

De Mel, Suresh; McKenzie, David; Woodruff, Christopher

**Working Paper**

## Who are the microenterprise owners? Evidence from Sri Lanka on Tokman v. de Soto

IZA Discussion Papers, No. 3511

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* De Mel, Suresh; McKenzie, David; Woodruff, Christopher (2008) : Who are the microenterprise owners? Evidence from Sri Lanka on Tokman v. de Soto, IZA Discussion Papers, No. 3511, Institute for the Study of Labor (IZA), Bonn, <https://nbn-resolving.de/urn:nbn:de:101:1-2008060556>

This Version is available at:

<https://hdl.handle.net/10419/34838>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

IZA DP No. 3511

**Who Are the Microenterprise Owners?  
Evidence from Sri Lanka on Tokman v. de Soto**

Suresh de Mel  
David McKenzie  
Christopher Woodruff

May 2008

# **Who Are the Microenterprise Owners? Evidence from Sri Lanka on Tokman v. de Soto**

**Suresh de Mel**

*University of Peradeniya*

**David McKenzie**

*World Bank and IZA*

**Christopher Woodruff**

*University of California, San Diego*

Discussion Paper No. 3511  
May 2008

IZA

P.O. Box 7240  
53072 Bonn  
Germany

Phone: +49-228-3894-0  
Fax: +49-228-3894-180  
E-mail: [iza@iza.org](mailto:iza@iza.org)

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post World Net. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

## ABSTRACT

### Who Are the Microenterprise Owners? Evidence from Sri Lanka on Tokman v. de Soto<sup>\*</sup>

Is the vast army of the self-employed in low income countries a source of employment generation? We use data from surveys in Sri Lanka to compare the characteristics of own account workers (non-employers) with wage workers and with owners of larger firms. We use a rich set of measures of background, ability, and attitudes, including lottery experiments measuring risk attitudes. Consistent with the ILO's views of the self employed (represented by Tokman), we find that 2/3rds to 3/4ths of the own account workers have characteristics which are more like wage workers than larger firm owners. This suggests the majority of the own account workers are unlikely to become employers. Using a two and a half year panel of enterprises, we show that the minority of own account workers who are more like larger firm owners are more likely to expand by adding paid employees. The analysis suggests that finance is not the sole constraint to growth of microenterprises, and provides an explanation for the low rates of growth of enterprises supported by microlending.

JEL Classification: O17, L26

Keywords: entrepreneurship, self-employment, De Soto

Corresponding author:

David McKenzie  
MSN MC3-300  
The World Bank  
1818 H Street NW  
Washington, DC 20433  
USA  
E-mail: [dmckenzie@worldbank.org](mailto:dmckenzie@worldbank.org)

---

<sup>\*</sup> The authors thank Josh Lerner, Antoinette Schoar, Tavneet Suri and participants of the NBER conference on International Differences in Entrepreneurship for valuable comments and Susantha Kumara and Jayantha Wickramasiri for outstanding research assistance. AC Nielsen Lanka administered many of the surveys on which the data are based. Financial support from NSF grant numbers SES-0617424 is gratefully acknowledged. This paper was drafted in part while Woodruff was visiting LSE, whose support is also greatly appreciated.

The self employed make up around a third of the non-agricultural labor force in low-income countries. A substantial majority of these self employed work alone, hiring no paid employees. These own account workers represent half or more of the informal sector in low-income countries. Is informality a way station on the road to wage work or a stepping stone for nascent entrepreneurs? The academic and policy worlds have widely divergent views on this question. Victor Tokman, espousing a view associated with the International Labor Organization (ILO), suggests that that the army of own account workers is marginalized and biding time until an opportunity for wage work arises: “Informal activities [arise from] the failure of the economic system to create enough productive employment” (Tokman 2007).<sup>1</sup>

Hernando de Soto is perhaps the best known exponent for a very different point of view. Starting with *The Other Path* in 1989, de Soto has held that microenterprise owners are entrepreneurs who, but for constraints they face on various fronts, might well run larger enterprises. In an interview with the New York Times in 1992, de Soto states: “[The own account workers] are in the informal sector because they have no choice. They have no access to credit. They cannot get their business application approved. Or they are just prohibited from opening such a business. They have nowhere else to go.” (NY Times March 21, 1992).<sup>2</sup>

