

MIMOSA

Microfinance Index of Market Outreach and Saturation

Part 1 - Total Credit Market Capacity

March 2013



Planet Rating

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Abstract

This paper presents the first analysis of credit market capacity using the Global Findex dataset, a survey on the use of financial services in 148 countries, published in April 2012.

Unlike other development interventions, too much credit can be a bad thing. Knowing where the upper limit lies is thus critical for microfinance practitioners, whose goal is to improve access to financial services in the poorer segments of the world's population while ensuring that its clients remain protected from the risks related to over-borrowing. In a context where the precise estimation of the market potential for microcredit has proven difficult, we are taking the opportunity offered by the Global Findex to study the overall formal credit market in a country as a first step to understanding the potential for microcredit specifically.

We find use of loans from financial institutions (formal credit) to be highly correlated to the Human Development Index, as well as use of formal savings and semi-formal loans. Accordingly, we propose to predict market potential for formal credit through a formula based on these three indicators. We then compare this predicted market potential to the current use of formal loans to calculate the penetration rate, which we rate on a 5-point market score, ranging from countries that are likely under-served to those that may be approaching or exceeding the upper limit for sustainable credit use.

Besides highlighting risks, the market score can also provide guidance for policy objectives. For markets scoring 1, implying significant under-development of formal credit use, the scope of work is the largest, requiring both the development of market infrastructure as well as funding the development of new and existing MFIs. At the other end of the spectrum, countries scoring 4 or 5 are either approaching their credit capacity threshold or have crossed it altogether, and thus require a strong emphasis on preventing over-indebtedness. This entails developing credit bureaus and putting in place appropriate regulations to limit excessive lending, while focusing growth strategies on expanding to underserved segments and deepening financial inclusion by serving still-unmet needs, such as payments, insurance, and savings. Between these two extremes, markets scoring 2 or 3 generally show a normal level of development in the use of formal credit, suggesting that microfinance practitioners should focus on improving service quality while pursuing sustainable growth.

In addition to modeling credit capacity at the overall retail market, we examine aspects related to Global Findex that can be more specifically tied to microfinance lending directly. These include a comparison of MIX Market and Global Findex data, as well as a look at how the model performs when applied to individuals in the bottom 40% of earners, as reported by Global Findex.

This paper, dedicated to evaluating total credit market potential, is the first in a series to be published by Planet Rating, and will gradually constitute the Microfinance Index for Market Outreach and Saturation (MIMOSA).



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Introduction

Outreach. Competition. Access. Over-indebtedness. Hardly any discussion of microfinance goes by without hearing one or more of these words. At heart, they are different facets of the same question: what is the potential market for loans from Microfinance Institutions (MFIs) in a given country?

This is a question that has not yet been fully answered, nor is this the first attempt at answering it. Perhaps the best-done study thus far was a recent paper by a team at the University of Zurich,¹ and there are several others that preceded it. However, none of these studies have been able to propose a methodology that would simultaneously be simple to use, show reasonably accurate results, and be easily applied to nearly all developing countries. That is the objective we have set for MIMOSA.

The release in April 2012 of the Global Findex database, created by the World Bank, provides a unique opportunity to accomplish this. The Global Findex is a dataset on the use of formal and informal financial services (bank accounts, savings, credit, payments, etc.), based on surveys of at least 1,000 individuals in each of the 148 countries covered, all conducted in 2011.² Both the initial analysis by the survey authors,³ as well as most of the subsequent analysis of this extraordinary dataset has focused on the question of insufficient access to financial services. This paper zooms in on one component of financial access - credit - and asks the opposite question: when is there too much access?

At the very basic level, the Global Findex database gives us an idea of the level of credit penetration around the world: on average, 10.4% of adults age 25 or older reported taking a loan from a financial institution in the past year, with just three countries - Mongolia, Iran, and Cyprus - reporting a figure above 30%; U.S. is much lower, at 21.6%, and U.K. is lower still, at 13.1%. At the other extreme, Yemen and Turkmenistan stand at just over 1.0%.

In the search for the elusive measure of market potential, these figures provide a useful benchmark. The model outlined below takes it a step further, by seeking to define reasonable boundaries for credit utilization in a given country context. But there is a problem: the Global Findex covers the entire retail credit market and says nothing about microfinance or microcredit specifically. Can it be relevant to the microfinance sector?

From Finance to Microfinance

Indeed it can. Over the past decade, microfinance institutions have become an important component of the broader financial sector in many countries. No longer is microfinance the domain of small NGOs that stand apart from the financial sector - increasingly, banks are competing with MFIs, while many MFIs have become banks themselves. In this context, the structure of the overall formal retail credit market is a key foundation for measuring potential for microcredit specifically.

Separating microfinance customers from the broader population can also prove difficult. Certainly, financial access among the poorer segments is often different from those of richer ones. Were it possible to model credit utilization solely for microfinance customers, that would probably be of greater relevance to the sector. Unfortunately, there is no simple way to do this with Global Findex data. Part of this results from the difficulty of comparing the spectrum of microfinance customers between different countries. Microfinance usually serves the poor, but rarely the poorest: in some countries this may mean those within the 30-80% income percentiles, while in others it may be those within the 10-30% range.

¹ Annette Krauss, Laura Lontzek, Julia Meyer, Maria Frommelt: Lack of access or crowded markets? Towards a better understanding of microfinance market penetration. 23 August 2012

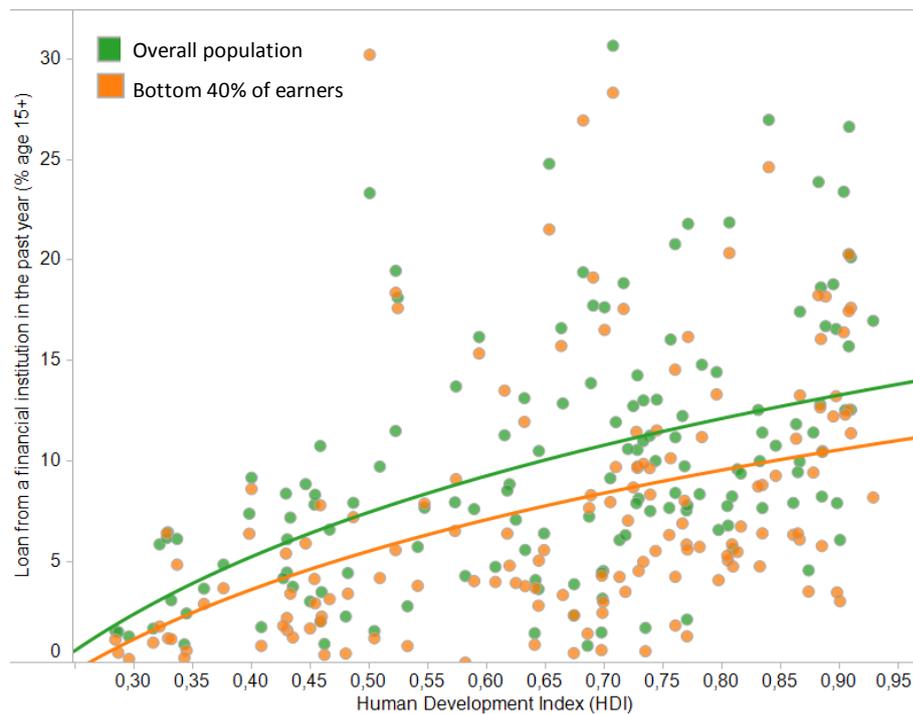
² World Bank Global Financial Inclusion Database (Findex): <http://bit.ly/VXW9Tl>

³ Asli Demirguc-Kunt, Leora Klapper: Measuring financial inclusion: the Global Findex Database, World Bank, April 2012



Meanwhile, Global Findex provides only a single poverty-related breakdown, separating the bottom 40% and top 60% of income percentiles.⁴ This cutoff highlights important differences: the bottom 40% of earners tend to use about 1/4th less formal credit than the overall population, with the gap increasing to about 40% in the least developed countries (Figure 1). These differences are important, but they also highlight the fact that borrowing levels among the country's poor tend to parallel those of the broader population. Because of this and the fact that the 40% demarcation is not a good descriptor of microfinance clientele in many countries, we have decided not to include this metric in MIMOSA 1.0, though we provide a separate analysis for the bottom 40% of earners in Appendix III, which can be used as a supplement to the main MIMOSA scores.

FIGURE 1: THE BOTTOM 40% OF EARNERS BORROW SLIGHTLY LESS FROM FIS THAN THE OVERALL POPULATION, SOURCE FINDEX



CURVED LINE: REGRESSION OF LOG (HDI); R2= 0.10

⁴ Breakdowns by quintile are available at the microdata level, but only at the individual country level, and not included in the compiled 148-country dataset.



