DISCUSSION PAPER SERIES

DP13698

MICRO-EQUITY FOR MICROENTERPRISES

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DEVELOPMENT ECONOMICS

ISSN 0265-8003

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Discussion Paper DP13698
Published 27 April 2019
Submitted 22 April 2019

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MICRO-EQUITY FOR MICROENTERPRISES

Abstract

Many microenterprises in developing countries have high returns to capital, but also face risky revenue streams. In principle, equity offers several advantages over debt when financing investments of this nature, but the use of equity in practice has been largely limited to investments in much larger firms. We develop a model contract to make self-liquidating, quasi-equity investments in microenterprises. Our contract has three key parameters that can be used to shift risk between the entrepreneur and the investor, resulting in a continuum of contracts ranging from a debt-like contract that shifts little risk from the entrepreneur to a pure revenue-sharing contract in which the investor absorbs much more of the risk. We discuss implementation choices, and then provide lessons from a proof-of-concept carried out by an investment partner, KGC Equity, which made nine investments averaging $3,800 in Sri Lankan microenterprises. This pilot demonstrates that our contract structure can work in practice, but also highlights the difficulties of micro-equity investments in an environment with weak contract enforcement.

JEL Classification: O12, O16, G21

Keywords: micro-equity, Microenterprises, Microfinance, alternative financing, Contract Enforcement In Transition

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Acknowledgements
We are grateful for funding for this pilot from the Strategic Research Program (SRP) of the World Bank, and thank the Hambantota Chamber of Commerce for their collaboration on our proof-of-concept trial. We are especially indebted to Lasantha Tennekoon from Kandy Consulting Group (and its subsidiary, KCG Equity) for both his efforts and patience through all the work related to awareness raising, pre-selection, implementation and monitoring of the micro-equity contracts. We thank Thomas Hellman and Ramana Nanda for discussions.

Micro-equity for Microenterprises*

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Micro-equity for Microenterprises

Abstract

We develop a model contract to make self-liquidating, quasi-equity investments in microenterprises. Our contract has three parameters that shift risk between the entrepreneur and the investor, yielding a continuum of contracts ranging from a more debt-like contract to a pure revenue-sharing contract in which the investor absorbs more risk. We discuss implementation choices, and provide lessons from a proof-of-concept pilot carried out by an investment partner that made nine investments averaging $3,800 in Sri Lanka. This pilot demonstrates that our contract structure can work in practice, but also highlights difficulties of micro-equity investments in an environment with weak contract enforcement.

1 Introduction

Recent experiments providing grants to microenterprises have found high returns to capital for the average firm (de Mel et al., 2008; McKenzie and Woodruff, 2008; Fafchamps et al., 2014; Hussam et al., 2017). However, these high returns also reflect high risk (Samphantharak and Townsend, 2018). Returns vary substantially across firms (de Mel et al., 2008; Hussam et al., 2017) and over time (Rosenzweig and Udry, 2017), with firm revenues fluctuating by large amounts from one month to the next (Fafchamps et al., 2014), and half of all firms likely to die within six years (McKenzie and Paffhausen, 2017). The most common source of external finance for microenterprises is a loan from a microfinance institution. However, loans have had limited impacts on the profitability and growth of enterprises (Banerjee et al., 2015). One reason is that microfinance contracts structured to minimize default risk may discourage investment in risky projects with high expected returns (Fischer, 2013; Field et al., 2013; Battaglia et al., 2019). Field et al. (2013) experiment with a loan contract providing borrowers with an initial two-month grace period. They find that borrowers with the more flexible contract make riskier, higher-return investments. While the returns are high enough to offset the risk for the firm, the contracts are not profitable to lenders, who suffer the downside of the increased risk without benefiting from the upside of the increased return.

Equity investment offers a potential solution to this situation, with the investor sharing both the risk and reward of the investment. Contracts in which payments to the investor are tied to firm performance increase the willingness of both investors and firms to take on riskier and more uncertain projects (Kerr and Nanda, 2011). However, equity investments have traditionally been limited to large companies with audited accounts, with an important part of the investor's expected returns coming from exit through a public offering, acquisition, or the sale of the ownership stake in the firm. There are many challenges in implementing the model in microenterprises, for whom accounts are usually informal and exit through sale of the enterprise is not feasible. In this paper, we describe the results of a small-scale micro-equity

experiment carried out in conjunction with a chamber of commerce in Hambantota, Sri Lanka.

Micro-equity has been discussed for a long time, but implementation remains rare. One exception to this is the Islamic financing *musharaka* contracts, in which the return to the lender comes as profit sharing rather than fixed interest. Micro-equity has also been discussed in the social-investing space as either an alternative or complement to microfinance (e.g. Chowdhry, 2010; Ayayi, 2012). However, in practice there are few concrete examples that show how such contracts could be structured, or pilots of how they would work in practice with microenterprises in developing-country settings.[1]

We design a model contract for making micro-equity investments in existing microenterprises. We face several difficulties in mapping typical angel finance / venture capital funding models to the microenterprise context. First, the target enterprises are at least partially informal. They rarely use external accountants, and may not keep formal records. Most of their business transactions are in cash. Second, the target businesses are owner-managed. There is no market for the sale of the business, either through an IPO or through a sale to a larger business. That presents a serious constraint on investor exit options. We address these issues by basing contract payments on revenues, which investors find somewhat easier than profits to monitor, and by having the firm buy back the equity investment through additional revenue-based payments or through fixed monthly payments.[2]

The contract calls for monthly payments comprised of two components: a fixed amount that at least partially repurchases the equity investment, and a specified percentage of relevant monthly revenues that provides the investor's return and any part of the initial investment not returned through the fixed payments. The percentage of revenues to be

[1]One organization that conducted early pilots in this space was inVenture. However, Singh and Ingawale (2014) describe how the organization quickly pivoted from trying to provide equity funding to small firms to providing a text-based daily record-keeping system that could be used to help record transactions in firms, with the idea that this might be used by others interested in making such investments.

[2]Several investment organizations operating in Africa make limited use of royalty-based quasi-equity contracts similar to the one we implement in Sri Lanka. See annual reports of Business Partners Limited (www.businesspartners.co.za/en-za.), GoFin (www.grofin.com/), and SEAF (seaf.com), and the discussion of these in Kulasinge et al. (2018). The minimum investments by these entities is typically many times larger than the investments made by KCG Equity in our study.

paid by the firm is calculated from four key parameters: 1) the projected revenues of the firm after the equity-financed investment during the investment period (36 months in our case); 2) the expected return on investment for the equity investor; 3) the share of the equity investment bought back through the revenue-sharing mechanism; and 4) the proportion of base-year, pre-investment revenues that are excluded from the calculation. The contract allows the parties to flexibly shift risk from the entrepreneur to the investor by varying the contract parameters. In particular, increasing either of the last two parameters increases the share of the risk borne by the investor, and decreases the share borne by the entrepreneur. Note, however, that increasing these parameters further exacerbates the revenue-projection problem.

We discuss the challenges of these contract design features in much more detail below. KCG Equity, our investment partner, faced challenges both in fixing the contract parameters, and in collecting enforcing the return on the investment. Entrepreneurs may have an incentive to underreport revenues, for example, especially given the cash-based nature of the businesses. Moreover, the lack of an exit strategy significantly alters the incentives of the entrepreneur receiving the investment. Our design leveraged the social capital of the local chamber of commerce to decrease malfeasance, and KCG Equity signaled to all parties a willingness to expand the investment program if it proved successful at the pilot stage.