These divergent views are reflected in the work of other academic researchers as well. Fields (1975) developed an early model of the informal sector as a way-station of those queuing for a formal job in urban areas. Others have followed this line. (See Fields 2004 for a review.) Bennett and Estrin (2007) are among those modeling the microenterprises as a stepping stone to formal business ownership. In their model, entrepreneurs start in the informal sector because entry costs are lower. After learning

---

<sup>1</sup> To be fair to Tokman’s view, he goes on to say: “This debate has evolved in the last few years, resulting in a substantial narrowing of the gap which had existed between those who argued in favour of the simplistic notion that legislative or procedural changes are enough to overcome the existing problems and those who denied the role of regulatory arrangements relating to the economic system.” We believe the distinction we draw between the two views of informality is valid. But we confess to choosing quotes which make the differences in views sharper than most of those involved in the debates would admit.

<sup>2</sup> De Soto’s view has had a significant impact on both research and policy. Djankov et al (2002) measure the time and monetary costs of registering a business in 75 countries. Kaplan, Piedra, and Seira (2007) and Bruhn (2007) analyze the impact of a policy simplifying the registration scheme in Mexico, reaching somewhat contradictory conclusions with respect to the impact on the formation of new businesses.

about the demand for their products, they decide whether to move to the formal sector and expand, or to shut down.

The heterogeneity of the informal sector in low-income countries allows each side to cite at least anecdotal evidence supporting its own story. But we are unaware of any study which takes these arguments to the data in a systematic way with samples representative of both the informal sector and larger firm owners. In this chapter, we aim to provide such a systematic comparison of wage workers, own account workers, and employers, using data from surveys in Sri Lanka. The wage worker and larger firm surveys are cross-sectional; the own account worker data come from a survey begun in April 2005, with the most recent survey conducted in October 2007. We use both the cross sectional comparison and the dynamics from the microenterprise panel.

There are at least two lines of empirical research which are related to our analysis. William Maloney and coauthors use labor market surveys in several Latin American countries to study the pattern of transition into and out of self employment and the informal sector more generally. These data show high rates of mobility between formal wage work and informal self employment in all of the countries examined (Maloney 1999; Bosch and Maloney 2007; Bosch, Goni, Maloney 2007). Moreover, a large majority of own account workers report being self employed by choice rather than by force, for the lack of available wage jobs. Perhaps the strongest evidence that the self employed are drawn by opportunity is that in Mexico, at least, transitions from formal wage work to informal self employment are procyclical (Bosch and Maloney 2007). Collectively, the Maloney et al analysis indicates the lack of any hard barrier between wage work and self employment in the Latin American countries. But most of their findings are also consistent with a Lucas-style decision model (Lucas 1978), where those with low levels of entrepreneurial ability move between wage work and self employment as economic opportunities change. Because the Latin American labor data are limited to overlapping one-year panels, they tell us less about whether those transitioning to self employment subsequently grow to become employers.<sup>3</sup>

---

<sup>3</sup> Woodruff (2007) questions how much of this mobility is sustained rather than representing short term churn.

Simeon Djankov and coauthors have compiled data which allows a broader comparison of the attitudes, abilities and work histories of wage workers and owners of enterprises with at least five employees in Russia, China and Brazil (Djankov et al, 2005, 2006). Own account workers are intentionally left out of the sample in order to sharpen the distinction between wage workers and entrepreneurs. Our analysis is closest in spirit to that of Djankov et al, but we explicitly bring the own account workers into the comparison and also include a greater range of owner characteristics. From a policy perspective, understanding who the own account workers are is critical given their weight in the labor force. If the sector is an incubator for larger firms, then policies should aim to help microentrepreneurs grow and generate employment. If, on the other hand, the owners of the smallest businesses are unlikely to grow to be employers, then policies aimed at job generation should focus instead on constraints to growth among those who are already employers above some threshold and there is less reason to encourage growth of the smallest enterprises.

We begin by discussing how the characteristics of entrepreneurs in developing countries might be affected by the weak institutional environment in which they operate. We next describe the surveys and data and then examine differences in family background, education and ability, attitudes toward risk and measures from the entrepreneurial psychology literature between the three groups. Our wage worker and own account worker samples are nearly evenly split by gender. But the larger firm owner sample is predominantly male, reflecting the population of larger firms. Therefore, after presenting the full results, we separate the sample by gender and show where this affects the findings.