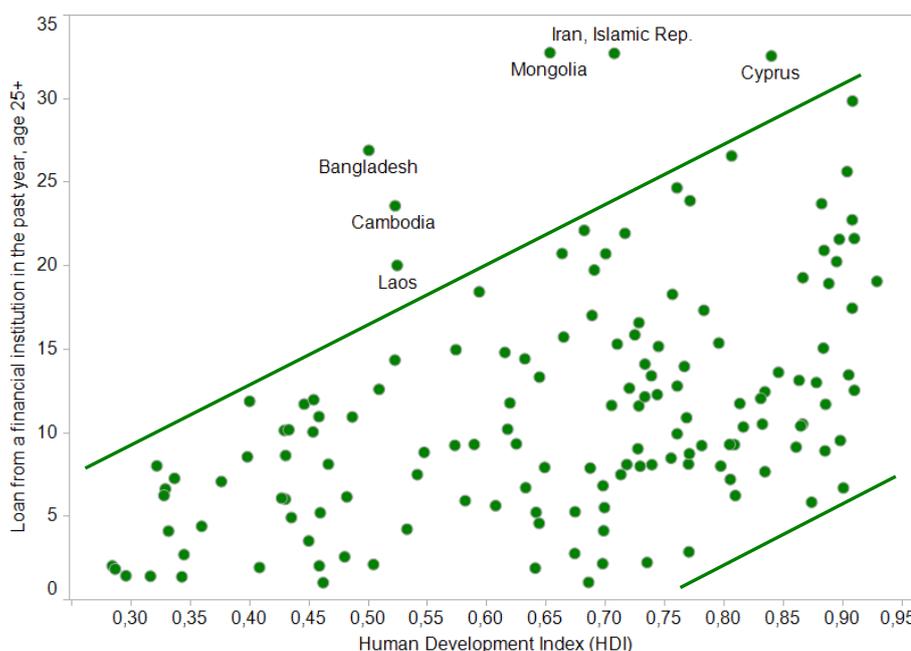
Building the MIMOSA Model

The building blocks of the MIMOSA model may appear surprisingly simple: it relies on just three predictor variables: Human Development Index (HDI), level of semi-formal borrowing, and rate of saving at financial institutions. However, each of these indicators encapsulates a number of key factors that turn out to be surprisingly relevant for predicting market credit capacity. We review each of them below, and then return to review the model itself.

Human Development Index

One common factor across countries that emerges especially clearly from the Global Findex dataset is the relationship between credit utilization and the Human Development Index (HDI), an index developed by the UNDP, incorporating per capita GNI (Gross National Income, at purchasing-power parity) as well as indicators for education and health. HDI shows a strong positive correlation with formal credit use, with developed countries reporting much higher levels of formal credit than less developed ones. Perhaps more noteworthy is the strong upper bound of this trend, with only a small handful of countries exceeding the apparent limit (Figure 2). This is especially relevant to our objective of measuring market credit capacity.

FIGURE 2: FORMAL CREDIT USE STRONGLY CORRELATES WITH HDI, SOURCE FINDEX



NOTE: GREEN LINES REPRESENT VISUAL APPROXIMATIONS OF UPPER-AND LOWER-BOUNDARIES OF BORROWING RATES.

Using HDI for estimating market potential may not at first appear an obvious choice. However, HDI encapsulates multiple factors that prove deeply relevant to financial inclusion and access to formal credit. First, HDI corrects for the most common problem of using a basic wealth metrics, such as per capita GNI: the often greatly uneven distribution of wealth. Countries with high concentrations of wealth are likely to score substantially lower on the HDI scale than their total wealth might imply, since such concentration would likely result in relatively poorer performance in life expectancy and education. Moreover, solid performance on the latter two indicators is also often associated with strong institutions, since delivering on either of the two indicators requires effective deployment of resources down to the household level.

These are not simply suppositions. We tested multiple indicators as potential alternatives, and none provided any additional explanatory value that was not already captured by HDI: per capita GNI by itself or combined with the GINI index to control for concentration of wealth, direct measures of

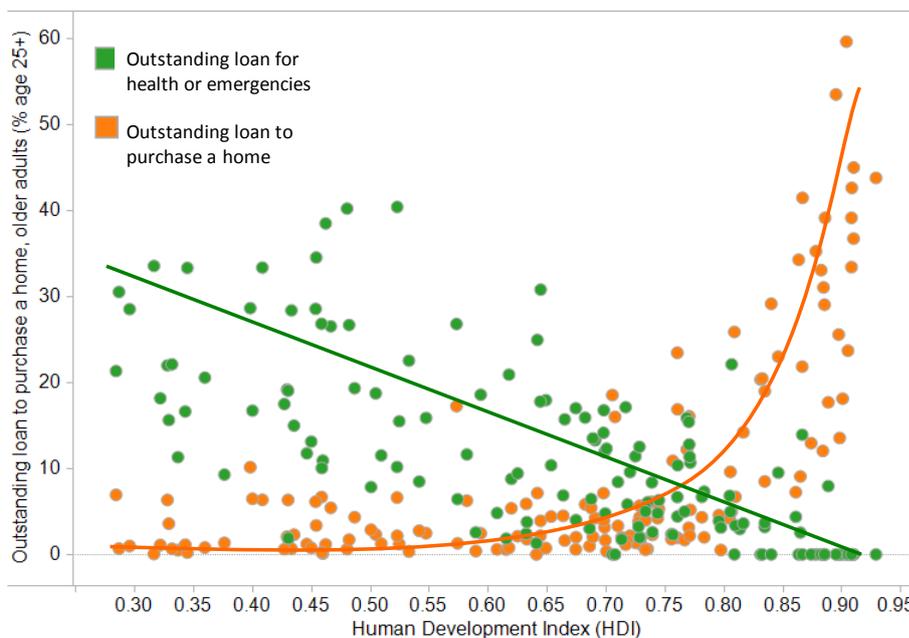


poverty levels (<\$1.25 a day or <\$2.00 a day), governance indicators such as the Democracy Index⁵ or business environment measures such as the Doing Business Index⁶ and COFACE⁷.

So why is HDI so important for predicting credit utilization and capacity? Mainly because it explains much of what we observe in reality. Widespread concern in the sector about over-indebtedness,⁸ and especially in countries that breach the implied upper bound in Figure 2, suggests that the natural credit absorption limit in these markets is not only lower than previously thought, but also likely to be below that upper bound level as well. And since the upper bound is expressed as a function of HDI, we have little option other than to incorporate HDI in the model.

Underlying this observation, there are important structural constraints that we believe reduce the potential for retail credit in low-HDI countries (be it for enterprises, housing, consumption etc.). Low and irregular incomes and the absence of reliable social supports like pensions and health insurance increase borrowers' risk of taking on formal debt, thus reducing credit demand. Meanwhile, retail loans offered by financial institutions in developing countries also tend to have higher interest rates than their counterparts in more developed economies, while the absence of formal and reliable collateral reduces the type of loans that can be provided. Each of these factors has a dampening effect on both demand and supply, and thus far microcredit has only been able to partially address these issues.

FIGURE 3: CREDIT USE SHIFTS GREATLY WITH HDI (FORMAL & INFORMAL), SOURCE FINDEX



NOTE: VISUAL TREND LINES WERE MANUALLY OVERLAID. IN DEVELOPED ECONOMIES, QUESTION REGARDING LOANS FOR HEALTH & EMERGENCIES WAS OMITTED.

A look at the dominant credit uses - health and emergencies in poor countries and home purchase in rich ones - supports the hypothesis that developing and developed economies have intrinsically different retail credit needs. At the lower end of the development scale, 18.3% of older adults in low income countries have outstanding loans for health and emergencies, but only 2.9% for home

⁵ http://www.eiu.com/public/thankyou_download.aspx?activity=download&campaignid=DemocracyIndex2011, requires free registration

⁶ <http://www.doingbusiness.org/>

⁷ http://www.coface.com/CofacePortal/COM_en_EN/pages/home/risks_home/country_risks

⁸ David Lascelles and Sam Mendelson, Microfinance Banana Skins 2012: The CSFI survey of microfinance risk, Center for the Study of Financial Innovation, New York; the survey found over-indebtedness to be the topmost concern of microfinance practitioners



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purchase.⁹ Meanwhile, in OECD¹⁰ countries, the figures for borrowing for home purchase is eight times higher at 28.6%, while borrowing for health and emergencies is so low that it was excluded from the survey altogether (Figure 3).¹¹ Importantly, this includes both formal and informal borrowing, and thus can only be partly explained by the level of available financial access. When combined with total borrowing levels, what these patterns seem to suggest is that it is not just greater financial access that increases credit use, but people's changing needs as their country develops and their incomes and assets grow and become more formal.

But what about the most obvious argument against HDI: doesn't such a metric go against the stated objectives of expanding financial inclusion, which is to increase access to financial services in developing markets? Are we not turning the notion of financial access expansion on its head by suggesting that financial access (or at least, use of credit) should be lower in developing countries than developed ones? After all, part of the reason developing countries have less formal credit is exactly because they also have fewer and less developed financial institutions¹², with weak supervision, absence of centralized credit reporting, limited outreach to remote areas, and limited offerings of well-designed credit products that fully suit the needs of low-income populations. So why would we want to still take this route?

Rate of Saving at Financial Institutions

In fact, we do not. The second key predictor in MIMOSA is the reported savings rate at financial institutions, which is positively correlated with the use of formal savings accounts (Figure 4). By including formal savings rates in the MIMOSA model, we can correct for the weakness of using HDI alone. A low-HDI country that stands out by having a more developed financial sector than its peers would feature higher levels of formal savings and would thus be modeled at a higher level of market credit capacity than suggested by its level of economic development.

There are two main reasons why saving at financial institutions is an important factor for predicting credit capacity. First, saving serves as an indication of client financial capability and also reflects the nature of their relationships with financial institutions. Second, savings rates are a strong indication of financial access, both in terms of financial sector development, as well as the level of institutional presence in the market.¹³

But what about the client? Why would savings imply higher borrowing capacity? And if it does, why does the same not apply to savings generally, and not just with financial institutions? On the first point, the presence of savings reduces the risk assumed by the client when borrowing - in the event of a cashflow shock, savings can be tapped to make repayments, thus cushioning the negative impact of the shock. Moreover, a client who saves is probably a better financial manager, and thus more likely to take on debt with better understanding of the attendant risks and commitments.