After describing the contract, we present results from a proof-of-concept pilot of the contract with nine investments made in Sri Lankan microenterprises in 2013. KCG Equity, a private entity established specifically to test the contract, invested between Rs. 250,000 and Rs.700,000 ($1,984 to $5,556)[3] in the enterprises. These case studies illustrate how such contracts can be implemented in practice, and also highlight some of the challenges of making these investments in an environment in which firms do not have externally verifiable accounts, and in which enforcement of contracts is difficult. Even with the Chamber as a partner, the overall portfolio made a loss. While several of the investments worked as designed, some entrepreneurs failed even to make the fixed payments related to the return of

[3]We use an exchange rate of $1 to Rs.126 prevailing in February 2013, at the time of our first investment, and use Rs. to denote Sri Lankan Rupees and $ to denote US dollars throughout.

capital called for in the contract. At least in this instance, either the chamber's social capital or the investor's signals of scaling up, or both, were not a sufficient disciplining device. We draw lessons from this experience for future efforts.

2 Making Micro-Equity Investments in Microenterprises

There are three key steps involved in making a micro-equity investment. The first is designing a contract for the investment, the second is selecting enterprises for investment, and the third is collecting (and enforcing) a return on this investment. These three steps are interrelated, with the type of contract affecting the types of firms that are interested in this investment, and the selection of firms and contract type affecting how easy it is for investors to collect a return.

2.1 A micro-equity contract: conceptual issues

There is little experience with micro-equity contracts (ME), and, so far as we are aware, no theory addresses how the contracts affect incentives of entrepreneurs and investors. We discuss those issues here, taking the standard venture capital contract (VC) as a benchmark. The standard VC context and the context in which micro-equity is likely to operate differ in certain respects, and we show that three key differences matter. These stem from the fact that the businesses in which ME is invested: 1) cannot be easily valued, either at the point the investment is made, or at any point thereafter; 2) typically have semi-formal accounting systems, and operate largely with cash transactions, making moral hazard issues more extreme; and 3) are ongoing businesses that are likely to show a substantial but not explosive rate of growth following the investment. The enterprises in which ME is likely to be invested are almost exclusively owner-managed. Sales of businesses of this size are very rare, and arms-length sales are even rarer, at least in these settings.[4] Thus, there is a lack of a standard VC exit option of sale through IPO, merger, or acquisition. The market for the

[4]McKenzie and Paffhausen (2017) note that no business in a sample of microenterprise in Ghana was sold within a year of the first survey, while in a survey of Sri Lankan microenterprises, only 1.5 percent of the businesses that the original owner was no longer operating had been sold.

sale of the business in the VC model provides a valuation of the business at the point of exit. This is key because the ability to place a market value on the firm, even in the absence of a sale, allows contracting over the market value at some future point in time. The ability to value the business now and in the future is the feature that, as Gompers (1995. P. 1467) puts it, "allows an ex post settling up..." of the investment.

We begin with a comparison of stylistic VC and ME models of investment. We model the ME contract as a self-liquidating, revenue-based, royalty contract. We focus first on the assumption that the VC model allows the business to be fairly valued by markets, while the ME model assumes that market valuation of the business is not feasible. We show that the ability to value the business has two beneficial effects. First, it allows the VC investor to capture a share of the discounted profit stream in perpetuity, whereas the ME investor only captures a share of the profits over a much shorter period. This allows the VC investor to gain the same return with a lower share of profits, since her share is effectively captured over the life of the business. Second, the ME contract incentivizes the entrepreneur to shift profits into the future, to periods in which the profits accrue entirely to her, while VC model effectively taxes the entrepreneur's effort equally in every period.[5]

The entrepreneur's share of the profit stream in the VC model can be expressed as:

$$\Pi^{E}_{VC} = \sum_{t=1}^{\infty}(1-v)(R_0 - C_0)(1+g(e_t))^t \tag{1}$$

Where v is the share of the firm allocated to the investor, R_0 and C_0 are revenues and costs in the base period, g is rate of profit growth, which is, in turn, a function of e_t, the effort exerted by the entrepreneur in each period.

In the absence of a sales-based exit option, exit through repurchase of the investment may be the only option. This repurchase can take one of two forms: transfer of a share of sales to the investor sufficient to repay (in expectation) the capital investment and the return,

[5]In a model with fixed, per-period, costs of readying the business for sale, the entrepreneur will have incentives to front-load effort in order to retain a larger share of the business at the time of the sale.

or repayment of the capital investment on a fixed schedule, with the return on investment coming as a share of sales. Either way, we assume the contract is self-liquidating: there is some point at which the entrepreneur has bought the investor out of the business, after which the entrepreneur retains the full profit stream. We thus write the entrepreneur's share of the profit stream with the ME contract in two components[6]:

$$\Pi^{E}_{ME} = \sum_{t=1}^{y}\{[(1-m)R_0 - C_0](1+g(e_t))^t - k_t\} + \sum_{t=(y+1)}^{\infty}(R_y - C_y)(1+g(e_t))^{(t-y)} \quad (2)$$

Where m is the share of revenues allocated to the investor, k (possibly equal to zero) is the fixed payment associated with repayment of the investment, and y is the period over which the investor retains a share of the profits. To reflect the contract we implemented, and for the sake of simplicity, the share m remains fixed over the term of the investment, rather than declining as the investment is reduced.

With either the VC or ME contract, the entrepreneur will choose effort to equate the marginal cost and marginal value of his effort. Both the VC and ME contract lead to distortions with respect to the first best. Relative to the equity (VC) contract, the royalty (ME) contract intensifies the distortions for two reasons. First, the return on the investment is captured in y periods in the ME contract and over the life of the firm in the VC contract, since future profits are capitalized into the price at which the business is sold on exit. This implies that $m > v$, so with convex effort costs, the entrepreneur will exert lower effort with the ME contract. Second, as noted by Jensen and Thursby (2001), royalty contracts distort the firm's production function by, for example, incentivizing sale of higher-margin products. Third, given the self-liquidating nature of the contracts used in the ME context, a further inter-temporal distortion occurs. Since the ME contract discretely increases the share of profits the entrepreneur retains after repurchase, she has an incentive to shift profits from

[6]We assume for simplicity that revenues and costs grow at the same rate, so that the firm's profit rate remains unchanged.

the present to the future. Neither of these distortions is present with the VC contract. In a context in which measurement of sales is difficult, the ME contract also gives the entrepreneur an incentive to hide sales. To the extent that current revenues / profits affect the market value of the enterprise, the incentive to hide is not present in the VC contract in which, by contrast, one may worry about over-reporting.

The fact that the VC contract allows the investor to capture a share of profits in perpetuity through the sale of the business gives the VC contract an advantage over the self-liquidating ME contract. But do royalty-based contracts have advantages? Savva and Teneri (2015) note that universities often privatize their research through contracts that involve both an equity stake and a royalty share. The prevalence of the royalty share suggests that, in spite of the disadvantage highlighted above, the contract may have offsetting advantages. Savva and Teneri focus on the difficulty a university's Technology Transfer Office (TTO) has in valuing the commercial potential of the invention at the time the contract is signed. In particular, the they note that university's TTO is at a significant informational disadvantage relative to the inventors. In the face of this informational disadvantage, Savva and Teneri show that by offering the investor a choice of multiple contracts with varying equity and royalty shares, the TTO can induce the investor to reveal information about his expectations for the market demand for the invention.

This informational disadvantage will also generally be a characteristic of ME investors, because the small scale of the investment will not support a large fixed investment in gaining expertise in a specific sector.[7] We show in Section 2.3 that varying the share of the investment that is repaid as a fixed payment rather than through an increase in the royalty rate also induces the entrepreneur to reveal information about her prospects for growth.

