

Microentrepreneurs and Their Money: Three Anomalies

Bindu Ananth
Harvard University

Dean Karlan
Yale University
Innovations for Poverty Action
M.I.T. Jameel Poverty Action Lab

Sendhil Mullainathan
Harvard University
Innovations for Poverty Action
M.I.T. Jameel Poverty Action Lab

March 7th, 2007

DRAFT

Introduction

How do microfinance clients manage their cash? What drives and constrains their investment behavior? Is there an underlying pattern in their occupational choices? Gaining insight on these questions is important, because it helps us understand the scalability of microfinance products, the long-run viability of loans, and their potential channels of impact.

In this paper, we discuss three observations from the field that we believe shed light on the finances of the poor. We label these observations as “anomalies” because we feel they are inconsistent with much (though not necessarily all) of the received wisdom. A deeper understanding of these “anomalies” may allow microfinance institutions (“MFI”s) to improve their product designs. They also provide suggestions of some high-impact *non-credit* interventions. Below, we sketch each anomaly. Work on this is currently in progress, so we understand more about some of the anomalies than others.

Anomaly I: Persistent Borrowing Cycles

Given the high cost of borrowing, it is striking that many individuals find themselves in perpetual debt. Banerjee and Duflo (2006) document patterns of consumption and debt amongst the poor in 13 countries and find, for instance, that in Udaipur, India, about two-thirds surveyed had an outstanding debt, but almost entirely from informal sources such as shopkeepers (37%) and moneylenders (18%) and relatives (23%). The source is not so much what matters, it is the price: the informal loans on average charged 3.84% per month for those living on less than \$1 a day, and 3.13% for those living on between \$1 and \$2 a day.

MFI clients often include informal sector urban vendors who trade perishables and thus have daily working capital cycles. MFI loans typically substitute or complement trade credit or one-day informal loans traditionally used by such vendors. Here we put forward a puzzle regarding how or why micro-entrepreneurs use high-interest rate debt to finance inventory with daily (or high-frequency) turnover.

Consider the case of a vegetable vendor in Chennai: Nearly every morning, she takes out loans to buy vegetables from a wholesaler, and in the afternoon she pays the loan off with her daily sales. She does this every day, paying an interest rate of 10% per day. Fruit vendors, flower vendors, and other vendors of perishable products take out similar high interest, short-term loans to finance their working capital.

In 2006, we conducted a small survey among vegetable vendors in Chennai, India that provides some useful descriptive data. The average working capital outlay of those surveyed was roughly Rs. 2000 (approx. USD 45). There are many types of loans taken out by vendors varying in repayment tenor (daily, weekly, monthly). Short-term loans with daily repayments are typically used for working capital. These require that interest be deducted up-front and principal paid in equal daily installments. 50% of these respondents claim to be borrowing short-term for at least a ten year period preceding the survey. Of all those who had availed of daily installment short-term loans, 40% had a daily loan in addition. Typically, this would entail borrowing Rs. 1000 (approx. USD 22.5) in the morning and repaying the same with interest at the end of the business day.

In a similar survey carried out in the Philippines, 66% of respondents reported borrowing with interest to finance working capital. The average loan size reported was roughly 3500 Pesos (USD 72). No one in the sample was borrowing for a period greater

than two months. The majority (43%) were borrowing for a one month tenure. Only 12% reported attempting to substitute borrowing with savings.

Viewed as a whole, the picture is one of widespread and frequent short-term borrowings. Fifty percent of respondents in the India sample stated reason for borrowing as “need capital to maintain business.” Similarly, 25% of those surveyed in Philippines reported borrowing for “capital to maintain business.” This somehow suggests that own capital is not sufficient to finance a minimum scale of business that appears invariant. This is the puzzle that we discuss to in this section.

Persistent borrowing at these astounding rates is not merely a policy issue but is potentially reflective of a deeper conceptual puzzle. According to traditional theory, households should equalize rates of return across all margins. In this case, if they are borrowing at this rate, the rates of return on all other margins must be *at least as high*. Specifically, their rate of return on their investments and their consumption must be at least as high as this. If their investments did not earn as much as the interest rate on the borrowing then they can increase their utility by simply investing less. Similarly if consumption tomorrow is not discounted by the borrowing rate they should simply consume less.