The specific manner in which savings correlates with borrowing is a bit of a mystery. If savings rates affect borrowing capacity, why would it matter whether a client uses a formal account at a financial institution or an informal savings group? Yet the data suggests that there is quite a strong difference. Whereas formal savings show a clear positive correlation with formal borrowing (Figure 4), the correlation for use of savings clubs is actually negative, and also notably weaker (Figure 5). It turns

⁹ Weighted average for countries defined as Low Income in the Global Findex

¹⁰ Organization for Economic Cooperation and Development

¹¹ The figures here are not directly comparable with frequency of borrowing discussed earlier. Loan purpose (home purchase, emergencies, etc.) is based on measures of stock, i.e. loans reported as outstanding at the time of the survey, whereas figures for loan source (formal institution, friends & family, etc.) are based on measures of flow, i.e. loans borrowed last year. This becomes more problematic with multi-year loans (such as home mortgages), where the frequency of borrowing in a 12-month period is much lower than the number of loans reported as outstanding. This is a limitation of how Global Findex data was gathered.

¹² Formal institutions in Findex include not only banks and NBFIs, but also NGOs, credit cooperatives, and other formal organizations, regardless of their regulatory status.

¹³ Presumably, one could use the number of bank accounts for the same purpose. However, because saving is an ongoing activity and requires a significant level of trust in financial institutions, it provides a more meaningful measure of financial access than simply counting the number of bank accounts.



out that nearly all of this apparent correlation in the latter case can be explained by HDI, with less-developed countries featuring both more savings clubs and less formal borrowing (Appendix V).

FIGURE 4: FORMAL SAVINGS CORRELATE POSITIVELY WITH CREDIT LEVEL, SOURCE FINDEX

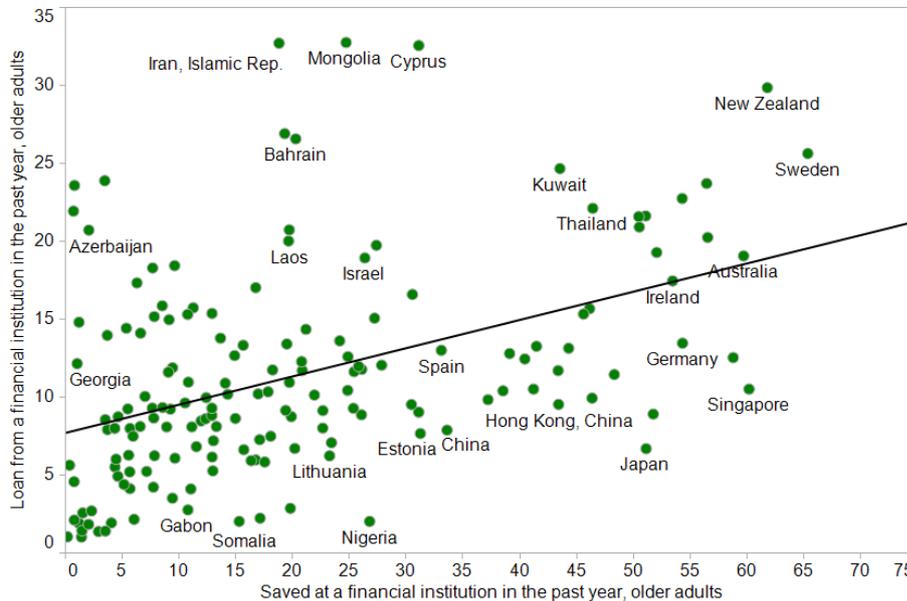
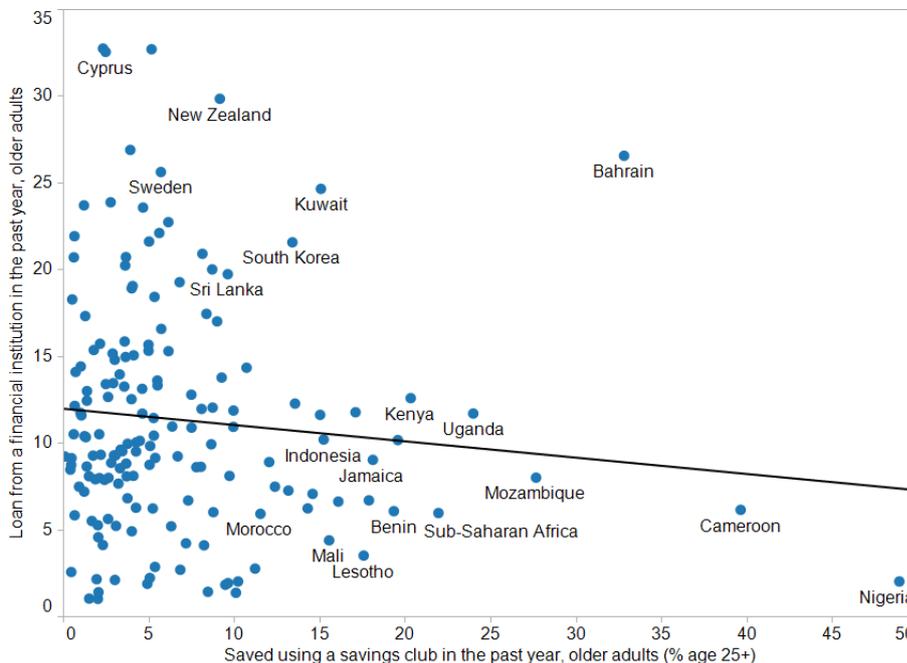


FIGURE 5: USE OF SAVINGS CLUBS NEGATIVELY CORRELATES WITH THE USE OF FORMAL CREDIT



We believe the difference between the two modes of saving lies in two factors: level of financial institution development described above, but also in the nature of the relationship between clients and financial institutions. An individual with a single relationship - be it as a saver, creditor or something else - is more likely to build trust with that institution and the formal financial sector generally, and thus may be more likely to expand that relationship into other products when given the opportunity. The relationship also works in reverse, whereby financial institutions can leverage an existing savings relationship with a client to gain better visibility of the client's cash-flows and thus have more confidence in making a lending decision.



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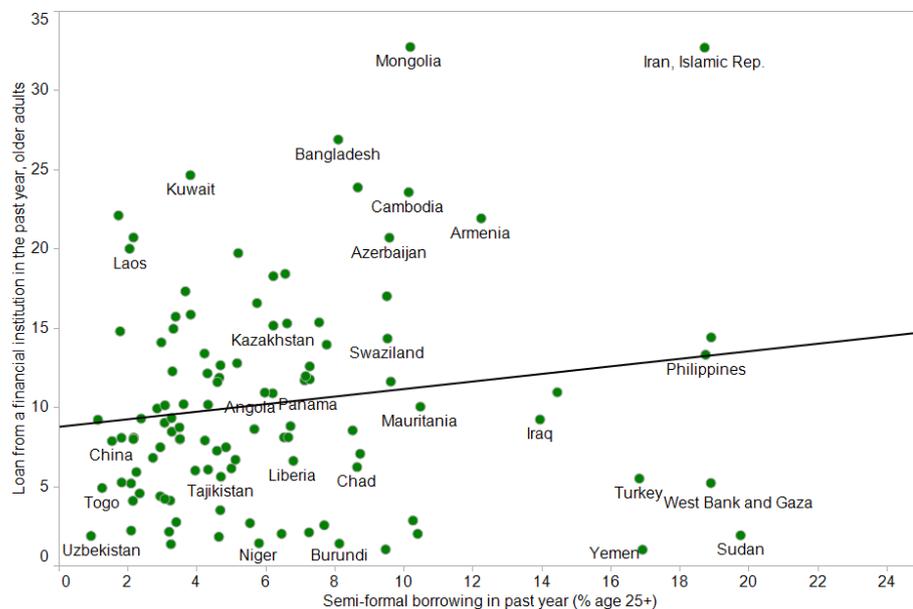
We don't want to overstate our case here. The hypothesis that the presence of greater savings outreach can be a positive factor in increasing client borrowing capacity requires additional research to validate. And even if this effect does get validated, the use of formal credit will still be to a large extent bounded by the country's level of development. Nevertheless, it does suggest that promotion of savings is something that MFIs, regulators, and donors should consider not just in the context of improving financial inclusion generally, but also in the context of stabilizing and strengthening credit markets.

Semi-formal Credit

The third and final leg of the MIMOSA 1.0 model is what we call semi-formal credit, which we define as the average rate of borrowing from private lenders (e.g. moneylenders), employer loans, and store credit. In evaluating credit penetration, one key area to recognize is the level of intrinsic demand, i.e. what is the credit culture in a given country? Even with similar levels of HDI and savings frequency, some societies are inherently more predisposed to credit. Use of semi-formal credit, which has a positive correlation with financial sector borrowing (Figure 6), is the proxy by which we measure this credit culture.

An important reason why we believe semi-formal borrowing is an effective proxy for credit demand is that such credit tends to develop organically, without requiring infrastructure or external support. It is rarely if ever regulated, and is largely independent of the quality level of country's governing institutions. However, in some more developed countries these types of loans may be formally registered and reported to credit bureaus, which distinguishes them from completely informal transactions. Likewise from the borrower perspective, because semi-formal loans are sourced outside the home and outside of immediate kinship circles, they retain some of the same qualities as formal credit.

FIGURE 6: SEMI-FORMAL BORROWING CORRELATES WITH FORMAL CREDIT, SOURCE FINDEX



NOTE: SEMI-FORMAL = AVERAGE(PRIVATE LENDER, EMPLOYER, STORE CREDIT)

There are two important issues pertaining to semi-formal borrowing that warrant some review. First, there is a common and somewhat intuitive perception that semi-formal (and informal) borrowing fills the demand for credit when formal loans are inaccessible. In fact, the opposite is true, since formal and semi-formal lending are positively correlated, and that correlation becomes stronger after factoring out the country's level of development (HDI). The second issue is the strong distinction between semi-formal loans and loans from friends and family, with the latter showing no relationship to formal lending at all, once HDI is factored out. We believe this is a reflection of the social nature



of these credit channels, which is far more closely related to the strength of social bonds, extended families, urbanization, and other factors, while bearing little relationship to financial sector development. A more technical analysis of these factors is presented in Appendices 6-7.