[7]We explored the possibility of working in the tourism sector, but for logistical reasons, that was not possible. Micro-equity funds that could focus on a single sector might gain expertise that would overcome this problem, or at least make the informational disadvantage comparable to that faced in more typical VC contexts.

2.2 A micro-equity contract in practice

The conceptual discussion suggests the inability to value the business leads to inherent disadvantages of micro-equity relative to standard venture capital contracts. The contract we designed allows these disadvantages to be mitigated at the cost of shifting risk away from the investor and toward the entrepreneur. In practice, we face a trade-off between purer equity contracts with greater moral hazard concerns and more debt-like contracts that shift less of the risk and reward to the investor. We discuss two parameters that determine where on the equity–hybrid debt spectrum the particular investment lies.

The basic contract calls for investor to make an investment of amount X (e.g. Rs. 500,000) in the microenterprise. This investment is made as a silent partner, so that the investor does not have control over the day-to-day operations of the business, but also is not responsible for any debts or liabilities incurred by the microenterprise. In exchange for this investment, the investor and microenterprise sign a contract forming a partnership for a fixed period T months (e.g. 36 months). During the partnership period, the entrepreneur makes monthly payments which provide (in expectation) the return of, and a return on, the invested capital. The monthly payment has two components: a fixed, pre-determined, amount to repay a share (ranging from zero to 100 percent) of the capital investment, and a share of the applicable revenues of the business that covers the remaining capital investment and the return on the investment. Varying the share of the capital returned as a fixed payment and the share returned as revenue-sharing is one parameter that affects the risk-sharing - moral hazard trade-off.

The contract uses revenue sharing rather than profit sharing for several reasons. The first is that revenue is more easily monitored and verified than profits. Second, using revenues reduces the incentive for the microenterprise owner to front-load costs that might have payoffs only after the end of the micro-equity contract. For example, owners could take on additional debt to buy capital, expense the interest, and reduce profits today, but then own the asset once the investor has exited. A downside of revenue sharing is that it offers less insurance to the entrepreneur than profit sharing, since it does not insure the owner against fluctuations

in costs that cannot be passed onto customers in the form of higher prices.

KGC Equity invested in ongoing businesses. In some cases, the businesses were large relative to the investment. Entrepreneurs understandably questioned why KCG wanted a share of the revenues of the existing business rather than basing the return only on incremental revenues arising from the investment. [8] Where the existing business was well established and large relative to the investment, taking a share of the full business revenues implied shifting little risk to the investor. The incremental revenue generated from the new investment is much less predictable, and involves more risk. Thus, a contract calling for royalties based on incremental, rather than total, revenues, shifts more of the risk to the investor. Because it was usually impossible to fully separate the revenues of the existing business on the one hand and the incremental investment on the other, KCG allowed entrepreneurs to exclude a percentage of base-year revenues from the revenue-sharing calculation. Note that the total expected payment is not affected by this revenue exclusion, since the payment is calculated to produce an expected return on the investment amount. Nevertheless, excluding a larger share of the base-year revenue implies that a larger share m of the incremental revenue is transferred to the investor. In the context in which underreporting of revenues is a concern, the trade-off is one between risk-sharing and moral hazard.

The contract payments following an investment of amount I were then determined as the sum of two types of payments:

a) *Fixed payments*: the microenterprise pays a share δ of the capital investment as fixed payments. The amount of the investment returned as fixed payments can vary from zero (in which case, all capital is returned through a share of revenues) to 100 percent. In our contracts, we allowed a three-month grace period on fixed capital repayments at the start of the contract, implying the enterprises made fixed payments of $\delta \mathrm{I} \ /(T-3)$ each month after the third month.

b) *Revenue sharing*: the microenterprise pays a share m of relevant revenues each month.

[8] The investor's return in a standard VC contract is based on incremental (discounted future) revenues because the discounted revenue stream at the time of the investment determines the value of the business that that point in time, and the share of the ownership allocated to the investor.

This provides the return to the investor as well as the share $(1-\delta)$ of the invested capital not repaid through fixed payments. We denote the share of base-year revenues excluded from the calculation as B, with enterprises paying an amount $max[m(R_t - B\bar{R}), 0]$ where R_t is revenue for the month, $\bar{R}$ is monthly revenue for that month in the year before the contract was signed, and $0 \leq B \leq 1$ is the share of prior revenue shielded from revenue sharing.

The proportion of revenues shared, m, varies with the choice of δ and B. The share increases as more of the capital is repaid through revenue sharing (that is, as δ becomes smaller), and as the share of excluded base-year revenues increases (that is, as B increases). As a result, contracts that provide the most insurance to the entrepreneur against downside risk (when $\delta = 0$ and $B = 1$) will also require them to share more of their upside gains with the investor. These more equity-like contracts increase concerns with moral hazard.

Once δ and B are fixed, the investor and entrepreneur must agree on a value for the share of revenue to be received by the investor. This will be a function of the size of the investment, the expected revenue (including revenue growth) subject to the royalty rate, and the targeted return on the investment. The entrepreneur will have an incentive to overestimate future revenue growth, since a higher projected revenue implies a lower m for any given investment and expected return. There are several approaches that can be used to determine m. In practice, we used a spreadsheet that allowed us to consider payment scenarios for varying δ and B, expected revenue growth rates and investor returns, showing each scenario to the entrepreneur.

The revenue share m paid to the investor is a function of seven parameters: I, T, δ, B, $\bar{R}$, g, and the targeted return on the investment (r). We based the target return on a loan-equivalent return, in the aim of both simplicity and transparency with the entrepreneur. That is, we started by determining the monthly payment for a loan amount I over a term T (in months) and an (annual) interest rate r.[9] We summed this monthly payment over the term of the investment T to determine total (nominal) loan payments. From this, we

[9]We use T in months and r in years, and hence use the Excel command $PMT([\frac{r}{12}],\text{T},\text{I})$.

subtracted the amount of the equity investment to be returned as fixed payments, δI. The result is the total (nominal) amount we aimed to collect through revenue sharing, which is $\sum_{t=1}^{T} PMT([\frac{r}{12}], T, I) - \delta I$. We divided this by the revenues subject to the royalty over the investment period, which is $\sum_{t=1}^{T} max(\hat{R}_t - B\bar{R}, 0)$. The royalty rate is then:

$$m = \frac{\sum_{t=1}^{T} PMT([\frac{r}{12}], T, I) - \delta I}{\sum_{t=1}^{T} max(\hat{R}_t - B\bar{R}, 0)} \tag{3}$$

Note that because the loan payments are assumed to be fixed in each month starting at month one, while the revenue sharing is back-loaded because of expected growth in revenue, the real return to the investor will be lower than the targeted loan-equivalent rate. In our case, the expected return was typically about 2 percentage points less than the targeted loan-equivalent return, or for example, 16 percent rather than 18 percent. Because the subtlety arising from the difference in discounting is difficult to explain to entrepreneurs, the fact that it goes against the investor is unfortunate from a bargaining perspective, because the actual returns to the investor are generally somewhat lower than the entrepreneur believes them to be.

2.3 Adverse selection and contract choice

Entrepreneurs have an informational advantage in projecting the returns to the investment funded by the equity contract. As in the case of university TTOs discussed by Savva and Teneri (2015), this raises the possibility that offering multiple contracts might induce the entrepreneur to reveal information through the choice of contract. With the micro-equity contract described here, we might vary both the expected return to be realized by the investor and the share of the capital to be paid through fixed payment rather than royalty.

