. This reduces the denominator of potential borrowers substantially so that actual loan market penetration rates increase strongly. For instance, in 2010 the value for Bosnia and

Herzegovina changes from 73.2% to 98% (the lower bound) or 149% (the upper bound), even after the reduction in LoanPenNat that happened after 2008 as described above.

Refinement: multiple borrowing

Taking into account that MFI clients are indebted with more than one loan changes the estimates for the penetration rates considerably.

Refer to table 3 for results of a selection of countries with available information on multiple borrowing. Bosnia and Herzegovina is an extreme case of multiple borrowing. In 2010, the general penetration rate (based on the national poverty line) was 73%, whereas the penetration rate adjusted for multiple borrowing drops to 34%.

Table 3: Loan market penetration (based on national poverty line) adjusted for multiple borrowing in 2010

Country	LoanPenNat (%)	LoanPenMultiple (%)
Bosnia and Herzegovina	73	34
Ecuador	22	15
Ghana	6	6
Kosovo	28	21
India	15	12
Morocco	42	33
Peru	57	42
Philippines	20	14

Intuitively, the reduction in the loan market penetration due to multiple borrowing (LPenMultiple) compared to the general loan market penetration rate in many countries shows that microcredit lenders tend to focus on new borrowers that resemble their current market, or have a credit history with other lenders. This may be due to lack of appropriate diversification of products and distribution systems to reach other unbanked potential borrowers.

Refinement: households instead of individuals

As discussed above, it is more appropriate to base estimates for the loan penetration rate on the number of households than the number of individuals. Table 4 compares the penetration rates of the two measurements for a selection of countries with values above 100%, using a global average household size of five and a lower (LPenHHLow) and an upper

(LPenHHHigh) boundary of number of loans per household. The resulting penetration rates based on households, of which LPenHHLow is arguably more realistic, are naturally larger than the penetration rate based on individuals.

Table 4: Loan market penetration (based on national poverty line) adjusted for household size in 2010

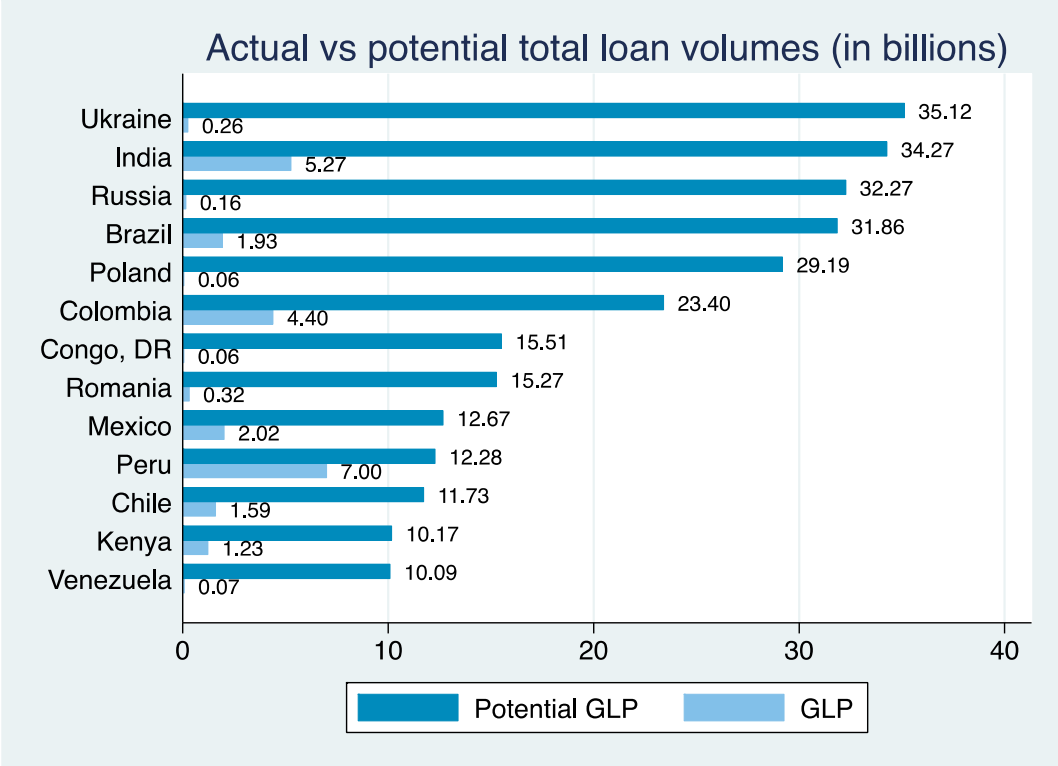
Country	LPenHHLow	LPenHHHigh	LoanPenNat
Vietnam	335	251	95
Montenegro	284	213	83
Bosnia and Herzegovina	260	195	73
Sri Lanka	210	158	63
Mongolia	201	151	59
Tunisia	196	147	56
Peru	182	137	57
Bangladesh	179	135	56
Armenia	151	113	44
Cambodia	147	110	46
Morocco	140	105	42
Azerbaijan	135	101	37
Jordan	123	92	42
Serbia	117	88	34
Malaysia	112	84	35
Albania	109	82	32
Paraguay	97	73	32
Kosovo	90	67	28
Kyrgyzstan	82	61	25