Could the marginal return on investment in her business actually be above the anecdotal 10% overnight? If it is more than 10%, then the question is, “why is her business not expanding?” Rarely do such street or market vendors expand their business, nonetheless as rapidly as implied by a 10% overnight marginal return on investment. It is of course not possible to rule out a production function in which there is a high rate of return on investment but with sharply decreasing returns. So the investment margin is

not a puzzle by itself (unless data were to show that vendors were not earning this rate for return).

It is the consumption margin on the other hand that is the more basic puzzle. This is a classic tradeoff between consumption now and consumption later, but here the implied discount rate of consumption is quite high. The return from *not borrowing* (i.e., saving) is 10% overnight! Discount rates at this level are clearly well above estimates that people would consider sensible. Instead of a borrowing puzzle we really have a savings puzzle: why does she not save her profits and borrow less? The question rests on whether the truly poor can or cannot save (see Armendariz de Aghion and Morduch, 2005, in particular Chapter 6, for more discussion). Go back to the specific numbers in our example.

What if our vendor put aside 10 of the 100 Rupees a day for working capital the next day? What if she put aside only 5 Rupees a day, the cost of cup of tea a day? What if she put aside just 1 Rupee a day? With savings compounding at 10% a day, saving 10 Rupees allows her to borrow only 990 the next day. Already she has saved an extra Rupee in interest expense. The power of compounding is deceptively powerful. Consider how the above savings scenario of saving one rupee (\$0.02) a day plays out:

Table 1

Loan Size		20					
Interest Rate		0.1					
Time Unit (Days = 1, Months = 30)		1					
Daily Reduction in Consumption		0.02					
Time Periods to Zero Debt		49					
Time	Loan Size	Old Interest	New Interest Amount	Dollar Savings from Lower Consumption	Interest Savings Relative to Before	Total Savings Flow this Time Period	Total Savings Stock

1	20.00	2.00	2.00	0.02	0.00	0.02	0.02
2	19.9800	2.0000	1.9980	0.02	0.0020	0.0220	0.0420
3	19.9580	2.0000	1.9958	0.02	0.0042	0.0242	0.0662
4	19.9338	2.0000	1.9934	0.02	0.0066	0.0266	0.0928
5	19.9072	2.0000	1.9907	0.02	0.0093	0.0293	0.1221
6	19.8779	2.0000	1.9878	0.02	0.0122	0.0322	0.1543
7	19.8457	2.0000	1.9846	0.02	0.0154	0.0354	0.1897
8	19.8103	2.0000	1.9810	0.02	0.0190	0.0390	0.2287
9	19.7713	2.0000	1.9771	0.02	0.0229	0.0429	0.2716
10	19.7284	2.0000	1.9728	0.02	0.0272	0.0472	0.3187
11	19.6813	2.0000	1.9681	0.02	0.0319	0.0519	0.3706
12	19.6294	2.0000	1.9629	0.02	0.0371	0.0571	0.4277
13	19.5723	2.0000	1.9572	0.02	0.0428	0.0628	0.4905
14	19.5095	2.0000	1.9510	0.02	0.0490	0.0690	0.5595
15	19.4405	2.0000	1.9441	0.02	0.0559	0.0759	0.6354
16	19.3646	2.0000	1.9365	0.02	0.0635	0.0835	0.7190
17	19.2810	2.0000	1.9281	0.02	0.0719	0.0919	0.8109
18	19.1891	2.0000	1.9189	0.02	0.0811	0.1011	0.9120
19	19.0880	2.0000	1.9088	0.02	0.0912	0.1112	1.0232
20	18.9768	2.0000	1.8977	0.02	0.1023	0.1223	1.1455
21	18.8545	2.0000	1.8855	0.02	0.1145	0.1345	1.2800
22	18.7200	2.0000	1.8720	0.02	0.1280	0.1480	1.4281
23	18.5719	2.0000	1.8572	0.02	0.1428	0.1628	1.5909
24	18.4091	2.0000	1.8409	0.02	0.1591	0.1791	1.7699
25	18.2301	2.0000	1.8230	0.02	0.1770	0.1970	1.9669
26	18.0331	2.0000	1.8033	0.02	0.1967	0.2167	2.1836
27	17.8164	2.0000	1.7816	0.02	0.2184	0.2384	2.4220
28	17.5780	2.0000	1.7578	0.02	0.2422	0.2622	2.6842
29	17.3158	2.0000	1.7316	0.02	0.2684	0.2884	2.9726
30	17.0274	2.0000	1.7027	0.02	0.2973	0.3173	3.2899
31	16.7101	2.0000	1.6710	0.02	0.3290	0.3490	3.6389
32	16.3611	2.0000	1.6361	0.02	0.3639	0.3839	4.0228
33	15.9772	2.0000	1.5977	0.02	0.4023	0.4223	4.4450
34	15.5550	2.0000	1.5555	0.02	0.4445	0.4645	4.9095
35	15.0905	2.0000	1.5090	0.02	0.4910	0.5110	5.4205
36	14.5795	2.0000	1.4580	0.02	0.5420	0.5620	5.9825
37	14.0175	2.0000	1.4017	0.02	0.5983	0.6183	6.6008
38	13.3992	2.0000	1.3399	0.02	0.6601	0.6801	7.2809
39	12.7191	2.0000	1.2719	0.02	0.7281	0.7481	8.0290
40	11.9710	2.0000	1.1971	0.02	0.8029	0.8229	8.8519
41	11.1481	2.0000	1.1148	0.02	0.8852	0.9052	9.7570
42	10.2430	2.0000	1.0243	0.02	0.9757	0.9957	10.7527