There is, however, a risk in relying on semi-formal lending as a proxy for credit demand. While its impact is indeed substantial and statistically significant, there are several countries that appear to buck the trend: Bolivia, Laos, and Thailand all have low rates of semi-formal and high rates of formal lending - a disparity that cannot be explained by HDI. The resulting output of the model shows a lower credit capacity than would be the case if semi-formal lending were more commonplace. But that conclusion is not necessarily right. To take the most prominent example, Bolivia is a market where microfinance has been active for well over two decades, during which time it has become fully integrated into the broader financial sector. Its MFIs also carry some of the broadest suites of financial products. It is reasonable to postulate that over the decades in which MFIs have been active, they may have had a strong influence in the population's perception of credit, thus raising credit utilization via these formal channels, even if originally semi-formal channels had been little-used. We do not know whether something similar may be at play in Laos and Thailand.



Constructing the Capacity Model

The three indicators above - HDI, formal savings rate, and use of semi-formal credit - are combined in a simple linear regression model to estimate a country's formal credit usage (regression output in Appendix I):

$$credit_demand = -1.60 + 0.125 * HDI + 0.124 * formal_savings + 0.405 * semiformal_credit$$

<i>credit_demand</i> :	Predicted level of potential retail credit demand
<i>HDI</i> :	Human Development Index (source: UNDP, 2011)
<i>formal_savings</i> :	Saved at a financial institution last year, % age 25+ (source: Global Findex 2011)
<i>semiformal_credit</i> :	Average of (loan from a private lender in the past year (% age 25+), loan from an employer in the past year (% age 25+), loan through store credit in the past year (% age 25+)) (source: Global Findex 2011) ¹⁴

The output of this process yields predicted credit usage rates that generally follow the pattern set by the observed rates, though along a somewhat narrower path (Figure 7). However, there is another, more notable outcome that leads to significant policy implications: the slope of the upper bound is shallower than for the observed rates. Thus, for the least developed countries (HDI below 50), the predicted output tends towards the higher end of observed credit usage rates. This implies that the financial sectors in a significant number of these countries are under-developed, even after accounting for their lower level of overall human development.

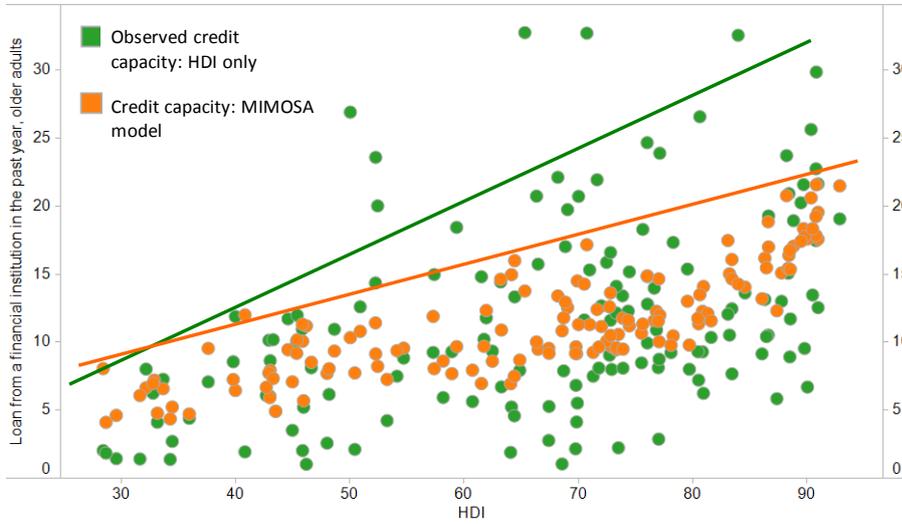
Another useful representation of the impact of this pattern can be seen in Figure 8. A strict argument for financial access implies that the blue horizontal line should be the ideal representation, with the upper limit for credit usage remaining the same regardless of the level of development. Our estimation is that the market potential for formal credit is more like the orange line in that same figure: by focusing on strengthening the financial and microfinance sectors, increasing savings rates, and improving credit offerings to include longer maturities and more flexible terms, market potential can be raised above the currently observed limits. However, all these improvements combined still cannot fully balance out the lower market potential for formal credit in countries with low HDI.

Looking at Figure 7, one may note that the MIMOSA model line suggests lower capacity than indicated by HDI alone, at least at all but the lowest levels HDI. In fact, this is not the case, because MIMOSA suggests the target level of credit utilization - not the upper bound. To calculate the upper bound, we use the MIMOSA scoring system.

¹⁴ Note that because this indicator is a composite, there may be significant overlaps between the three credit sources (e.g. the same individual might borrow from both an employer and a store during the period). This introduces some potential for distortion in how demand for formal credit is estimated, but we believe the impact of this is limited.

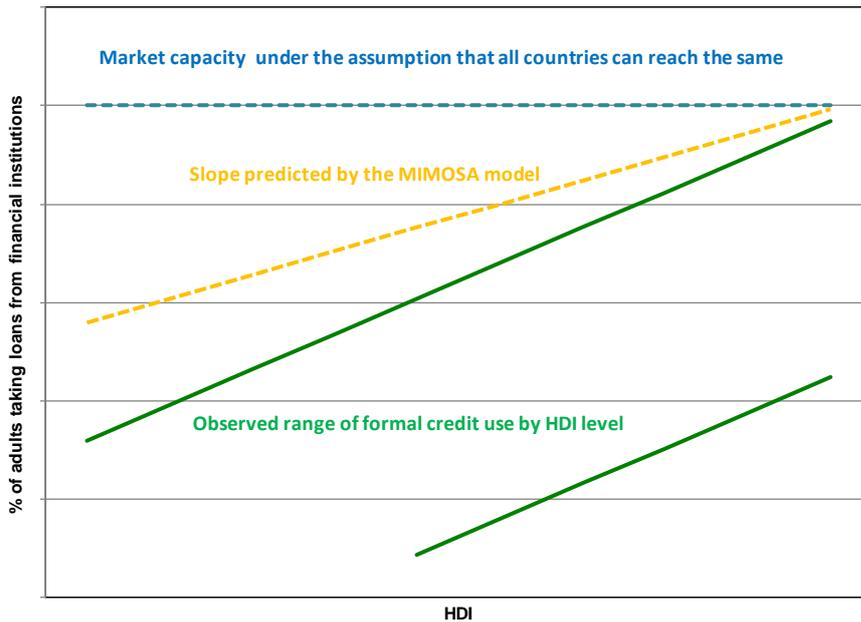


FIGURE 7: COMPARING MODEL OUTPUT TO OBSERVED CREDIT UTILIZATION RATES, SOURCE GLOBAL FINDEX, UNDP, AND PLANET RATING CALCULATIONS



NOTE: UPPER LIMITS WERE MANUALLY OVERLAID.

FIGURE 8: FINANCIAL ACCESS THEORY VS. FINANCIAL CAPACITY THEORY



Using the predicted usage rates generated by the model, we score current penetration levels on a 5-point scale, with 1 (green) being least penetrated and 5 (red) being most penetrated. We set the boundary between categories 2 and 3 (light green and yellow) at the neutral point, where the predicted score equals the observed value. The other thresholds are set at the limits denoted in Table 1.



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The boundaries of these thresholds are guided by two understandings of credit use. First, we recognize that the estimation provided by the model is not necessarily a specific target that ought to be reached and maintained. Variation around this level is normal and should be expected. Thus, we view both categories 2 and 3 as normally functioning markets, with the main difference being that the former displays greater capacity for growth.

The outside categories seek to define more significant deviations from this normal target level. At the bottom of the scale, category 1 denotes a country where retail credit appears to be substantially below what its potential demand would suggest. At the upper end of the scale, the delineations become more fraught. The colors here are meant to act as warning flags - for countries in category 4, that is between 50-100% above the predicted level, detailed analysis of market stability factors - including evaluation of levels of over-indebtedness - should be prioritized. Finally, the highest category of 5, where credit utilization rates are at least double their predicted value, presents a significant risk. Certainly, no model is perfect and there may be legitimate reasons to suggest that existing levels may be sustainable, but absent strong evidence of this, one should view these markets as being at or above their long-term sustainable credit-carrying capacity.

TABLE 1: MIMOSA MARKET SCORECARD

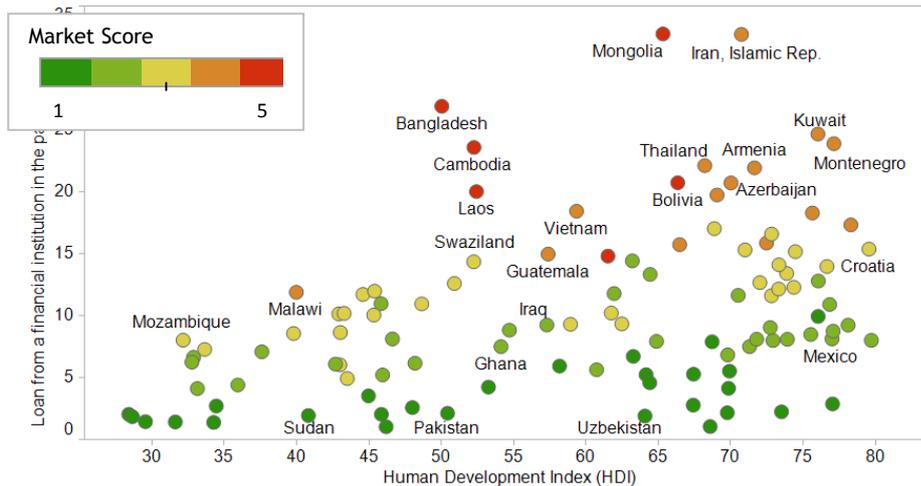
Category	Market Penetration	Number (share) of countries (HDI<80)
5	>100% above predicted level	6 (6%)
4	50-100% above predicted level	14 (13%)
3	0-50% above predicted level	29 (27%)
2	0-30% below the predicted level	32 (29%)
1	>30% below predicted level	28 (26%)



Findings from the model

This is not a full review of the model output. Planet Rating will be releasing detailed country analyses separately, but we would like to review how the model output can be interpreted and applied, using a few markets as examples.