Refinement: adjusting for loan (and deposit) volume

Based on our general definition (2) of market penetration (see section 3.1), we consider loan market penetration in terms of total actual loan portfolio vs. potential loan portfolio if all

potential borrowers were served. We calculate the potential volume of loans outstanding for all countries. Figure 3 shows the countries with a potential total volume of loans larger than US\$ 10 billion compared to their total aggregated volume of loans outstanding (excluding China, which alone has an estimated potential volume of loans of US\$ 306 billion). The results need to be read with caution. For instance, Ukraine ranks first not because of its number of potential borrowers but because of the very high average loan balance of existing customers. Other, in particular medium to high-income countries such as Poland and Chile may not realize the potential loan volume as long as product innovations do not reach potential customers in the microfinance market segment. Nevertheless, Figure 3 shows that some countries such as India, Mexico, or Kenya offer considerable potential for expansion.

Figure 3: Potential total volumes of loans



As we need to rely on very restrictive assumptions, it is not possible to express the penetration rate in terms of loan volumes and obtain different results than when expressed in terms of individuals.⁵ We therefore do not recalculate refined market penetration rates based on total loan volumes.

⁵ More detailed data are needed in order to achieve this. A major drawback of the simplistic approach of calculating the potential loan volume is that we have to assume that the loan size of potential new clients will not differ compared to the average loan size of current borrowers. However, one can expect that the new clients will not necessarily obtain similar loan sizes (and thus, average outstanding loan balances) as the current clients.

Refinement: the rural-urban divide

Looking at the national penetration rate of the microfinance market can be misleading in many countries. The refined penetration rates therefore distinguish rural and urban penetration of the microfinance market for loans for a selection of countries. To avoid data inconsistencies, we calculate the ratio for countries for which available data on the share of urban and rural borrowers reflect at least 55% of the total number of borrowers accounted for in the MIX. We also calculate the evolution of penetration rates for urban and rural areas, respectively, for three years 2008-2010.

Nevertheless, it is not possible to generalize that microfinance market penetration is always higher in urban areas. Take the case of Armenia. In Armenia, the national penetration estimate is 44% (in 2010), whereas the rural penetration is about 95% and the urban penetration is 17%. The same holds for several countries with a stronger focus on rural microfinance or rural poverty concentration (Cambodia Chile, China, Costa Rica, Jordan, Malaysia, Mongolia, Montenegro, Thailand) or a high population density in rural areas making the distinction urban/rural less meaningful (Bangladesh). The rural loan market penetration is much lower than urban market penetration in the majority of countries. Strong differences exist for instance in Bolivia (17% rural loan market penetration versus 33% loan market urban penetration), or Uganda (6% rural loan penetration versus 80% urban loan market penetration); an extreme example is Vietnam, where the urban penetration rate reaches 202% and the rural penetration is much lower at 89% (compared to a national penetration rate of 95%).