43	9.2473	2.0000	0.9247	0.02	1.0753	1.0953	11.8480
44	8.1520	2.0000	0.8152	0.02	1.1848	1.2048	13.0528
45	6.9472	2.0000	0.6947	0.02	1.3053	1.3253	14.3781
46	5.6219	2.0000	0.5622	0.02	1.4378	1.4578	15.8359
47	4.1641	2.0000	0.4164	0.02	1.5836	1.6036	17.4395
48	2.5605	2.0000	0.2561	0.02	1.7439	1.7639	19.2034
49	0.7966	2.0000	0.0797	0.02	1.9203	1.9403	21.1438

Saving 10 Rupees a day, a vendor would have 1000 Rupees saved for working capital in only 28 days. Saving 5 Rupees a day, it would take a vendor 33 days. Saving just 1 Rupee a day, it would take 50 days. She then saves one hundred rupee a day in interest expense, which is roughly \$2 a day, enough to raise the person above the poverty level.

The flexibility of loan amounts vary of course depending on the moneylender, but in Chennai, for instance, these “meter loans” are available in at least 10 Rupee increments from most moneylenders. So this prevents the 1 Rupee a day strategy from working, but it would only take 10 days to save up 10 Rupee. Lumpiness to allowable loan sizes from moneylenders cannot explain this puzzle.

So given this, how is it sensible to borrow continuously? There are a number of possible explanations to this puzzle, but each seems to have a problem (or at least each lacks solid evidence to support it). We now consider several, and why each explanation seems unsatisfying as “the” answer.

First, perhaps we are mis-measuring the net “cost” of these loans. Specifically, suppose vendors are borrowing to maintain good relationships with the moneylenders in case of a crisis. So the price they are paying is not for the loan they are on but for the potential to get a bigger loan in case of emergency. While theoretically feasible, we do not think this reflects on the ground realities. Not everyone borrows continuously and

they still manage to borrow from moneylenders. It seems unlikely that one needs to remain in a debt cycle in order to borrow at all. The moneylenders know their local communities, who is trustworthy, and how to recover a high proportion of their loans (Aleem 1990). Their tasks are highly labor intensive, which explains their high interest rates, but it is their local knowledge of people in the community that allows them to lend at all. This explanation also seems implausible due to the magnitude: the moneylender loans are not *that* large, and at these interest rates it would not take too long to save up the amount they are able to borrow in time of crisis.