Suppose ME's expectation for growth is g^* and that the entrepreneur's expected growth is drawn uniformly from $[g_L, g_H]$. Assume that ME is correct on average, so that g^* is the midpoint of the range. Now we want to show that there is a set of contracts that can be offered to the entrepreneur that will induce her to reveal whether her expected growth is

higher or lower than g^*, and that will leave the investor better off than a contract based on g^*.

Suppose the ME offers two contracts $\{\Delta, m\}$ or $\{\delta, M\}$, where $\delta < \Delta$ are the shares of capital returned with fixed payment and $m < M$ are the royalty rates including any royalty to pay back the capital. Where the contract parameters are calibrated so that the return to the investor is equalized for each contract at a growth rate g^*, the entrepreneur expecting higher growth ($g > g^*$) will choose the contract with the lower royalty rate, Δ, m and the entrepreneur expecting ($g < g^*$) a will choose $\{\delta, M\}$. Relative to the parameters chosen to equalize returns at growth $g*$, this suggests that raising m in the $\{\Delta, m\}$ offer will still induce sorting of high-and low-growth entrepreneurs while increasing the return to the investor.[10]

In practice, we allowed the entrepreneurs to choose the share of the investment capital to be paid through fixed capital payments, and, hence, we offered a range of contract choices. But we did not vary the expected return condition on growth across these contracts because we felt this would complicate the description of what was a very different type of investment contract from those available to our target firms.

2.4 Selecting which enterprises in which to invest

Microenterprises are abundant in developing countries, but the modal firm is a self-employed owner without any employees, and very few of these firms ever grow beyond micro-size. Moreover, while VC's face a highly skewed distribution of returns (e.g. Hall and Woodward, 2010) in which a small upper tail provides almost all the returns, micro-equity investment will not be able to rely on a few successful "exits" to provide returns. The goal is therefore less about identifying superstar firms, and more about identifying a subset of firms that have high marginal returns to capital, even if most experience only modest growth with the investment.

Several approaches now seem to offer potential for identifying firms with high marginal

[10]This discussion ignores variance in risk aversion across entrepreneurs. The $\{\Delta, s\}$ contract allocates more of the risk to the entrepreneur, and hence even for some growth rates $g > g^*$, the entrepreneur may choose $\{\delta, S\}$. This might be compensated by varying B, the share of base-year revenues excluded from the agreement.

returns. A first approach is for microfinance lenders to start with debt financing, and to track borrowers through several cycles to learn about their ability and willingness to repay, and, potentially, about the firm's cash flows. This has the advantage of selecting on repayment ability, but because debt financing might exclude high-risk, high-expected-return firms in the first place, this approach may exclude firms whose return on equity financing might be the greatest. A second approach is to work with an institution such as a chamber of commerce, NGO, or training organization that has a pre-existing relationship with firms, and has thus observed firm performance over time, and developed a sense of which entrepreneurs are more likely to succeed. Information on entrepreneurs with potential for growth might also be solicited amongst neighbors (Hussam et al., 2017), an approach that has the advantage of using local knowledge, but which will be dependent on how useful that local knowledge is. An additional advantage of micro-lenders, chambers of commerce, and similar organizations is that they may have social capital with local firms. The investor may benefit, in terms of better reporting and repayment, if firms find value in maintaining relationships and reputations with these local organizations.

A third approach is to have firms apply for funding through a business plan competition or similar competitive mechanism. McKenzie (2017) shows that the firms that apply for such programs tend to be positively selected, and that winners grow rapidly after receiving capital. An alternative approach is to rely on large amounts of data and prediction models to predict which firms will be good investments. McKenzie and Sansone (2017) find machine-learning methods have very little power in distinguishing growth paths amongst semi-finalists in a business plan competition. But such models may be better at distinguishing between subsistence and growth-oriented firms among microenterprises. For example, Hussam et al. (2017) find machine learning helps predict which Indian firms have higher returns; Arráiz et al. (2017) find that the algorithm used by the Entrepreneurial Finance Lab is able to use psychometrics to identify borrowers without credit histories who borrow more when given the chance, and who repay at similar rates to other borrowers; and Björkegren and Grissen (2018) find mobile call record data helps predict which borrowers will have better repayment

trajectories.

The choice between these methods will depend on who the investor is, and on scale. These methods will differ in terms of their feasibility and cost-effectiveness, and a micro-equity investor may be able to fine-tune this selection process over time through experimentation and the collection of return data.

2.5 Additional contractual options

The contract outlined in the previous section is relatively straightforward, which is important when explaining a new financial product to microenterprise owners. Several additional options might be added to improve the contract, at the cost of additional complexity.

The first is the option of a mid-loan grace period.[11] To build further insurance into the equity agreement, the contract might allow the owner to choose one month to defer a payment, to be made up either over later months or by extending the contract one month. This helps if the household or business experiences a shock in a particular month. A second option is for the investor to bundle additional services with the finance. Venture capitalists and angel investors typically provide strategic advice and networking contacts, in addition to financing. A key challenge for this approach with micro-equity is that, because the investment amounts are small, any such additional services need to be provided at very low cost. One example comes from inVenture, which built a tool called inSight that uses mobile technology to allow enterprise owners to text their revenues and expenses daily, and to receive, in return, accounts information, and a credit score that was provided to lenders (Singh and Ingawale, 2014).

2.6 Collecting and enforcing payment

The final step involves the investor verifying the revenue of the microenterprise, calculating the amount owed, and receiving payment. The venture capital literature notes that VCs

[11] See Battaglia et al. (2019) and Barboni and Agarwal (2018) for experiments showing that allowing flexibility of payment timing in standard microfinance contracts leads to enterprises making higher-return investments.

are most active where information asymmetries are highest (e.g., Gompers 1995). In the context of large firms in high-income countries, this translates to industries with high levels of intangible capital. We are interested in a model that allows investment in firms with almost exclusively tangible assets, but where nevertheless there is a high level of information asymmetry. In our context, this asymmetry comes from the difficulty in valuing assets and recording revenues. Given the high level of cash transactions in our target firms, the entrepreneurs will often have information about performance that will be only coarsely observed by the investors.[12]

Verification of revenue depends on the type of business in which the investment is made. In the best case, revenues of the enterprise may be verifiable from a third party or objective source. This may be the case if the microenterprise sells all of its output to a single buyer (as in some agricultural businesses, or businesses working in a supply chain), or when physical measures of output can be readily tracked (as with odometers or GPS tracking of transport providers).[13] A second case comes from businesses with very simple production functions. For example, an Islamic lender in Egypt described to us making a musharaka contract with an egg producer, calculating payments on the basis of the number of chickens the producer had, along with an estimate of eggs produced per chicken on average and prevailing egg prices.

But for most microenterprises, revenue will not be so easily verifiable. Investors must therefore rely on microenterprises recording and reporting revenue, coupled with occasional spot checks. This implies moral hazard, which can be mitigated by a combination of attempting to select business owners who are more likely to report truthfully, some threat of punishment, and incentives for reporting higher revenue. For example, Islamic lenders may rely on moral incentives for truth-telling (e.g. Bursztyn et al., 2018). To the extent that successful repayment of the micro-equity contract provides a stepping stone to additional financing,

[12] A similar issue can take place within firms, where firm owners have difficulty observing the sales made by workers. See Kelley et al. (2018), who show that introducing technology to reduce this friction can help improve firm growth.

[13] Chowdhry (2010) gives another example, in which the investor (Confianza-USA) takes a share of credit card receipts, in the case of small U.S. enterprises for which such sales are an important share of revenue.

microenterprises may have incentives to report more truthfully in order to demonstrate business size and growth levels needed to qualify for further financing.