FIGURE 9: CREDIT USAGE BY HDI, WITH MIMOSA SCORES APPLIED, SOURCE FINDEX AND PLANET RATING CALCULATIONS



First, the most controversial set: the six countries whose market penetration scored 5 (red). Reviewing the credit utilization rate chart from before, but now with the MIMOSA scores applied (Figure 9) one can readily see that HDI plays a major role in predicting market potential for retail credit. All but one of the outliers above the implied upper bound demarcated in Figure 2 receive a grade of 5. The sole exception - Iran - is one that also features both high savings rates (18.8%) and high semi-formal credit usage (56.1%).

Another three are all substantial outliers, with Bangladesh at 160%, Cambodia at 158%, and Mongolia at 138% above the predicted credit use rate. With one out of three adults (32.8%) reporting taking a loan over a 12-month period, Mongolia has the distinction of having the highest credit usage of any country in the world, whether developed or developing. At 26.9%, Bangladesh is likewise among the ranks of countries with highest credit-use. And while Cambodia is somewhat lower, at 23.6%, its negligible savings rate (0.8%) reflects a deeply unbalanced financial sector. All three have been noted by market experts to have high rates of cross-indebtedness and quite possibly over-indebtedness.

There are also two countries slightly below the upper bound that are marked red. In the case of Kyrgyzstan, its savings rates are minimal (1.2%) and semi-formal credit is also low (5.3%), thus suggesting that its credit market potential should be lower than HDI alone might indicate.

On the other hand, the case of Bolivia may be one example that highlights the weaknesses of any model that seeks to apply common standards to a hundred different markets. Bolivia's savings are strong (19.7%), but semi-formal credit is low (6.5%) and it is the latter that's driving down the predicted market potential calculated by the model. As described earlier, this negative effect from low semi-formal lending may not be applicable to Bolivia, suggesting that its market saturation score should perhaps be a 4 rather than 5.

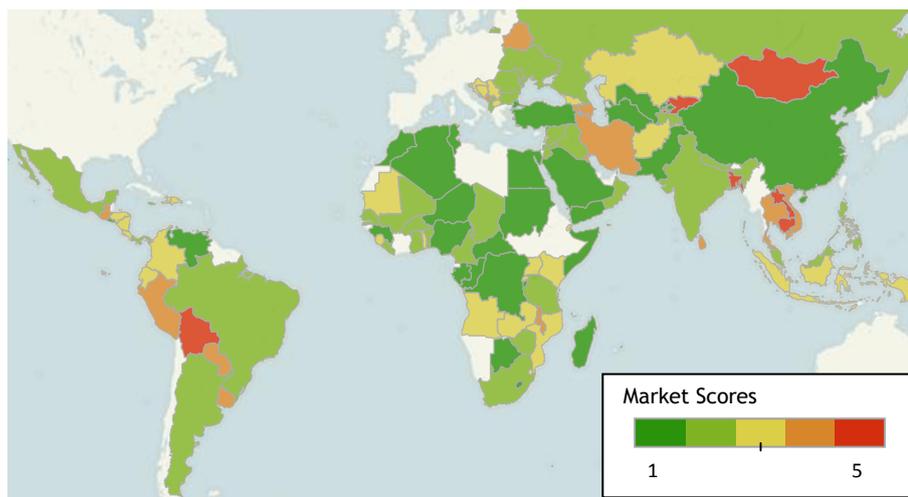
Of those markets scored as 4 (orange), several have also been noted by Planet Rating and other experts as potentially overheated, especially Peru, Armenia, and Azerbaijan. Meanwhile, markets with high borrowing rates, but that are not generally thought of as microfinance hotspots - Belarus, Kuwait, Vietnam, Thailand, Sri Lanka and a few others - are likewise scored in this category. This lends credence to the model as a means to measure credit capacity and penetration in both markets with active microfinance sectors as well as those served mostly by other financial providers.



MIMOSA Microfinance Index of Market Outreach and Saturation

Recent crisis countries - Bosnia and Nicaragua - are scored 3, which suggests that these markets have largely normalized. Note that the metric used here - loans taken during the past 12 months (for a survey conducted in 2011), denotes market activity during 2010-11, and does not measure outstanding loans that are holdovers from earlier borrowing. The same applies in the case of Morocco (scored 1), though in this case, the relatively narrow target population served by microcredit reduces the sector's impact on overall credit penetration rates.

FIGURE 10: COUNTRY SCORES SHOW NOTABLE REGIONAL PATTERN, SOURCE PLANET RATING CALCULATIONS



It is also worth noting a strong regional pattern (Figure 10, see Appendix II for country list): the most developed regions for microfinance - Latin America/Carribbean and Eastern Europe/Central Asia - show a pattern consistent with regions featuring well-developed microfinance markets: relatively few under-served countries (score 1), slightly more over-served ones (scores 4-5), and most countries ranked in the two middle bands around the predicted credit level.

East Asia/Pacific and South Asia are significantly skewed towards the upper range of scores, with EAP showing half of its markets scored 4 or 5, all of them in Southeast Asia. This includes Cambodia, which is served mainly by the traditional microfinance ecosystem, as well as Laos, Thailand, and Vietnam, which are served mostly by homegrown credit institutions. Perhaps this is a reflection of a different cultural approach to credit in the region, suggesting higher credit capacity than predicted by MIMOSA, though it could also be a signal for concern.

Finally, Sub-Saharan Africa is heavily weighted towards the low end of the scale, with 62% of countries showing penetration rates below those predicted by the model, and only one country (Malawi) scoring above the +50% penetration level (orange). Clearly this is a region with rich opportunities for further market development. Even more tilted is the Middle East/North Africa region, where more than half the countries score 1, the lowest category of under-served markets. Indeed, this is despite the fact that a number of countries show high rates of saving and semi-formal borrowing. It is possible that religious proscriptions against interest lending may be reducing effective demand for credit or preventing formal institutions from meeting it, suggesting that further scaling up of Islamic finance may be the appropriate strategy.



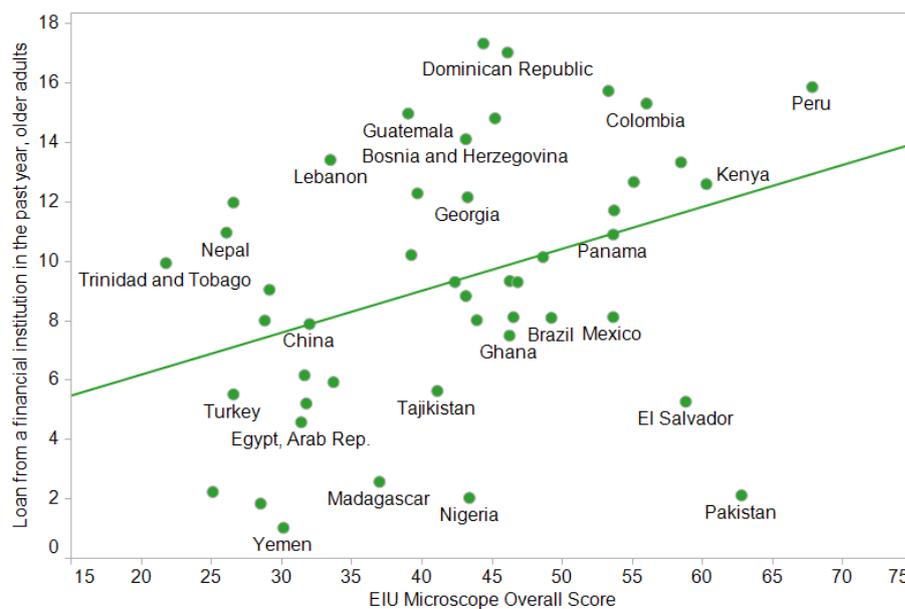
Supporting factors

Given that it is based on just four factors, it is to be expected that there are situations that the model does not capture and cannot explain. This is especially true of indicators specific to the microfinance sector since, as explained above, we have explicitly decided to set this issue aside for future releases of MIMOSA. However, some thought to the factors we have explored in the process may prove useful as a first glance into what those subsequent releases may contain.

Microscope Overall Score (Economist Intelligence Unit)

Markets with better regulation and stronger supporting infrastructure (such as credit bureaus and similar) are likely to support somewhat deeper credit capacity than those that score lower on these metrics. In essence, by giving MFIs tools to evaluate clients' existing levels of debt, such environments enable MFIs to operate in competitive markets while avoiding excessive client over-indebtedness. In David Roodman's Bicycle Tire Theory of Microfinance,¹⁵ such markets can be said to have thicker tires (stronger market and regulatory infrastructure), thus allowing more air (credit) to be pumped inside before they pop. This may be partly the reason why there is a strong positive correlation between the EIU Microscope overall score and the level of observed credit penetration (Figure 11).