Second, perhaps they have no access to a cheap or safe savings device (even overnight, or perhaps in the case of lumpy allowable loan sizes, for the ten days or so needed to save enough to lower the loan size a tier). The problem with this is that informal savings devices do exist. For example, ROSCAs are very common in this region and a woman could very easily save through a daily or weekly ROSCA. In fact, there are ROSCAs that exist at the market where the women buy vegetables and fruits. So it seems implausible that the borrowing occurs merely there is no savings possible for the short windows necessary to solve this problem.

Third, perhaps household bargaining causes conflicts, preventing the vendor from saving any cash at all. Certainly we know that *some* conflict exists in the household causes inefficiencies, e.g. Udry (1996) finds sub-optimal household allocation of resources across plots in agricultural, and Duflo and Udry (2004) also find inefficiencies from failure to share risk within the household. But, for this to be the sufficient explanation, the *cost* of finding a solution, a way of hiding money, has to be incredibly high. As before we have evidence that informal arrangements such as ROSCAs, exist to

help women save money from her spouse and other family members (Anderson and Baland, 2002), and formal savings instruments as well can serve this purpose (Ashraf, Karlan and Yin, 2006). Thus many methods exist, both informal and formal, for women to maintain money separately from the household, and it seems unlikely that this is a sufficient explanation for borrowing continuously at these rates.

The most likely explanations seem to be that vendors do not fully appreciate compounding, or do not have access to a cheap commitment savings device that facilitates this exact process of unraveling their debt. We are currently testing these hypotheses in the field and running interventions that will facilitate a switch from debt-cycle to savings-cycle. We will look at whether mental accounting and financial planning training or access to a savings lock box help vendors save in increments (e.g., one less cup of tea per day), and then reduce their borrowing in increments. Given the high cost of credit in these markets, any switch to savings could lead to an enormous increase in consumption for the household.

In many cases, we see microfinance lending at much lower rates. The puzzle becomes less stark, but remains a puzzle. The above spreadsheet is available at <http://www.poverty-action.org/debtcycle.xls>, and allows individuals to assume different interest rates and daily savings flows in order to examine how long it takes to escape the debt cycle. This puzzle we believe provides a magnifying glass view into microfinance client behavior that is necessary to understand better in order to write prescriptions for better product and process design for formal sector institutions.

Anomaly II: Too few joint production ventures

Many MFI models are built on a foundation of group solidarity. This being the case, why are there not more instances of profitable joint production? In other words, if social collateral was powerful enough to overcome information asymmetries in the credit markets for formal sector lenders, why haven't poor individuals come together for years to engage in more profitable production ventures when there are economies of scale to small operations?

Suppose, for example, we have 50,000 Rupees for buying cattle, and there are two types of cows available for purchase: 5,000 Rupee cows and 10,000 Rupee cows. The 5,000 Rupee cows yield 500 Rupees worth of milk each month in the flush season, while the 10,000 Rupee cows yield 1,200 Rupees of milk. Optimally of course, we would buy five 10,000 Rupee cows; the worst choice would be to buy ten 5,000 Rupee cows.

Consider now, instead, two farmers with 5,000 Rupees each. Optimally, they would pool their resources and purchase one 10,000 Rupee cow jointly, increasing their daily sales by 20% from 500 to 600 Rupees a month. Yet they do not. The puzzle here is one of joint liability. In other words: Do group arrangements merely use social capital to function and solve problems? Or is it really a tax on individuals? What are the significant costs of joint ventures?

Collective purchasing clearly allows for increased returns here. Nevertheless dairy farmers do not generally pool their money to buy cattle, opting instead to purchase lower quality cows that produce relatively less milk. Building sheds for cows is another example of a potentially valuable joint production activity for dairy farmers. High-yielding cows need more shade. Yet again, in the case of sheds as in the case higher

quality cattle, farmers do not generally pool resources. This suggests that joint liability may constitute a tax, and quite a large one, since on their own they are unable to solve this basic coordination and monitoring problem.

Could it be that costs of cooperating are simply too high? Is joint production particularly difficult in the context of dairy farming? Certainly it is hard to monitor the breakdown of input costs of feeding a cow in joint production. But in reality joint production here could be particularly easy. Cow milking days, for instance, could be alternated between two farmers or between families. The feeding of the cows, too, could be pre-committed by jointly purchasing feed, and the actual care or observation of the cow could be delegated to neighbors.