Even after determining the royalty rate that yields a fair return in expectation, investors may still face challenges in receiving payments. Formal enforcement is difficult and prohibitively costly in most contexts.[14] The same moral and dynamic incentive mechanisms that encourage truth-telling about the level of revenue can create incentives for firm owners to repay. Investors may also find ways to use the reputational capital of entrepreneurs. If firm owners are chosen for investment through chambers of commerce or microfinance organizations to which they have social capital, failure to repay may be costly to their reputations with those organizations. However, in the absence of these incentives, the ability of the investor to enforce payment will depend on the legal environment for contract enforcement in their country.

3 A pilot in Sri Lanka

To understand how a micro equity contract might work in practice, we worked with KCG Equity to carry out a proof-of-concept pilot in Sri Lanka. In 2012, KCG Equity engaged a lawyer to design an actual contract that could be issued under Sri Lankan law, and was itself able to enter into partnership agreements with selected enterprises. We chose to work in Hambantota district. This is a relatively underdeveloped district in the south of Sri Lanka and is the birthplace of the then-president of Sri Lanka. The government planned to transform the area into a new major urban hub. The first phase of a new port opened in 2010, and Sri Lanka's second international airport opened in March 2013. At the time, this area therefore seemed a promising area for growth-oriented microenterprises.

[14] As we discuss in more detail below, we are still in the process of formally enforcing agreements with three entrepreneurs who egregiously defaulted on our contracts.

3.1 Selecting microenterprises

Given the small scale of the pilot, we ruled out a business plan competition or competitive application approach. Together with KCG Equity, we met with both a local microfinance organization and the Hambantota Chamber of Commerce, and decided to partner with the chamber. The chamber has around 300 direct members (SME owners), a few large corporate members, and links with different trader associations. They had two programs that offered a promising pool of growth-oriented entrepreneurs who might be interested in equity investment. The first was a youth business program, in which they made loans of up to Rs. 200,000 (average size Rs. 75,000) to young business owners, for up to two loan cycles, with the goal of graduating them to other financing. The second was an entrepreneurship award program, where the chamber identified promising businesses in the district and gave several awards each year.

Our hope was that working through the chamber would help induce honest reporting of revenues and repayment. Entrepreneurs were asked to sign a contract in front of a witness from the chamber, and were told that their reputation with the chamber would be affected by any non-payment. The signing of the agreement took place at the chamber itself before the chamber's lawyer who also undertook the legal registration work. Second, they were told that the ability of KCG Equity to make future investments in other businesses in the community would depend on their performance and repayments. Third, it was emphasized that keeping several years of revenue-sharing records would provide the necessary information to make a persuasive case to banks or other financial institutions for subsequent financing needs.

We conducted awareness programs for groups of candidate firms identified and invited by the chamber, and explained the details of the micro-equity contract. Interest in this financial product was fairly high; over 40 percent of the firms that attended the information sessions ultimately applied for an investment. Table 1 provides summary information on the nine firms in which investments were made. The owners are typically in their 30s, and all owners are male (KCG entered negotiations with a couple of female-owned firms, but they turned down the investment offers). The nine firms have an average age of eight years, have

3 employees, average monthly revenue of Rs. 420,000 ($3,333), and average monthly profits of Rs. 71,000 ($563). All of the firms were formal for tax purposes, having registered at the district secretariat. However, only one firm used an external accountant, with the remainder keeping records themselves.

Firms were typically interested in capital to buy specialized equipment that would allow them to expand their product range or improve the efficiency of production. For example, one firm specialized in vehicle repair. The owner wanted to import from Singapore a vehicle scanning machine costing Rs. 800,000. The machine would allow them to do automated scanning and repair of newer vehicles with electronic components. At the time of investment, there were no other repair shops in the area, and car owners typically had to travel to Colombo for such a service. A second example was a firm making yogurt and flavored ice packets. The owner sought an investment of Rs. 450,000 to buy a new ice drink packaging machine that would enable the business to produce ice packets of differing sizes and flavors, expanding his product range. In both cases the equipment does not have a local resale market, and there is risk in terms of whether the new investment will deliver the anticipated increase in revenue. Appendix A provides details for each of the nine cases.

3.2 Contracts and investments

Each contract was for 36 months, with an initial three-month grace period for fixed payments. The investments ranged from Rs. 250,000 to Rs. 700,000 ($1,984 to $5,556), with an average investment of around Rs. 480,000 ($3,810). Firms were allowed to chose parameters in the contract within a restricted range of $0.5 \leq \delta \leq 1$ (so that firms would re-pay at least half of the equity investment) and $0 \leq B \leq 0.9$ (so that firms could not fully shield prior revenue levels from sharing). The revenue share, m, was then determined using the chosen δ and B and benchmarking against the prevailing interest rate of 18 percent. The investor used a spreadsheet to show firms the payment shares implied by different choices of δ and B. Table 2 shows that all but one firm chose $\delta = 1$, committing to buy-back the entire investment with fixed payments. However, the firms showed more variability in their choice of B, with

five firms choosing not to shield any part of past revenues, and four firms choosing to shield between 30 and 90 percent of prior average revenue levels. The resulting share of revenue to be paid, m, ranged from 0.29 to 5.85 percent. This was equivalent to a mean (median) of 8.2 percent (5.1 percent) of average monthly profits according to the profit data firms reported at the time of application. The entrepreneur's contract choices meant that they retained a relatively large share of the incremental revenue stream, which has the advantage of lowering moral hazard concerns, but also perhaps suggests that our growth projections were conservative in their view.[15]

3.3 Contract performance

The nine investments totaled Rs. 4,310,000 ($34,206). Table 3 summarizes the repayments for each investment. Firms reported less revenue than they had predicted, so that the total repayment due from revenue-sharing was approximately Rs. 1.3 million less than the interest that would be paid on an 18 percent declining-balance loan over this period, with every single investment yielding less than the 30.1 percent nominal three-year return of such a loan. However, the larger problem was enforcement of repayment, conditional on the revenues that firms reported. Only two of the firms (the vehicle repair firm A, and the motor coil rewinding firm C) made all payments on time and yielded positive returns. A third firm (firm G) experienced some repayment issues, but was able to complete the payments required with some delays.

The remaining six firms all paid back substantially less than the capital invested. Four of the six paid their contractual revenue-sharing and principle payments for at least seven or eight months before falling into arrears. The other two firms fell into arrears before even making their first principle payment, and ended up paying only two months of principle repayments in total, and only a few months of revenue sharing. The three-year contracts ended between February and November 2016. At the end of the contracts, we had only

[15] We did not vary the expected return, however, and so at least for this pilot, did not induce firms to reveal information about expected returns in a manner that allowed us to capture a larger share of the investment gains.

received Rs. 2,259,383 ($17,932) in total payments, yielding a return of -47.6 percent. The total amount outstanding was Rs. 2,501,929 ($19,857).

KCG Equity sought to enforce re-payment and chase up arrears during the contract period through multiple avenues. The first involved in-person visits to firms and discussions, and several review meetings with firms at the chamber of commerce, in the presence of chamber staff, and in one meeting, a lawyer. This led to some short-term improvements for some firms (e.g. one investee paid up several overdue payments on the day of the review meeting), but did not substantially change longer-term repayment. The chamber exerted some pressure, and denied a loan application to one firm that was behind on its payments. But overall, the chamber appeared to have limited leverage. Investigating further options, KGC learned that it could not report the lack of payment to the credit bureau, given that the investment was not a loan. There were no private collection agencies to which KCG Equity could sell the obligation.