### **Entrepreneurship in developing and developed economies:**

*Entrepreneur* is derived from the old French term *entreprendre*, meaning one who undertakes. In standard definitions the word is defined simply as someone who undertakes to own and manage a business, taking the risk of profit or loss (see Oxford English Dictionary). In addition to risk, economists often associate entrepreneurs closely with innovation – Schumpeter (1934) defining an entrepreneur as one who implements change in markets through the carrying out of new combinations, moving the market

away from equilibrium. Others such as Israel Kirzner instead view the entrepreneur as someone who moves the market towards equilibrium by recognizing and acting upon market opportunities (Kirzner, 1979).

Risk and innovation are the two characteristics most closely associated with entrepreneurs. But the empirical literature has also suggested several other characteristics. Lazear (2005), for example, focuses on the need for entrepreneurs to be jacks of all trades. This need has both a cross-sectional and time-series component. A wage worker, even a manager in a large firm, may specialize in one aspect of the business, but the entrepreneur has the need to direct many dimensions of the development, production and sales of products. Lazear finds that MBA students who later become entrepreneurs take a greater range of classes with in business school than those who become managers in larger companies. At any point in time, we might expect entrepreneurs to be multi-taskers as well. Wage workers may focus on a much narrower set of tasks. The entrepreneurial psychology literature has termed the ability and willingness to juggle many tasks in the cross section *polychronicity* (Bluedorn et al. 1999). The willingness to take risks is often viewed as an innate characteristics, but aspects of being an entrepreneur may also be learned. Dunn and Holtz-Eakin (2000), for example, find that those whose parents are entrepreneurs are more likely to become entrepreneurs themselves.

All of these factors are generally collapsed into a single term in theoretical models of occupational choice. Lucas' (1978) model of the size distribution of firms, for example, starts from the premise that individuals face the choice of working as a wage worker at the prevailing wage  $w$ , or becoming an entrepreneur and residual claimant of a firm whose output depends on the capital and labor used in production, and on the entrepreneur's ability level, denoted as  $\theta$ . Thus, each individual considers starting an enterprise with output  $Y = \theta K^{\alpha} L^{(\beta-\alpha)}$ , where  $\alpha < \beta < 1$  sets a finite size for the enterprise. At optimal levels of capital and labor (which depend on  $\theta$ ),  $L^*(\theta)$  and  $K^*(\theta)$ , the profit from self employment is  $Y(K^*(\theta), L^*(\theta)) - wL^*(\theta) - rK^*(\theta)$ . In the absence of any constraint, each individual weighs this against the wage s/he would earn in the labor market, and chooses the occupation with the higher earnings.

But constraints are seldom entirely absent, especially in developing countries. There has been quite a lot of focus on the importance of financial constraints in

determining both occupational choice and firm size (Evans and Jovanovic 1989, Blanchflower and Oswald 1998?, Banerjee and Duflo 2005). Hurst and Lusardi (2004) suggest that some of the evidence on capital constraints might instead be interpreted as reflecting the fact that aversion to risk falls with wealth. There is also the fact that an entrepreneur may not know his ability level before beginning the business. Jovanovic (1982) develops a model in which learning is important. Cabral and Mata (2003) are among those finding a relationship between firm size and firm age consistent with learning after entry.

Most of the empirical literature we have referenced uses data from high-income countries. There are reasons to believe that entrepreneurship differs in developing and developed countries for several reasons that may affect which factors differentiate entrepreneurs from wage workers. First, risk is likely to play a larger role and innovation a commensurately smaller role. The instability of the political and economic environment increases uncertainty of outcomes. Fewer firms operate at the cutting edge technologically. Technologies are likely to be adopted rather than invented in developing countries. Second, agency problems are arguably greater in developing countries. The difficulty of using courts and the scarcity of formal information systems makes delegation of authority within enterprises more problematic. This makes both arms length contracting across firms and separation of ownership and management within firms more difficult. We might expect the local social and political connections to matter more in more hostile institutional environments.

Third, agency issues and lower levels of formal schooling in the labor force make management of workers more challenging. Labor regulations which raise hiring and firing costs also contribute to making labor management more challenging. Combined with the difficulty of separating ownership and management, this implies that entrepreneurial outcomes will depend on managerial ability to a greater extent than is the case in developed countries.