One may suggest that risk aversion leads individuals to want to diversify, thus prefer two lower-yielding cows to one higher-yielding cow. But this has the same problem: diversification could also be achieved by expanding the group. Now, instead of two people buying one cow, four people could buy two cows. More compellingly, though qualitative, individuals request higher loan sizes exactly to buy *one* better cow rather than to buy two less good cows.

To take an example where observability of individual effort is less of an issue, clients who are retail traders in the same neighborhood could pool orders together and buy stocks in bulk from wholesalers. This presumably lets them benefit from volume discounts while each running their enterprise separately. Why is it that activities such as these that rely on minimal cooperation (the extreme being joint ownership) are not commonly observed?

It seems clear that joint production is *at least* as easy as the joint liability required in self-help groups or other group lending programs. Specifically, it is easier to take care of a cow than to deal with the joint production of financial services in a self-help group. Individuals face difficulties in joint liability groups and dislike having to participate. Yet they do so in the case of MFI loans simply because the credit is cheaper. If an MFI charges r , there is a joint liability tax of t , so that the “effective” rate is $r + t$. The anecdotes above show that t can be quite large. The effective rate is high when some have to repay the debt of others. The social cost of being punished (or punishing) could also be quite high. The mere fact that many individuals prefer higher-cost individual lending reveals the fact that t is indeed often high. This could also help to explain why some people stay out of micro-finance joint liability loans. They find the tax too large.

Testing this hypothesis requires more work contrasting individual versus joint liability borrowing. In a recent experiment in the Philippines, a lender employing group liability, with weekly group meetings, decided to remove the group liability (the group meetings remained in tact). In the first year, repayment rates did not change, and client retention and inflow increased (Giné and Karlan, 2006). Thus, the shift seems to have expanded access to credit, and been profitable for the lender. Questions remain, however, as to whether the program could succeed if they were *selecting* individuals without the group liability. Future work with this bank is testing that important policy question.

If joint liability is negative rather than positive feature from the demand side, our thinking on optimal liability structures should change. One, greater effort should be spent devising individual lending and savings products. This could be one of the easier

ways of increasing access: reducing the joint liability tax lowers the effective interest rate faced by borrowers. Two, we should be more skeptical about policies that promote group structures such as self-help groups for the sake of the group structure, rather than for the sake of cost-savings.

Anomaly III: Non-Financial Market Failures

Here we consider two seemingly anomalous financial situations that may be a result of market failures in other markets.

Labor Markets

A dairy farmer borrows money from an MFI. When she invests it, she typically spends the money on livestock, at a small convenience store, on some capital equipment she can use at home, or on some capital equipment that she or her husband is renting. We can observe two things about her investments that lead to the same conclusion. For one, she will rarely if ever expand her business when she gets more loans by hiring outside labor.

The second thing we can observe comes from looking closer at her finances. Let's say she owns a 6,000 Rupee buffalo. A 6,000 Rupee buffalo produces 3 liters of milk per day at 8 Rupees a day, making her daily revenue 24 Rupees and her monthly revenue 720 Rupees. A buffalo lactates eight months a year, giving her 5,760 Rupees in yearly revenue. Feed costs 2,400 Rupees annually, and 3-4 hours a day of labor at the market rate of 6 Rupees, amounts to at least 4,320 Rupees a year. The gross profits here are positive before considering the opportunity cost of her time, and negative once they are included. Could it be that women do not price their own labor when they think about

profits? Or, is this a result of a labor market failure (see Emran, Morshed and Stiglitz, 2007)?