Given this, KCG Equity next turned to the possibility of taking the defaulting firms to court, with the aim of demonstrating their seriousness and having a demonstration effect any future investments. A lawyer advised that they should begin with an arbitration process, as otherwise a judge would likely throw out the cases given the relatively low amounts and small size of the firms. They went through an arbitration process with the six firms that had not made their agreed payments. The arbitration arrangement was for firms to make an initial 25 percent payment of the balance due (in Jan 2017) and the rest in eleven installments over the course of the year (Feb-Dec 2017). However, only one firm made the initial 25 percent payment; three others made partial payments, and two firms refused to pay anything throughout the year. The arbitration process therefore yielded repayment of only 9.3 percent of the total balance owed, or Rs. 232,500 ($1,845).[16]

KCG Equity then decided to proceed with a filing of claims in court. The case had to be filed in local courts in Hambantota, and a representative from KCG Equity would need to be present for all hearings. KCG Equity is located in Kandy, six hours away from the courts,

[16] As we discuss below, one investee reached an agreement to repay an additional Rs. 334,150 ($2,652) after the arbitration but before court filing.

and firms could postpone hearings at the last minute. KCG Equity was told that if they were fortunate, the case might be settled in two or three court appearances, but that some cases continue for 10 or more appearances. Moreover, even if KCG Equity were to receive a favorable ruling, investees might be able to show the court that they are unable to pay. In that event, separate court orders would be needed to seize assets and sell them off to recover funding.

The legal process began in March 2018 with a lawyer in Hambantota issuing Letters of Demand. This provides a small window of opportunity for settlement before proceeding with the case filing. KCQ Equity reached an agreement with one investee to pay the total amount outstanding amounting to Rs. 334,150 ($2,652). This settlement agreement was honored over the course of a 10 month period. KCG Equity's lawyer proceeded with filing the remaining five cases, amounting to a total outstanding of Rs. 1,935,279 ($15,359), in May 2018. Court hearings commenced in August 2018 and are still ongoing at the time of writing.

3.4 What went wrong, and lessons for future micro-equity investments

This pilot only partially succeeded as a proof-of-concept. KCG Equity received principle repayments and state-contingent revenue-sharing as agreed, with no enforcement problems, from three of the nine contracts. In a fourth case, KCG Equity received repayment of the principal and minimal revenue sharing after arbitration and the threat of litigation. This demonstrates that such contracts can work in practice. However, the overall portfolio made a loss, and experienced several problems.

We have only nine data points, so can offer only highly speculative observations on patterns in the data. Nevertheless, a few patterns are worth highlighting, using payments received before court filing as the basis of returns. First, our contract focuses on a share of sales, but the incentives of entrepreneurs may be affected more by the payments as a share of profits. Using base-year reported revenues and profits, the average (unweighted) royalty rate was just under 2 percent, but payments as a share of profits averages 8 percent. The realized return across the nine projects is correlated more closely with contract payments

as a share of profits (-0.38) than with the share of revenues (-0.10). Second, the realized return was higher where the investment was a smaller share of initial capital stock. In the four enterprises that ultimately paid the KCG Equity investment averaged just under 11 percent of base-year capital stock. In the five enterprises that at least partially defaulted, the average was 21 percent. Finally, all four of the enterprises that repaid chose to shelter some share of base-year revenues from the royalty payment (and hence, chose a higher royalty payment as a result), while none of those that defaulted chose to shield any base-year revenue. We speculate that these choices may have reflected unobserved intentions with respect to repayment. All of these observations are highly speculative, and should be read as such. But perhaps they offer some guidance for future attempts to enter royalty-based contracts.

As with any investment, external circumstances also affected returns. One factor expected to positively affect the growth of firms in Hambantota was the pending opening of a new sea port and airport in the city. However, neither grew as expected. Further, the surprising election loss in January 2015 of locally-born President Rajapaksa could have compounded this. The airport was subsequently described as the "world's emptiest international airport".[17] This highlights the importance of geographic diversification of investments to limit exposure to demand shocks

The larger problem appears to be moral hazard due to the difficulties of enforcing contracts in a developing country legal environment. Part of this might be solved by better ex ante selection of firms to invest in, using some of the alternative methods discussed in section 2.1. Part may be solved by dynamic incentives – perhaps making shorter and smaller initial investments, with successful completion opening the possibility for larger and longer-term investments or debt financing, or offering value-added services such as accounting advice. But ultimately, the contract will require a credible threat of enforcement. A small-scale investment fund seems likely to find this difficult, given the costs of using the legal system. Possible solutions could include such contracts being made by microfinance organizations that can tap into community enforcement mechanisms as well as rely on repayment histories, or

[17] See Shepard (2016).

for the investment fund to sign a contract with a third-party enforcer, who can be the residual claimant if the contract goes into arrears. Explicit penalty clauses for non-payment could be added to charge interest on arrears and lay out this process. Bundling the investment with accounting services that would provide some value to the enterprise and enhanced monitoring to the investor is also a possibility, if such services could be offered at low enough cost.

Note that we did receive some payment from all nine firms in which we made an investment, which differs from the venture-capital type of equity investing. However, we did not have any superstar firms with very high returns that could help offset the losses on other investments. Here there is likely to be a trade-off between attempting to generate higher payments from each firm invested in (e.g. by basing m on historical revenue levels, rather than projected revenue levels, given the over-optimism of firms and the possibility of under-reporting), and the potential for adverse-selection, whereby firms with the highest growth prospects may not wish to receive investments that require them to share too large a share of their revenue growth. Further experimentation with the choice of our contractual parameters is needed.

4 Conclusions

KCG Equity invested Rs. 4.3 million, recovering Rs. 2.3 million in the planned three-year investment period and Rs. 2.8 million within five years. As an investment, the micro-equity portfolio was therefore a failure. However, as a proof-of-concept of the possibilities offered by the new contractual structure, as well as for learning about constraints to royalty-based investments, we view the pilot as at least a partial success. We believe the contract designed here has several attractive features that make it useful to other investors who are investing in situations where the selection, monitoring, and enforcement issues are easier. The results also help explain why the returns to capital may be so high in many microenterprises, since agency issues make it very difficult for outside investors to form joint ventures that share in these high returns. We see this as a first step in making such contracts more viable, and look forward to further experimentation in this domain.

We chose not to bundle the investment with any other input to the firms. However, given the particular challenge of obtaining true sales values, an interesting alternative would be to bundle the investment with outside accounting (and perhaps basic financial consulting) services. Since the costs of providing these services would need to be recouped in the royalty share, there is a trade-off between increasing the incentives for the entrepreneur to hide revenues (due to the higher royalty rate) and increasing the ability to monitor revenues. If the latter effect outweighs the former, then the share of true revenues reported to the investor would increase. In addition, the accounting services might also lead the firm to make better decisions and hence increase actual revenue, the largest share of which would accrue to the entrepreneur.

References

Arraiz, I., Bruhn, M., Ruiz Ortega, C., and Stucchi, R. (2017). Are psychometric tools a viable screening method for small- and medium-enterprise lending. *World Bank Policy Research Working Paper* no. 8276.

Ayayi, A. (2012). Micro-credit and micro-equity: The david and the goliath of micro-enterprise financing. *Economic Papers*, 31(2):244–54.

Barboni, G. and Parul, A. (2018). Knowing what's good for you: Can a repayment flexibility option in microfinance contracts improve repayment rates and business outcomes? Working Paper, Warwick Business School.

Battaglia, M., Gulesci, S., and Madestam, A. (2019). Repayment flexibility and risk taking: Experimental evidence from credit contracts. Working Paper, Bocconi University.

Björkegren, D. and Grissen, D. (Forthcoming). Behavior revealed in mobile phone usage predicts loan repayment. *World Bank Economic Review*.

Bursztyn, L., Fiorin, S., Gottlieb, D., and Kanz, M. (2018). Moral incentives in credit card debt repayment: Evidence from a field experiment. *Journal of Political Economy*.