Table 5: Penetration rates India vs. Andhra Pradesh for 2010

Area	LoanPenNat (%)	DepPenNat (%)
All of India	15	3
Andhra Pradesh	157	114

The example of the state of Andhra Pradesh in India shows how important it is to differentiate within countries, see table 5. Whilst the high microfinance market penetration for loans has been widely cited, the literature reports that access to deposit services is much better here than in other Indian states, with 78% of the population having a savings account with a formal institution (Srinivasan 2010, 71). Within Andhra Pradesh, the loan penetration may be even higher in rural areas if other loan suppliers than those listed in the MIX are included in the data, in particular the semi-formal self-help groups. For instance, Johnson/Meka (2010) report that 93% of rural inhabitants in their sample have a loan.

Refinement: consumer lenders

Incorporating data on consumer credit in South Africa changes the penetration rate considerably, see table 6. The general penetration rate (focusing on the current number of

borrowers reported by the MIX only) is about 1% in 2010. Adding the relevant data on consumer credit (LoanPenCC1) raises the penetration rate to 29%. To avoid an overlap of customers, we assume that borrowers have only two consumer loan agreements, which lowers the penetration rate (LoanPenCC2) to 14%, which is still much higher than LoanPenNat.

Table 6: Penetration rates South Africa including consumer credit for 2010

Area	LoanPenNat (%)	LoanPenCC1 (%)	LoanPenCC2 (%)
South Africa	1	29	14

Refinement: additional lenders

Countries with suspected large influence of lenders that are not completely covered in the MIX include for instance China, Thailand, Vietnam, South Africa and some countries with strong credit union presence. We calculate alternative penetration rates for loans that include data from those financial institutions covered in the WDI data, namely banks, MFIs, credit unions, and “other financial institutions”. We proceed exactly as for the alternative penetration rates for deposits above. As discussed, the WDI data cannot be used complementary to the MIX data, nor do they serve as a good substitute. In many cases, the WDI data seem incomplete when including only MFIs, cooperatives and other financial institutions. In some countries, strangely, even adding account data from commercial banks does not match our results based on MIX data. For instance, our penetration rate for loan accounts in Bangladesh based on MIX data is 56% in 2009, compared with 0.18% for all MFIs and cooperative institutions covered in the WDI data, and 0.4% if also commercial banks from the WDI data are included. The differences are similar for Cambodia, with a 42% penetration rate of loan accounts based on MIX data versus a 1% rate based on all financial institutions covered in the WDI data, and for Peru with 52% versus 8%. Only in some cases of higher-income countries with a larger commercial banking sector, the WDI coverage is higher. For instance, according to WDI data, penetration of loan accounts in Chile is 46% versus our result of 18% based on MIX data. These large differences in results highlight the need to specify the dataset used for penetration rate calculations, and indicate that the WDI data are less suited for an analysis of the microfinance market segment.

Combined results of indicator refinements

In the final step, we compare several refined measures for loan market penetration. We use again LoanPenNat as the base.

Arguably, not all refinements can be implemented at once. Comparing the general simple measurement and selected refined rates (see table 7), we can see, however, that the set of refinements leads to significant adjustments of the market penetration.

Consider the situation in Bosnia and Herzegovina (BiH). Around 73% of the poor working-age population, the classical target group of microfinance suppliers, had a loan in 2010. However, taking into account that not all people need a loan, we find, that about 97% of those, who actually wanted a loan, were already served by microfinance suppliers (LoanPenDemand). Disregarding the latter effect and adjusting only for multiple borrowing of existing clients, offers a very different view on the microfinance landscape: only about a third of the potential microfinance clients were served in 2010. This suggests a lot of room for growth in a mature market that has recently suffered from an over-indebtedness crisis and is often regarded as too penetrated. The penetration rates seem to contradict each other as they point in different directions. The penetration rate that combines both effects and accounts for multiple borrowing as well as for the effective demand for loans is 45%. This number seems relatively low, but when disaggregating this even further we see that the urban areas exhibit a much higher penetration rate of 63%, while the same estimate is only about 42% for the rural areas. This effect is obviously more pronounced in countries that are characterized by a more extreme urban-rural divide. Finally, assuming that the actual demand for a loan is determined at the household level and not individually, the Bosnian urban penetration rate skyrockets up to 313%.