FIGURE 11: MARKET QUALITY INDICATORS (MICROSCOPE) CORRELATE WITH CREDIT LEVELS, SOURCE ECONOMIST INTELLIGENCE UNIT



NOTE: THE ABOVE CHART EXCLUDES A HANDFUL OF MARKETS WITH ESPECIALLY HIGH RATES OF BORROWING (MONGOLIA, BANGLADESH, CAMBODIA, ETC.), WHICH ARE IDENTIFIED AS BOTH SIGNIFICANT OUTLIERS AND POTENTIALLY OVERHEATED. THE POSITIVE CORRELATION IS ONLY APPLICABLE TO THOSE COUNTRIES IN THE CHART.

That said, there are a number of potential stumbling points for this indicator. First, this is one case where timing makes a big difference. In many countries, stronger regulation of MFIs was introduced following market saturation and subsequent turbulence. Thus, even if the numbers appear the same, what we observe in the data represents an entirely different context from those countries that introduced strong regulation in anticipation of rapid market growth. Markets with prior experience of failure (such as Bolivia) have a lot more institutional experience in dealing with highly competitive environments, and presumably, are more resistant to future episodes of over-penetration.¹⁶

¹⁵ David Roodman, [The Bicycle Tire Theory of Microcredit Market Stability](#), 5 Dec 2012

¹⁶ Note for example that the Microscope scores for Bolivia are very close to those of Kenya and the Philippines, neither of which has had experience with a country-wide microfinance bust.



MFI Ratings

One area that the EIU Microscope index excludes is the quality of the MFIs themselves. For the same reason that regulatory and infrastructure supports are important, we believe institutional quality is also important. Higher quality MFIs should be able to better manage higher credit demand levels without destabilizing the market. However, given the diversity of rating methodologies used to score microfinance institutions' viability there currently is not a single indicator that can be used as a fair representation of the average quality of MFIs for all countries that this publication covers.

In 2012, the four rating agencies (M-CRIL, MicroFinanza Rating, MicroRate, and Planet Rating) agreed on a comparability table of their ratings scale that allows cross-comparison across different ratings.¹⁷ In future releases of MIMOSA, we hope to be able to reference this new resource.

Proxy for cross-indebtedness: comparing MIX Market to Findex

One especially interesting view into the role of microfinance players in the use of formal credit is comparing the number of borrowers reported to the MIX Market to the credit utilization rates on Global Findex. Essentially, this is a view into what share of the retail credit market is accounted by self-identified MFIs, that is, those institutions that report to the MIX. Indirectly, this approach can also be used to gage the level of potential cross-indebtedness.

We calculate the number of borrowers reported to MIX Market as a share of the total borrowers implied from the Global Findex survey, using the following calculation:

$$\frac{\frac{\text{Sum}(\text{MIX: Number of Active Borrowers 2011})}{\text{Country Population, age 15 +}}}{\text{FINDEX: Loan from Financial Institutions in the past year, age 15 +}}$$

The result yields some interesting insights. On one hand, it helps identify active credit markets with minimal participation from the international microfinance ecosystem, as opposed to homegrown MFIs or other institutions, such as credit unions or finance companies focused on consumer lending. On the other hand, it can identify markets where MFIs are the dominant providers of credit, and in some cases serve as an indication of widespread cross-borrowing within the microfinance sector.

Table 2 lists the countries at the top and bottom of this range. A country like Thailand, which has a high penetration rate (score of 4), has no microfinance activity reported to the MIX. The same is largely true for its neighbor, Laos. In fact, both have large homegrown lending programs to the poor, and this apparent discrepancy provides an important warning flag to investors and others seeking to expand microfinance in "unpenetrated" countries.

At the other end of the scale, there is Mexico, which is rated as under-served, yet where MFI borrowers appear to account for nearly all retail borrowers of financial institutions. The MIX represents only a sample of the large number of financial institutions in Mexico, with some very large ones notably absent. How is this possible? Short of large data errors in MIX or a faulty survey sample in Global Findex, the only remaining explanation is that there is a large amount of cross-borrowing among Mexican MFI clients. Thus, if the average Mexican client were to hold 2 or more MFI loans, this would cut the microfinance share of total borrowers by at least half - a far more realistic metric.

While MIMOSA points to a still under-served market in Mexico, a look at this supporting indicator suggests that overheating may in fact be quite extensive within the narrower microfinance segment. Indeed, a number of Mexican market experts have raised concerns (shared by Planet Rating) about the microfinance sector overheating in the country.

¹⁷ Global Rating Comparability, by Julie Abrams with the collaboration of M-CRIL, Microfinanza Rating, Microrate and Planet Rating; Multilateral Investment Fund, September 2012



MIMOSA blind spots

The above discrepancies between MIX, Global Findex and the MIMOSA score shows one of the biggest weaknesses of the model: its view is limited to the country-level. Thus, as the case of Mexico shows, it is quite possible to appear under-served while simultaneously having a growing credit bubble within a specific sub-segment of the population.

Take Nigeria, for example. As any person familiar with the microfinance market in Lagos will tell you, it is not virgin territory. Yet Nigeria has a MIMOSA score of just 1. This is the result of a vast country whose microfinance sector is concentrated in a handful of areas - Lagos and a couple of other cities - where competition is high. Without taking a closer look, the model's green light can thus mislead, and the same can be said about all countries with deeply uneven distributions of credit. Recognizing such situations requires a much closer analysis than this model allows, though it is something that a visit on-site should quickly uncover.

Another area that might generate debate is the relative ranking of Bolivia and Peru, at 5 and 4, respectively. Most market experts would in fact reverse those two positions, placing Peru at a higher-penetration level than Bolivia. But, here again, we have to step back. First, what the model identifies is not over-indebtedness or multiple borrowing. It simply seeks to establish penetration levels at the country-level, though in a way that might indirectly point to potential risks for microfinance as well as the broader financial sector. So let us review the numbers: Bolivia's financial institution borrowing rate for adults stands at 20.7%, while Peru is at 15.9%. That's a substantial difference. Peru also has a significantly higher HDI than Bolivia, while the figures for savings and semi-formal borrowing do not show much difference between the two. Clearly, at the country level, Peru is the less penetrated market, and this is appropriately captured by the model.

However, Peru scores much worse using the MIX/Global Findex comparison, where its MFI clients actually exceed all borrowers in the country, and by a large margin (138%). Even though, unlike Mexico, MIX Market has a far larger representation of financial institutions in Peru, the conclusion remains: obvious - and high - degree of multiple borrowing in Peru. While the MIX/Global Findex ratio for Bolivia is also high (95%), the Bolivian MFIs reporting to MIX is a larger portion of the total financial sector than is the case in Peru, suggesting that Bolivia's level of cross-borrowing is probably lower than in Peru.

TABLE 2: MFI BORROWERS AS SHARE OF ALL FI BORROWERS (%)