Chowdhry, B. (2010). "Microequity: A new model for financing microentrepreneurship". The Huffington Post. June 4. `https://www.huffingtonpost.com/bhagwan-chowdry/microequity-a-new-model-f_b_596329.html?guccounter=1&guce_referrer_us=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_cs=KzztxzBGEhiMVwDMJ5MMuw`. [Accessed: February 14 2019].

De Mel, S., McKenzie, D., and Woodruff, C. (2008). Returns to capital in microenterprises: Evidence from a field experiment. *The Quaterly Journal of Economics*, 123(4):1329–72.

Fafchamps, Marcel, M. D., Quinn, S., and Woodruff, C. (2014). Microenterprise growth and the flypaper effect: Evidence from a randomized experiment in ghana. *Journal of Development Economics*, 106:211–226.

Field, E., Pande, R., Papp, J., and Rigol, N. (2013). Does the classic microfinance model discourage entrepreneurship among the poor? experimental evidence from india. *American Economic Review*, 103(6):2196–2226.

Fischer, G. (2013). Contract structure, risk sharing and investment choice. *Econometrica*, 81(3):883–939.

Gompers, P. (1995). Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance*, 50(5):1461–1489.

Hall, R. and Woodward, S. (2010). The burden of the non-diversifiable risk of entrepreneurship. *American Economic Review*, 100(3):1163–1194.

Hussam, R., Rigol, N., and Roth, B. (2017). Targeting high ability entrepreneurs using community information: Mechanism design in the field. Mimeo. Harvard.

Jensen, R. and Thursby, M. (2001). Proofs and prototypes for sale: The licensing of university inventions. *American Economic Review*, 91(1):240–259.

Kelley, E., Lane, G., and Schönholzer, D. (2018). The impact of monitoring technologies on contracts and employee behavior: Experimental evidence from kenya's transit industry. Mimeo. Berkeley.

Kerr, W. and Nanda, R. (2011). Financing new ventures. *Harvard Business School* Case Study 9-811-093.

Kulasinghe, S., Han, L., Hoshino, T., Rathi, A., and Lambert, D. (2018). Catalyzing small and medium-sized enterprise venture capital in sri lanka. *ADB South Asia Working Paper Series* no. 54.

McKenzie, D. (2017). Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. *American Economic Review*, 107(8):2278–2307.

McKenzie, D. and Paffhausen, A. L. (2008). Experimental evidence on returns to capital and access to finance in mexico. *The World Bank Economic Review*, 22(3):457–482.

McKenzie, D. and Paffhausen, A. L. (Forthcoming). Small firm death in developing countries. *Review of Economics and Statistics*.

McKenzie, D. and Sansone, D. (2017). Man vs machine in predicting successful entrepreneurs: Evidence from a business plan competition in nigeria. *World Bank Policy Research Working Paper* no. 8271.

Rosenzweig, M. and Udry, C. (2017). External validity in a stochastic world: Evidence from low-income countries. Mimeo. Yale.

Samphantharak, K. and Townsend, R. (2018). Risk and return in village economies. *American Economic Journal: Microeconomics*, 10(1):1–40.

Savva, N. and Teneri, N. (2015). The role of equity, royalty and fixed fees in technology licensing to university spinoffs. *Management Science*, 61(6):1323–1343.

Shepard, W. (2016). "The Story Behind The World's Emptiest International Airport". Forbes. May 28. `https://www.forbes.com/sites/wadeshepard/2016/05/28/the-story-behind-the-worlds-emptiest-international-airport-sri-lankas-mattala-rajapaksa/#43ecfadf7cea`. [Accessed: February 9 2018].

Singh, N. and Ingawale, M. (2014). *The Unreasonable Fellows*. Random House India.

Table 1: Enterprises Selected for Pilot

Enterprise Code	Business Sector	Owner Age	Owner Gender	Firm Age (years)	Number Employees	Monthly Revenue	Monthly Profits	Chamber Reference	Accounting done
A	Vehicle repair (auto electrical)	32	Male	8	7	524,931	78,739	Award winner	Outside Accountant
B	Tyre sales	37	Male	7	3	1,772,099	169,350	Best agent award	Spouse
C	Motor coil rewinding	59	Male	14	0.5	476,120	106,966	Award winner	Self
D	Printer	30	Male	6	3.5	192,576	92,081	Award winner	Spouse
E	Vehicle painting	37	Male	20	1	124,050	50,000	Chamber recommendation	Self
F	Vehicle/boat servicing	30	Male	7	1	43,225	29,642	Award winner	Self
G	Yoghurt and flavored ice	31	Male	5	4	273,376	43,458	Completed Chamber Loan	Self
H	Coir and Rope	31	Male	1	2	141,000	47,000	Well performing Chamber Loan	Self
I	Processed fruit drinks	34	Male	4	2	231,223	21,802	Chamber recommendation	Self
Average		36		8	3	419,844	71,004		

Notes: number of employees does not include the owner. Part-time employees are counted as half a worker.
Monthly revenue and monthly profits are averages for the 12 months prior to application, and are in Sri Lankan Rupees
Best agent award was for best agent in Southern Province for a tyre distributor.

Table 2: Contracts and Investments

Enterprise Code	Business Sector	Start date	Invested amount	Proportion of Equity to buy back (δ)	Proportion of prior revenue shielded (B)	Percent of revenue to be shared (m)
A	Vehicle repair (auto electrical)	01-Mar-13	500,000	1	0.60	1.02
B	Tyre sales	01-Jul-13	700,000	1	0	0.29
C	Motor coil rewinding	01-Aug-13	250,000	1	0.60	0.71
D	Printer	01-Aug-13	500,000	1	0.30	2.26
E	Vehicle painting	01-Sep-13	500,000	1	0	2.04
F	Vehicle/boat servicing	01-Oct-13	500,000	1	0	5.85
G	Yoghurt and flavored ice	01-Oct-13	450,000	1	0.90	1.73
H	Coir and Rope	01-Nov-13	360,000	1	0	1.29
I	Processed fruit drinks	01-Dec-13	550,000	0.75	0	2.64
Average			478,889	0.97	0.27	1.98

Table 3: Portfolio Performance

Enterprise Code	Business Sector	Repayment Due			Actuals Paid (end of contract)			Amount Due (at end of contract)	Arbitration Payments received (upto end 2017)	Litigation Payments received (upto Jan 2019)
		Capital	Revenue Share	Return if repaid (%)*	Capital	Revenue Share	Actual Return (%)			
A	Vehicle repair (auto electrical)	500,000	113,124	22.6	500,016	113,119	22.6	n.a.	n.a.	n.a.
B	Tyre sales	700,000	108,113	15.4	106,060	37,161	-79.5	664,887	50,000	in process
C	Motor coil rewinding	250,000	62,738	25.1	250,008	62,754	25.1	n.a.	n.a.	n.a.
D	Printer	500,000	51,494	10.3	137,753	22,107	-68.0	391,650	57,500	334,150
E	Vehicle painting	500,000	46,184	9.2	155,621	11,779	-66.5	378,800	95,000	in process
F	Vehicle/boat servicing	500,000	689	0.1	306,687	689	-38.5	193,329	30,000	in process
G	Yoghurt and flavored ice	450,000	44,139	9.8	449,785	44,343	9.8	n.a.	n.a.	n.a.
H	Coir and Rope	360,000	45,206	12.6	22,214	4,986	-92.4	378,003	0	in process
I	Processed fruit drinks	412,500	117,060	21.3	25,000	9,300	-93.8	495,260	0	in process
	Total / Average	4,172,500	588,747	13.7	1,953,143	306,239	-47.6	2,501,929	232,500	334,150

Notes:
Arbitration agreement was for firms to make an initial payment of 25% of balance due, and remainder in 11 payments over the year.
Of the six firms with amounts outstanding at the end of the contract, four responded with some payment of funds due to arbitration.
Litigation process began with the issuing of Letters of Demand. One firm settled out of court at that time. The other 5 cases are currently in court.
n.a. denotes not applicable, since no arbitration or litigation was needed with this firm.
Returns are calculated as repayments received as a percentage of amount invested, and are in nominal terms over three years.