Table 2

Dairy Production	
The Cost of a Buffalo	6000
Daily Revenue-3 liters at 8 rupees a liter	24
Monthly Revenue	720
Annual Revenue (8 Months a year)	5760
Annual Cost of Feed	2400
Net Profits (Before Capital Costs)	3360
Capital Costs (25% year)	1500
Net profits after Capital Costs	1860
Labor	2700

Durable Goods Rental Markets

Next consider rag collectors. Rag collectors often rent pushcarts at a daily rate of 30 Rupees. These same carts can be bought from between 1,000 to 2,000 Rupees. This implies an annual rent to price ratio on the order of 6 to 10, a stunning ratio. Often, an MFI loan allows a rag collector to buy instead of rent the pushcart. However, why is this ratio persisting in the first place? At a lower ratio, one could imagine the business risk and deterioration of the pushcart is enough to motivate one to rent rather than buy, but these pushcart vendors typically do not change occupations, and the pushcarts themselves have a life much longer than one to two months. These risks and depreciation alone cannot explain the high rental to purchase ratio.

Table 3

Rag Collectors	
Daily Pushcart Rental Rate	30
Annual Rental Rate	10950
Cost to Purchase	2000
Annual Rent to Cost Ratio	5.475

If an organization funded and launched pushcart rental businesses, would the price fall? Is the market for rentals competitive? If it is not, what is enabling this small scale enterprise, pushcart rentals and sales, to be monopolistic?

These two “anomalies,” taken together, suggest that a lot of decisions are responses to failures in other markets. These decisions may not be the “first-best” solution to the problem. In one case a dairy farmer investing her own labor solves a failure in the labor market, and in the other the decision to rent results from a failure in the rental market for capital.

This suggests we should think about interventions in “secondary” markets as an alternative. For example, interventions in the labor market, including childcare and other services to allow women to leave home and work, could have a significant impact on the efficiency of dairy farmers. Also, credit could be provided for small and medium enterprises that hire women. Finally, further research should look at investments in capital markets and provide credit to meet the higher end needs of the market, such as those who rent out capital equipment. This may actually serve to redistribute wealth in the same way as some MFI investments—by lowering rental costs.

These interventions may even prove superior to MFI products since they do not carry the risk of entrepreneurial activity; a woman may prefer to work at a particular wage rather than be an entrepreneur, and renting often involves an implicit insurance since the owner, and not the renter, must pay for repairs. Currently, MFIs over-emphasize entrepreneurship but we should be cognizant that not all clients want to be

entrepreneurs. Being an entrepreneur may be the occupation of last resort given a labor market failure.

Conclusion

While micro finance programs have achieved a lot in recent years in terms outreach among poor clients, little is known about factors driving client behavior and occupational choices. In this paper, we have highlighted three behaviors of micro finance clients that seem puzzling. These are 1) persistence in a borrowing cycle without expansion in underlying economic activity 2) lack of joint production activities despite cooperating on financial ventures and c) investment and labor allocation decisions which seem sub-optimal, and may be a result of failures in other related markets. By digging deeper to understand the drivers of these, we can provide useful insight to micro finance program and product design.

References

- Aleem (1990).** “Imperfect Information, Screening and the Costs of Informal lending: A Study of a Rural Credit Market in Pakistan”, *World Bank Economic Review*, 3, 329-349.
- Anderson, S. and Baland, J.M. (2002).** “The Economics of Roscas and Intra-household Resource Allocation,” *Quarterly Journal of Economics*, CXVII, (2002), 963-995.
- Armendariz de Aghion, B. and Morduch, J. (2005).** *The Economics of Microfinance*. Princeton University Press, Princeton, NJ.
- Ashraf, N., Karlan, D. and Yin, W. (2006).** “Female Empowerment: Further Evidence from a Commitment Savings Product in the Philippines”, Yale University Economic Growth Center working paper.
- Banerjee, A. and Duflo, E. (2006).** “The Economic Lives of the Poor.” Center for Economic Policy Research Discussion Paper Series No. 5968.
- Duflo, E. and Udry, C. (2004).** “Intrahousehold Resource Allocation in Côte d'Ivoire: Social Norms, Separate Accounts and Consumption Choices” working paper
- Emran, Morshed and Stiglitz (2007),** “Microfinance and Missing Markets”, Presented at the Sixth Annual Missouri Economics Conference, Columbia,
- Giné, X. and D. Karlan (2006).** "Group versus Individual Liability: Evidence from a Field Experiment in the Philippines." Yale University Economic Growth Center working paper 940.

Udry, C. (1996). “Gender, Agricultural Productivity and the Theory of the Household,”
Journal of Political Economy, (104/5).