Fourth, the market for business services is likely to be thinner in developing than developed countries. This implies that entrepreneurs must possess a greater range of skills themselves. Note that even in developed countries, entrepreneurs have been found to be jacks-of-all-trades, less specialized than managers (Lazear 2005; Wagner 2003). We

should expect a broad-based skill set, and the desire to juggle many tasks simultaneously, to be more important in a developing country context.

All of these factors collectively suggest that (self) selection of entrepreneurs from the population may differ in developing and developed countries. Unfortunately, the manner in which the entrepreneurial skill set has been assessed across countries is rather ad hoc. This makes comparison of the factors associated with selection into entrepreneurship difficult to compare internationally.

The combined theoretical and empirical literature therefore suggests a rich set of factors differentiating entrepreneurs from wage workers in both unconstrained and constrained environments. We draw on this literature to identify the relevant factors for placing the own account workers on the wage worker – entrepreneur scale. Our interest in undertaking this exercise is practical: From a policy perspective, should we focus on the own account workers as a potential source of job growth? Or should we instead focus on increasing incomes of the self employed where possible, in the interest of poverty alleviation, while looking elsewhere for the generation of jobs which these own account workers will fill?

### **Data and empirical approach**

We use data from a series of surveys carried out in Sri Lanka between 2005 and 2007. The first is a survey of 618 own account workers, selected from three districts in south and southwestern Sri Lanka, which we refer to as the Sri Lankan Microenterprise Survey (SLMS). The own account workers were surveyed quarterly between April 2005 and April 2007, and then again in October 2007. Each survey included questions on the operating performance of the firms during the month preceding the survey, and questions on additional topics which varied from quarter to quarter. For example, in the July 2005 survey, we played a lottery game from which we measure attitudes toward risk. In the January 2006 survey, we recorded data on the labor history of respondents; and in the October 2007, we gave the respondents a Raven progressive non-verbal test of reasoning. The survey questions relevant to the analysis here are discussed in more detail in the following section.

As with any panel, there was some attrition across rounds of the survey. However, the attrition was much less than we had anticipated, and the October 2007 survey includes 528 enterprises.<sup>4</sup> The project also included random grants of roughly \$100 or \$200, which were provided to just under 60 percent of the enterprises in the sample in either May 2005 or November 2005. These grants were intended to generate exogenous shocks to capital stock against which we can measure returns to capital. De Mel, McKenzie and Woodruff 2007a and 2007b explain the grants in more detail. For the purposes of this paper, we note only that receiving a grant does not appear to have any effect on the variables of interest. That is, even though we obtained information on entrepreneurial attitudes after the lottery draw, the responses of the grant recipients do not differ from the responses of the non-recipients.<sup>5</sup>

In July 2007, we carried out two additional surveys in the same geographic area of Sri Lanka. Sampling at the household level in the same GNs from which the own account workers were selected, we identified 456 wage workers working at least 30 hours per week. To these wage workers we administered a survey gathering information on their current jobs, labor history, family background, and attitudes. We also gave them digitspan recall and Raven non-verbal reasoning tests, and played a lottery game to measure risk aversion. Most of the questions were taken from previous rounds of the SLMS.

The second survey we carried out in July 2007 was with 424 owners of enterprises hiring between 5 and 50 employees. Some of these were identified through the household screen used in the wage survey. The majority came from identifying and approaching visible businesses. The sample of business owners comes from the same GNs in which the own-account and wage worker samples were selected, and from nearby GNs as well. The latter we added because we did not identify a sufficient number of larger businesses in the original set of GNs. The survey of larger firm owners was identical to the survey of wage workers, with two exceptions. First, we added a short section gathering operating data on the enterprise. Second, questions on attitudes toward

---

<sup>4</sup> Not every firm provided information on operating data in every round, but the response rates to the questions we use in the analysis here are nearly always close to 100%, conditional on being surveyed.

<sup>5</sup> There is a difference in responses between the treated and untreated SLMS samples in only one of the questions asked after treatments were given. By one measure, those receiving treatment have higher financial literacy, though the difference is significant at only the .07 level.

work and the selection of self employment over wage work were modified to reflect the fact that the respondents are business owners rather than wage workers.