5 Appendix: Case studies of each investment

Firm A: Auto Electrical

This firm repaired around 250 vehicles per month at the time of investment. The owner was seeking investment to help buy a vehicle scanning machine, which would allow automated scanning of newer vehicles that have electronic components. This machine would be imported from Singapore, and would come with 1 month of training from the manufacturer. Currently these types of jobs either have to be done manually and take 2 days, with high risk, or else the business owner has to send the customer to Colombo. The machine costs Rs. 800,000. The owner had saved 300,000 towards this, and received a Rs. 500,000 investment to pay for the remainder.

He purchased the equipment as planned and received training in the equipment use. However, the business generated from new equipment was lower than envisaged, with few new customers generated from the port, and customers who he thought he would attract continuing to go to authorized agents in Colombo. Nevertheless, he paid all payments on time, and completed the contract as designed.

Firm B: Tyre and battery sales

The owner had been running a tyre and battery sales business. They wanted to open a tyre services business in a new location to take advantage of the anticipated growth opportunities with port and airport traffic taking place in the city of Hambantota. This new business would offer tyre changing, tyre repair and sales, battery charging and replacement, and other related services. Setting up this new location would cost Rs. 906,000 for machinery and infrastructure, and the owner would contribute Rs. 206,000, seeking an investment of Rs. 700,000 for the remainder.

He opened a new branch soon after signing of the agreement, but business did not develop as envisaged. The owner experienced cash flow issues with corporate customers who delayed in payments, and stopped giving customer credit as a result, which limited customer base expansion. He paid on time through the first ten months, and then made no payments after

that. He claimed part of the reason was a robbery at his original location. He made partial payment of the amount outstanding during the arbitration process. This case is currently in court.

Firm C: Motor coil rewinding

This firm did electrical services, with the main service being motor coil rewinding. The owner was seeking to expand the range of services by buying a new lathe machine (Rs. 285,000) and an additional coil winding machine (Rs. 45,000). He sought an investment of Rs. 250,000, covering the remainder from own savings.

He purchased the coil rewinding machine, but held off on purchasing the lathe. The demand for rewinding services was lower than expected, and customers preferred to purchase new fans rather than repairing. However, actual revenues were reasonably consistent with projected figures, and he successfully paid his principle and revenue-share payments on time over the three years.

Firm D: Printer

This firm carried out printing work (bill books, notices, making stencils, leaflets, posters, books, seals, etc.). This work was done for the Water Board, hotels, private tuition teachers, other businesses, as well as consumers. He was seeking to expand his range of products by purchasing a dye-cutting machine. This machine cost Rs. 650,000 including transportation and insulation, and the owner requested an investment of Rs. 500,000, covering the remainder from own savings. One of the key customers for the new service would be Air Lanka's catering service.

He purchased the dye-cutting machine and set up the new location as promised, and made payments for the first seven months regularly but then ran into arrears. Sales were slower than expected. The airport expansion did not take place which directly affected his proposed business expansion. The owner also developed an allergy to the printing dye and was not able to work for awhile.

Even though he continued to make irregular payments during the contract, he was in substantial arrears at the end of the contract. Partial payment of arrears was made

during arbitration. The remaining outstanding amount was settled in full out-of-court at the beginning of the litigation process.

Firm E: Vehicle painting

This firm carried out vehicle painting, with the main service being to paint three-wheelers. The owner was seeking Rs. 500,000 in funding in order to construct a heat room and a garage, as well as buy a new compressor and spray gun, contributing Rs. 50,000 of own funding. This would enable him to handle additional business, as well as attract more customers.

He constructed the heat room and started operating it. But the owner claimed business dropped dramatically due to the entry of a low cost competitor into the area, so that revenues were much less than anticipated. He paid on time through the first six months, and then paid the revenue sharing payment only in the seventh month, and then ran into arrears. Even though he did make some additional payments later on he was in substantial arrears at the end of the contract.

At the beginning of the arbitration process, he paid 25 percent of the outstanding amount as required, but did not make any of the balance monthly payments. This case is currently in court.

Firm F: Vehicale and boat servicing

This firm provides mobile servicing of vehicles, machinery, and boats. The most common service offered was servicing multi-day trawler boats, but other work also included servicing paddy harvesting machines and other farm equipment on-site. The owner wanted to start a new location servicing hydraulic hoses (in bulldozers, heavy machinery, tractors, paddy harvesters, etc.) and selling three-wheeler and bike spare parts. This would require Rs. 1 million in investment, largely in new machinery, towards which the owner would supply half, and would seek Rs. 500,000 investment.

However, after financing, he did not purchase equipment, nor did he start operations at the new location. He cut back on mobile servicing work, claiming that this was due to more customers using do-it-yourself pressure washing machines, and to his vehicle being out of service for a while, and instead he did shift work at the airport as a wage worker. As a

result, he claimed to have business revenue in only two months within the first year, and made principle repayments only during the first two years and then ran into arrears. Partial settlement of amount outstanding was done during the arbitration process. This case is currently in court.

Firm G: Yogurt and flavored ice

The main product sold by this firm was yogurt, which was made and sold to retailers and canteens. The firm was also selling flavored ice packets, but wanted an investment to enable him to purchase a Rs. 550,000 ice packeting machine that would enable different sizes and flavors of this product to be made. The owner had saved Rs. 100,000, and sought Rs. 450,000 investment.

He purchased this equipment, and the new drink packets in different sizes became operational. He was able to sell to about 25 new customers/shops on 2 new routes. He envisaged expansion into several new delivery routes, but this has been somewhat limited due to lack of sales force with marketing abilities. He also started work in a government agency and so the business became a part-time venture. Even though there were some arrears at the end of the contract, he made all the payments required with some delays.

Firm H: Coir and rope

Coir is the fiber from the outside husk of the coconut. The owner was in business making coir rope, selling 1,500-2,000 units per month. He wanted to start also producing brooms, and sought an investment of Rs. 360,000 to pay for the cost of a specialized machine to make these brooms (Rs. 200,000) and for infrastructure needed around the new machine (Rs. 160,000).

After paying the initial two months of revenue share, he ran into arrears. He eventually paid only another two months of revenue share and two months of principal payments. He also evaded monitoring visits/calls throughout the contract period. The contract ended with substantial arrears. No payment was made during the arbitration process. This case is currently in court.

Firm I: Processed fruit drinks

This firm made processed fruit drinks, selling approximately 3,500 units a month to retailers, canteens, and consumers. The owner wanted to increase production capacity, and improve the quality of the product so that it met national health standards (which would then make it possible to sell to more stores and customers). He wanted to buy a water boiling unit, deep freezer, water treatment unit, and filling capping machine that would cost Rs. 700,000, contributing Rs. 150,000, and seeking an investment of Rs. 550,000.

He purchased most of this equipment, with the exception of the filling capping machine and started the quality certification process. However, the new lid design led to spoilage and returns of around 5,000 bottles, and a court case because of the spoilage.

He ran into arrears after making two months of revenue share payments. He subsequently paid two months of principal payment. No further payment was made during the arbitration process. This case is currently in court.