Senegal	138.6	2
Peru	137.8	4
Jordan	118.0	2
Benin	108.8	2
Nicaragua	106.5	3
Mexico	97.8	2
Kyrgyzstan	96.8	5
Bolivia	95.1	5
El Salvador	88.9	1
Paraguay	88.5	4
Vietnam	82.3	4
Burkina Faso	79.9	2
Ecuador	78.1	3
Togo	78.1	3
Mongolia	77.2	5
Pakistan	76.7	1
Tunisia	74.7	1
Kosovo	73.0	2
Cambodia	72.4	5
Niger	67.6	1
~~~~~	~~	~~
Romania	2.7	2
Congo, Rep.	2.4	1
Laos	2.3	5
Argentina	2.0	2
Zambia	1.6	3
Angola	1.5	3
Russia	1.4	2
China	0.7	1
Bulgaria	0.7	2
Syrian	0.7	2
Uruguay	0.5	4
South Africa	0.2	2
Thailand	0.0	4
Ukraine	0.0	2
Malaysia	-	2



## MIMOSA

# Microfinance Index of Market Outreach and Saturation

## Using the market capacity model

Knowing market capacity and saturation levels has important implications for multiple areas of the microfinance sector. Below is a simple set of guidelines for how the framework might be applied.

If you are an MFI and your market is in category 1, then perhaps concerns about competition and overindebtedness need not be great, unless of course there are large differences between national and local figures. On the other hand, if your market is in category 4 or 5, maybe it is time to retrench, revisit lending guidelines, and generally make sure that your path remains sustainable.

- 1**
  - Build out market support & infrastructure
  - Invest in new/growing MFIs
  - Focus on operational quality and growth
- 2/3**
  - Focus on service quality
  - Customer service and higher outreach in under-served areas
- 4/5**
  - Focus on preventing over-indebtedness
  - Insure that external financial inflows don't push markets over the edge.

If you are an investor looking to evaluate a new market, the model should likewise provide some answers. Is Rwanda your next market, or would you be better off looking at Burundi instead? Or maybe sanctions have been lifted on Iran - what might be your prospects there? The model will not do your leg-work for you, but it will get you started. You could also apply this to your overall portfolio to see what your exposure might be to markets whose credit capacity is strained.

Finally, if you are focused on market development, you can use the model as a guide for policy. For category 1 markets, the scope of work is greatest, requiring developing market infrastructure, as well as growing new and existing MFIs. On the other end of the spectrum, countries scoring 4 or 5 are either approaching their credit capacity threshold or have crossed it altogether, and thus require a strong emphasis on preventing over-indebtedness. This entails developing credit bureaus and putting in place appropriate regulations to limit excessive lending, while focusing growth strategies on expanding to underserved segments and deepening financial inclusion by serving still-unmet needs, such as payments, insurance, and savings. Between these two extremes, markets scoring 2 or 3 generally show a normal level of development in the use of formal credit, suggesting that microfinance practitioners should focus on improving service quality while pursuing sustainable growth.

## Next steps for MIMOSA

The predicted market potential and comparative market penetration level used here represents but a first step. In the coming months Planet Rating will be developing additional modules to more precisely evaluate market penetration specifically for the microfinance sector, develop country-level indicators for over-indebtedness, and other tools that will help meet the financial services needs of the world's poor while providing the best possible indicators for monitoring market safety and soundness. Stay tuned!



## Appendix I: Regression of key variables

The below regression output of variables against formal credit use (Global Findex: Loan from a financial institution in the past year, older adults) shows that the key indicators for the model are both statistically significant and have important weight in determining utilization of formal credit. The output forms the basis for estimating a country's potential demand for retail credit.

### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.556
R Square	0.309
Adjusted R Square	0.295
Standard Error	5.933
Observations	147

### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>significance F</i>
Regression	3	2251.7	750.6	21.3	0.0
Residual	143	5032.9	35.2		
Total	146	7284.5			

	<i>Coefficients</i>	<i>tandard Errc</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1.602	2.205	-0.727	0.469	-5.962	2.757
Semi-formal Loan- avg (non-F&F, 25+)	0.405	0.124	3.273	0.001	0.160	0.649
Saved at a financial institution in the past year, older adults	0.124	0.036	3.459	0.001	0.053	0.195
Human Development Index (HDI)	0.125	0.034	3.683	0.000	0.058	0.192



# MIMOSA

## Microfinance Index of Market Outreach and Saturation

### Appendix II: Country Scores by Region

	1	2	3	4	5
<b>Latin America &amp; the Caribbean</b>	El Salvador Trinidad & Tob Venezuela	Argentina Brazil Jamaica Mexico Panama	Dominican Republic Honduras Ecuador Colombia Nicaragua Costa Rica Haiti	Guatemala Peru Paraguay Uruguay	Bolivia
<b>Sub-Saharan Africa</b>	Botswana Burundi CAR Congo, DR Congo, Rep. Gabon Guinea Lesotho Madagascar Niger Nigeria Somalia	Benin Burkina Faso Cameroon Chad Ghana Liberia Mali Senegal South Africa Tanzania Zimbabwe	Angola Comoros Djibouti Kenya Mauritania Mauritius Mozambique Rwanda Sierra Leone Swaziland Togo Uganda Zambia	Malawi	
<b>Middle East &amp; North Africa</b>	Algeria Egypt Morocco Palestine Saudi Arabia Sudan Tunisia Yemen	Iraq Jordan Oman Syria	Lebanon	Iran Kuwait	
<b>Eastern Europe &amp; Central Asia</b>	Turkey Turkmenistan Uzbekistan	Albania Bulgaria Kosovo Moldova Romania Russia Ukraine Tajikistan	Bosnia Croatia Georgia Kazakhstan Macedonia Serbia	Armenia Azerbaijan Belarus Montenegro	Kyrgyzstan Mongolia
<b>South Asia</b>	Pakistan	India Nepal	Afghanistan	Sri Lanka	Bangladesh
<b>East Asia &amp; Pacific</b>	China	Malaysia Philippines	Indonesia	Thailand Vietnam	Cambodia Laos



### Appendix III: Modeling for the bottom 40% of earners

To demonstrate what a market capacity model would look like for poor populations, we created a parallel model using the figures that Findex provides for the bottom 40% of income earners in each country. However, there is a strictly technical issue that required slightly changing the model itself: Findex reports the bottom 40% breakdown for all respondents ages 15+, whereas the MIMOSA model is based on respondents ages 25+. The reason for the latter is to try to better align the working age populations between countries at different levels of development, since the average starting working age is higher in more developed countries, but this option was not available for modeling the bottom 40% of earners. Thus, we ran a new regression for ages 15+ (general population):

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6030
R Square	0.3635
Adjusted R Square	0.3502
Standard Error	5.0462
Observations	147

#### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	2080.03	693.34	27.23	0.0000
Residual	143	3641.42	25.46		
Total	146	5721.46			

	<i>Coefficients</i>	<i>Standard Err.</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2.2292	1.8892	-1.1800	0.2400	-5.9636	1.5052
Informal Loan - avg (non-F&F, 15+)	0.4234	0.1141	3.7092	0.0003	0.1978	0.6490
Saved at a financial institution in the past year (% age 15+)	0.1212	0.0314	3.8584	0.0002	0.0591	0.1833
Human Development Index (HDI)	0.1149	0.0296	3.8834	0.0002	0.0564	0.1734

Note that calculating market capacity scores using the 15+ population results in changes to a handful of countries - in each case by a maximum of a single category. Thus, while it is not equivalent to the MIMOSA model itself, we believe it is sufficiently similar to support further comparison between MIMOSA scores and those for the bottom 40%, whose regression model is calculated as follows:

$$\begin{aligned} \text{credit_demand_bottom40} &= -2.23 + 0.115 * \text{HDI} + 0.121 * \text{frml_savings_bot40} + 0.423 \\ &\quad * \text{semifrl_credit_bot40} \end{aligned}$$

The result is quite interesting: the countries scored as category 5 show minimal change, with Thailand being the sole addition to the list of the same 6 countries as before. However, for all other scores, there is a strong downward migration, with each of the categories shrinking substantially, and the bottom category of countries in category 1 doubling, from 28 countries in the MIMOSA model to 56 countries in the bottom 40% model. This strongly suggests that, while a number of countries are still facing significant concerns about over-saturation for the low-income segment, for most countries, the supply of formal credit for the bottom 40% of earners is well below the level that can be supported.