Taken together, the three samples provide survey data on wage workers, microenterprise owners, and larger firm owners. The breadth of information generated by the surveys for each of these three types of workers is, to our knowledge, unique. We use the data to compare the characteristics of the own account workers with wage workers on the one hand and larger firm owners on the other. We examine family background, measures of ability, attitudes toward risk, labor history, and measures from the entrepreneurship psychology literature. The specific measures are discussed in more detail in the following section. We then turn to techniques of species classification, using all or part of this list of characteristics. This allows us to categorize each own account worker as having characteristics more like the employers or more like wage workers.

### **Who are the Own Account Workers?**

We begin with simple comparisons of means of variables divided into six categories: ability, parental background, childhood (at age 12) conditions, labor history, attitudes toward risk, and psychological measures. One important difference in the samples is worth noting. Males make up a much larger portion of the SME sample than of either the wage worker or SLMS samples. Seven in eight SME owners (87%) are male, compared with 51% of the SLMS owners and 64 percent of the wage workers.<sup>6</sup> There are also some differences in the average age of the respondents in the three samples. By design, all are between the ages of 20 and 65. On average, the SME owners are the oldest (43.6 years of age), the SLMS owners next oldest (41.9 years) and the wage workers the youngest (37.6 years). As we point out later in discussing the labor history data, surprisingly few of the own account workers say they have ever been wage workers. But previous wage work is more common among the SME owners. So the difference in average age may reflect these transitions from wage work to self employment.

For all of the tables, we will show own account workers in the middle, with SME owners on the left and wage workers on the right. The column between the SME owners and the own account workers shows the level of significance of the difference in means

---

<sup>6</sup> All three samples were stratified to include a larger share of females than represented by the population.

between these two samples; the column between the own account and wage workers shows the significance of differences in means between these two samples.

Table 1 displays differences in several measures of ability. In addition to years of schooling, we tested respondents in three ways. First, we conducted a forward digitspan recall test. Respondents were shown a three digit number. The card showing the number was then taken away. Ten seconds later, respondents were asked to repeat the number as written on the card. Those responding correctly were shown a four digit number, and so forth up to 11 digits. The table shows that SME owners were able to recall just over 7 digits on average, while own account workers recalled just under six on average.

The second ability measure comes from a Raven progressive non-verbal reasoning test. We provided 12 printed pages, each of which contained one 3 by 3 pattern with one cell missing. Below the pattern were eight figures, one of which fit the pattern, and the other seven of which did not. The patterns become progressively more difficult from the first to the 12<sup>th</sup> page. Respondents were given five minutes to complete as many of the patterns as possible. They were instructed to skip as desired, but told that the patterns became progressively more difficult. The average respondent completed three of the patterns correctly.<sup>7</sup>

Finally, we administered a localized version of Frederick's three question cognitive reflection test (Frederick 2005). The test asks, for example: "A bat and a ball cost Rs. 1100 in total. The bat costs Rs. 1000 more than the ball. How much does the ball cost?." Fewer than one in three of the respondents answered any of the three questions correctly. We also use years of schooling and the response to three questions measuring financial literacy as measures of ability.<sup>8</sup>

The pattern of ability is consistent by almost all measures: The ability of own account workers is lower than both the SME owners and wage workers. The gap with respect to SME owners is significant at the .01 level for all but financial literacy, where the significance level is .05. SME owners have just two years of additional schooling, answered correctly 0.18 more of the cognitive reflection questions correctly (both two-

---

<sup>7</sup> We used the same version of the Raven used in the Mexican Family Life Survey (Rubalcava and Teruel, 2004)

<sup>8</sup> The measure of financial literacy comes from Lusardi and Mitchell, 2006.

thirds of a standard deviation), and recalled 1.3 more digits (.85 of a standard deviation).<sup>9</sup> On the Raven and financial literacy tests, the gaps were smaller, 0.4 questions or one-fifth of a standard deviation for Raven and 0.14 or one-third of a standard error for financial literacy. The table also shows the first principal component of the Raven, digitspan and CRT tests.

We find no difference between wage workers and own account workers in the Raven, CRT or financial literacy tests. Wage workers are able to recall more digits, a difference which is statistically significant at the .10 level but which represents only about a third of a standard deviation. They also have 1.1 more years of schooling on average. For ability measures, then, score one for Tokman's view. Own account workers appear to be closer to wage workers than to SME owners. These findings are also consistent with the Lucas framework with the more able self employed owning larger enterprises.