Table 7: Simple loan market penetration and refined loan market penetration rates compared for 2010

(in %)

Loan Market Penetration Rate	BiH	Ecuador	Ghana	India	Kosovo	Morocco	Peru	Philippines
General Penetration Rate	73	22	6	15	28	42	57	20
Adjusted for effective demand	98	29	8	20	37	56	76	26
Adjusted for multiple borrowing	34	15	6	12	21	33	42	14
Adjusted for household size	260	70	17	50	90	140	182	60
Adjusted for urban population	102	28	12	22	33*	65	105*	18
Adjusted for effective demand & multiple borrowing	45	20	6	15	27	41	55*	19
Adjusted for effective demand & multiple borrowing & urban population	63	25	11	21	32*	64	102*	17
Adjusted for effective demand & multiple borrowing & urban population & households	313	102	57	106	162*	318	511*	86

Note: * Rural/urban rates for Peru and Kosovo may be biased due to small sample size

Finally, combined market penetration rates like those shown in table 7 can reach high levels, thus showing that indeed some market segments may be penetrated very deeply. Using a definition of a saturated market at a penetration of above 100%, our calculations show that there are indeed “saturated” market segments in microfinance.

5.3 Further research

We have presented a unique dataset of microfinance market penetration both for loans and deposits taking into account that the potential number of individuals effectively demanding and using these services may be limited. We have drawn on data from the MIX database completed by various additional sources. Despite these adjustments our data may still be incomplete. In addition, other aspects will likely affect borrowers' and savers' habits and would ideally need to be added in a complete measurement of microfinance market penetration. First, this includes the already mentioned use of informal financial services that is not captured in the existing data. Further research and refinement of market penetration would need to include the use of informal financial services.

Also, our efforts to include other types of lenders were limited by severe data restrictions. We would have wished for more consistent data availability on consumer lenders and on commercial banks serving the microfinance market segment, and, in some countries, even other suppliers, for instance semi-formal self-help groups in India.

Mobile money is increasingly attracting the attention of the microfinance industry. While the take-off and large scale supply of mobile money models is not yet realized (Cobert et al. 2012) one can expect that to change in the next few years. Therefore, better measurements of microfinance market penetration need to capture the existing use of mobile money services and explore in how far they substitute or complement existing formal financial services or informal financial services.

6. Conclusion and outlook

Precise measurements for market penetration in microfinance are needed in order to better differentiate between markets that are deeply penetrated and those with significant potential for expansion. This paper proposes a new set of indicators to measure market penetration in microfinance markets. It presents a unique dataset of microfinance market penetration rates for loans and deposits for a large set of countries and implements refined measurements for a smaller selection of countries. The dataset presented in this paper constitutes a major improvement compared to older measures in the sense that they show that in many microfinance markets, market penetration is much higher than previously thought. In particular investors and other funders, but also owners and managers of financial institutions serving the microfinance market segment, need to be aware of limitations to grow in many markets. On average, penetration rates have increased until 2008 but not yet recovered from a drop in 2008. Moreover, there are other countries in which market penetration is at a persistently low level – some countries which do not seem to grow beyond a general loan penetration of around 7%, others that are stuck at around 1 to 2 % or even below. Persistently lower than average rates in many countries show that continuing to offer the same products in the same markets is not a way to go.

The different refined measurements of microfinance market penetration shed additional light on the different forces that influence the general market penetration rates. The fact that refined measurements, where available, differ substantially from the general rates, highlight two things. First, there is a need to continue to collect better data to complete refined measurements. Second, the microfinance market penetration rate varies depending on the purpose for which it is used, for example, to plan expansion or investment into geographical markets (urban vs. rural areas) or new products (such as, deposits or loans). For the time being, the general microfinance market penetration rate for loans based on national poverty line definitions, and the general microfinance market penetration rate for deposits based on national poverty line definitions and number of depositors, are the most exhaustive datasets to use in most contexts.

For all countries it is important to examine possible reasons for high or low market penetration. We discuss those intuitively for individual country results. Further research is needed to examine the link between market penetration in microfinance and other factors more systematically.

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