# MIMOSA

## Microfinance Index of Market Outreach and Saturation

TABLE 3: COMPARISON OF TOTAL MARKET SCORE AND BOTTOM 40% MARKET SCORE

Region	Country name	MIMOSA 1.0 Score	Bottom 40: Market Score
East Asia and the Pacific	Cambodia	5	5
	Laos	5	5
	Thailand	4	5
	Vietnam	4	4
	Indonesia	3	2
	Malaysia	2	1
	Philippines	2	1
	China	1	2
South Asia	Bangladesh	5	5
	Sri Lanka	4	4
	Afghanistan	3	2
	India	2	2
	Nepal	2	2
	Pakistan	1	1
Europe and Central Asia	Kyrgyz Republic	5	5
	Mongolia	5	5
	Armenia	4	4
	Azerbaijan	4	4
	Belarus	4	3
	Montenegro	4	4
	Bosnia and Herzegovina	3	3
	Croatia	3	3
	Georgia	3	1
	Kazakhstan	3	3
	Macedonia, FYR	3	3
	Serbia	3	2
	Albania	2	3
	Bulgaria	2	2
	Kosovo	2	1
	Moldova	2	2
	Romania	2	2
	Russian Federation	2	2
	Tajikistan	2	1
	Ukraine	2	1
Turkey	1	1	
Turkmenistan	1	1	
Uzbekistan	1	1	
Latin America and The Caribbean	Bolivia	5	5
	Guatemala	4	4
	Paraguay	4	1
	Peru	4	3
	Uruguay	4	3
	Colombia	3	3
	Costa Rica	3	1
	Dominican Republic	3	2
	Ecuador	3	2
	Haiti	3	1
	Honduras	3	1
	Nicaragua	3	2
	Argentina	2	1
	Brazil	2	1
	Jamaica	2	3
	Mexico	2	1
	Panama	2	2
	El Salvador	1	1
	Trinidad and Tobago	1	1
Venezuela, RB	1	1	

# Part 1

## Total credit market capacity



Region	Country name	MIMOSA 1.0 Score	Bottom 40: Market Score
Middle East and North Africa	Iran, Islamic Rep.	4	4
	Kuwait	4	3
	Lebanon	3	3
	Iraq	2	1
	Jordan	2	1
	Oman	2	2
	Syrian Arab Republic	2	2
	Algeria	1	1
	Egypt, Arab Rep.	1	1
	Morocco	1	1
	Saudi Arabia	1	1
	Sudan	1	1
	Tunisia	1	1
	West Bank and Gaza	1	1
Yemen	1	1	
Sub-Saharan Africa	Malawi	4	4
	Angola	3	2
	Comoros	3	2
	Djibouti	3	1
	Kenya	3	1
	Mauritania	3	2
	Mauritius	3	2
	Mozambique	3	1
	Rwanda	3	3
	Sierra Leone	3	3
	Swaziland	3	2
	Togo	3	1
	Uganda	3	3
	Zambia	3	1
	Benin	2	1
	Burkina Faso	2	1
	Cameroon	2	1
	Chad	2	3
	Ghana	2	1
	Liberia	2	1
	Mali	2	3
	Senegal	2	1
	South Africa	2	1
	Tanzania	2	1
	Zimbabwe	2	1
	Botswana	1	1
	Burundi	1	1
	Central African Republic	1	1
	Congo, Dem. Rep.	1	1
	Congo, Rep.	1	1
	Gabon	1	1
	Guinea	1	1
	Lesotho	1	1
	Madagascar	1	1
	Niger	1	1
	Nigeria	1	1
Somalia	1	1	



# MIMOSA

## Microfinance Index of Market Outreach and Saturation

### Appendix IV: GDP growth as a factor

The analysis has also observed that GDP growth rate is an important and statistically significant factor, with higher GDP growth (measured as the cumulative average growth rate during 2008-2011) being positively correlated with greater utilization of formal credit. There are good reasons for this – growing economies increase both individual expectations of future income as well as opportunities for business investment based on growing consumer demand. The result is an increased need for business investment and household spending, both of which drive credit usage.

These are good reasons for including GDP growth in a market potential model, and yet, we have chosen not to do so. Our reasoning for this is that, unlike any of the other indicators, GDP growth is backward looking (growth in prior years does not guarantee growth in future ones) and it is more volatile than the other indicators. More importantly, GDP growth may itself be based on unsustainable level of credit use, as was the case in advance of the current economic crisis in Europe and the U.S. For these reasons, we believe that including GDP growth as part of the model would be inappropriate and counter-productive.

Nevertheless, we recognize that economic dynamism is an important factor behind credit demand, and we will continue to explore how to incorporate it in future versions of the model.

#### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5650
R Square	0.3192
Adjusted R Square	0.2990
Standard Error	5.5427
Observations	140

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	1944.34	486.09	15.82	0.0000
Residual	135	4147.40	30.72		
Total	139	6091.74			

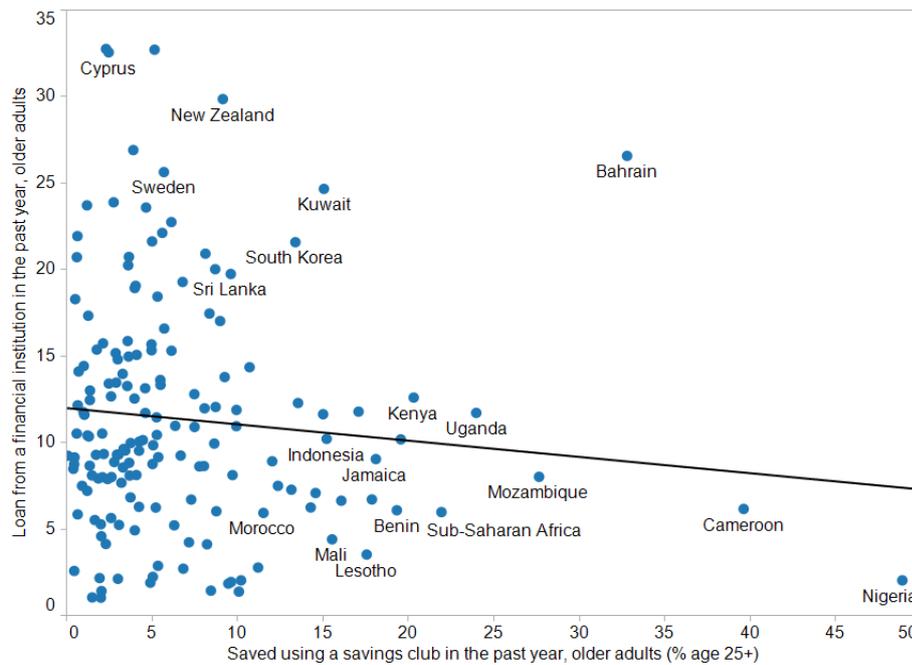
	<i>Coefficient</i>	<i>Standard Err</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2.0396	2.2581	-0.9032	0.3680	-6.5055	2.4263
GDP growth- 3yr (%)	0.5423	0.1901	2.8529	0.0050	0.1664	0.9183
Informal Loan (non-F&F, 25+)	0.1145	0.0444	2.5801	0.0109	0.0267	0.2022
Saved at a financial institution in the past year, older adults	0.1443	0.0355	4.0617	0.0001	0.0740	0.2146
Human Development Index (HDI)	0.1102	0.0328	3.3581	0.0010	0.0453	0.1750



### Appendix V: Saving with savings clubs

Informal saving with savings clubs is largely a function of the country's level of development, with higher level of development showing decrease of such savings. A regression that includes both HDI and savings groups shows the latter indicator to have no statistical significance as a predictor for formal borrowing.

FIGURE 12: USE OF SAVINGS CLUBS IS STRONGLY CORRELATED TO HDI



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.4588
R Square	0.2105
Adjusted R Square	0.1995
Standard Error	6.3198
Observations	147

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	1533.15	766.57	19.19	0.0000
Residual	144	5751.38	39.94		
Total	146	7284.53			

	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-1.8158	2.4109	-0.7532	0.4526	-6.5811	2.9495
Saved using a savings club in the past year, older adults (% age 25+)	0.0822	0.0775	1.0617	0.2901	-0.0709	0.2354
Human Development Index (HDI)	0.1924	0.0318	6.0561	0.0000	0.1296	0.2551



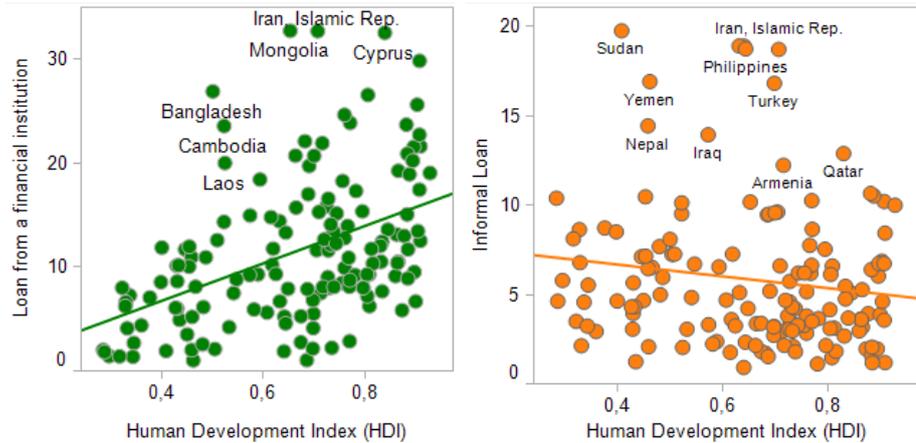
# MIMOSA

## Microfinance Index of Market Outreach and Saturation

### Appendix VI: Semi-formal borrowing

Although we incorporate semi-formal lending as a key part of MIMOSA, it is worth noting that the correlation between semi-formal credit and financial sector borrowing is quite small. Regressing financial sector borrowing against semi-formal credit yields a p-value of just .063, which is only weakly statistically significant.

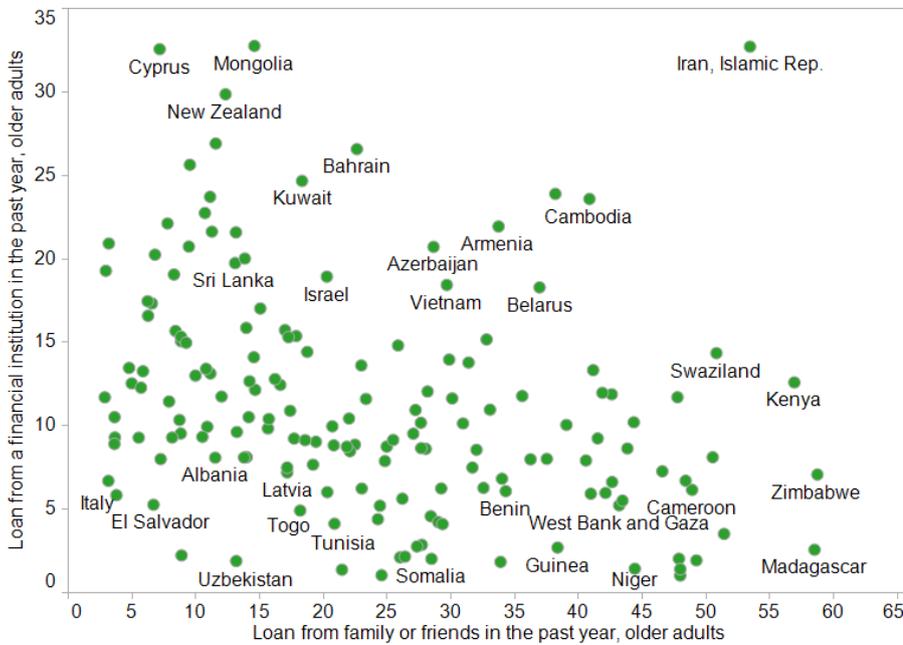
A lot of this apparent weakness is the result of the inverse relationship between semi-formal borrowing and HDI (semi-formal borrowing declines as HDI increases), thus cancelling its strong positive relationship with formal borrowing. The multi-factor comparison in the linear regression is able to account for this cross-relationship, which is why semi-formal borrowing becomes much more statistically significant when HDI is added to the regression.





### Appendix VII: Loans from Friends & Family

Borrowing from friends and family is largely a reflection of a country's HDI level, with increasing HDI showing a proportional decrease in such borrowing. Unsurprisingly, a regression that includes HDI shows no statistical significance for borrowing from friends and family as a predictor for formal sector borrowing.



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.4521
R Square	0.2044
Adjusted R Square	0.1933
Standard Error	6.3441
Observations	147

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	1488.83	744.41	18.50	0.0000
Residual	144	5795.70	40.25		
Total	146	7284.53			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-0.0310	3.5350	-0.0088	0.9930	-7.0182	6.9562
Loan from family or friends in the past year, older adults (% age	-0.0064	0.0482	-0.1325	0.8948	-0.1017	0.0889
Human Development Index (HDI)	0.1762	0.0396	4.4439	0.0000	0.0978	0.2546



## **MIMOSA**

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**About the PlaNet Finance Foundation**

The PlaNet Finance Foundation, a certified public interest organization, supports those in poverty who are excluded from the banking system by giving them the independence to develop income-generating activities. It funds innovative projects with the potential for a strong social impact that have been set up and run by the main development and microfinance players across the world. It also increases the social impact of microfinance by spreading best practices.



**About the PlaNet Finance Group**

PlaNet Finance is one of the positive, responsible economy's global leaders. For nearly fifteen years, it has worked to help poor populations gain access to financial services, and so improve their living conditions in a sustainable way by integrating them into the economic system. The PlaNet Finance group contributes to the development of the microfinance sector by implementing specific products and services that address the needs of people who are suffering due to their exclusion from the system. PlaNet Finance operates not only in developing countries, but also in the French suburbs. With an international presence in more than 80 countries, the PlaNet Finance group is now recognized as a major contender in the fight against poverty. It was founded in 1998 by Jacques Attali and Arnaud Ventura.



## MIMOSA

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