We next examine differences in parental background. (See Table 2.) For parent's schooling, the pattern is the same as for ability. The parents of SME owners have higher schooling than the parents of wage workers, whose parents have insignificantly higher schooling than the parents of own account workers. The gap between SME owners and own account workers is 1 year for either parent, about one-third of a standard deviation. However, the parents of both SME owners and own account workers were much more likely to have been self employed when the respondent was 12 years of age than were the parents of wage workers.

That mothers of the own account workers were more likely and the fathers were less likely to be self employed than for SME owners may suggest differences in income levels during childhood between these two groups. Table 3 contains other indications of childhood income, from a series of questions we asked each of the three groups about their life when they were 12 years of age. We first asked what percentage of the respondents neighbors "did not have enough to eat or sometimes got by with difficulty." We also asked what percentage of the respondent's childhood cohort sat for the O-level

---

<sup>9</sup> Even SME owners do not compare favorably with other groups on CRT scores. Frederick reports averages for students at nine universities in the United States ranging from 2.18 (MIT) to 0.59 (University of Toledo). A sample of first and fourth year undergraduates at the University of Peradeniya averaged 0.94 correct responses, with engineering students doing significantly better than students in the arts and humanities (1.49 correct vs. 0.38 correct on average).

exams (to pass into upper secondary school) and the A-level exams (final year examinations used for university entry). All of these are intended to measure childhood wealth levels. Childhood wealth might affect occupational choice through the quality of schooling, access to financial capital, or other channels.

We find that SME owners report a significantly smaller percentage of their childhood neighbors were poor, and a significantly higher portion of their childhood peers sat for both the O-level and A-level exams. Own account workers and wage workers report that the same percentage of their neighbors were poor (27%), but wage workers report that a larger percentage of their childhood cohorts sat for the O-levels and A-levels. By these measures, SME owners appear to have been brought up in the wealthiest neighborhoods and own account workers in the poorest neighborhoods.

The bottom half of Table 3 looks at the respondents own family rather than the neighborhood. We measure both family assets and family connections. One caveat to the asset measures is that circumstances change both across time and across rural / urban areas. The different ages of the owners means that they were 12 during different years. Those in rural areas may not have had radios or televisions not from a lack of wealth, but because the radio or television signal coverage did not reach them. With these caveats in mind, we find only two significant differences in asset measures. SME owners are much more likely to report that their family owned a car, while wage workers are more likely to report that they lived in a house with a dirt rather than cement floor. The pattern these responses suggest is consistent with the percentage of each group saying that their own family “sometimes did not have enough to eat or got by with difficulty.” Among SME owners, only 28 percent of respondents say this was the case, compared with 39 percent of own account workers and 49 percent of wage workers. We also asked respondents about their relative height at age 12. Showing them a ladder with rungs labeled 1 through 10, we asked them to place themselves on the ladder if the tallest member of their cohort was at the top and the shortest at the bottom. Both own account and wage workers place themselves near the middle, an average of 5.4 on the scale. SME owners say they were significantly taller, 6.1 on the scale. The gap represents about 0.4 of a standard deviation.

### *Labor history and attitudes*

We asked each individual to divide their work history into years as a wage worker, a self employed worker, an overseas worker, and an unpaid family worker or apprentice. Perhaps the most surprising finding is that more than half of the own account workers have spent their entire working life as a self employed worker. Only a third have ever been a wage worker, and only 5% have worked overseas. SME owners are significantly more likely to report having been a wage worker at some point during their life (45 percent).

We measure two attitudes suggested by two different strains of the entrepreneurship literature: attitudes toward risk and psychological measures. We measure risk in two ways. First, we conducted a lottery exercise with payoffs representing between a few hours and a few days wages. For the own account workers, we asked for behavior on three separate lotteries. We then rolled a ten-sided die and played one of the lotteries for real money. The payoffs were 40 rupees for the certain outcome and 100 rupees for the risky outcome. These represent about 3 hours and one day's reported mean earnings for the own account workers. Before actually playing we asked respondents which outcome they would choose as the probability of winning varied from 10 to 100 percent. We use these responses to calculate a coefficient of relative risk aversion.

For both the SME owners and wage workers, we first conducted the lottery exercise with the same payoffs. We then repeated the exercise with both the certain and risky payoffs increased by a factor of five. Since SME owners have much higher incomes than either own account or wage workers, the higher payoffs we used to come closer to matching the payoffs as a proportion of income. In practice, only a few respondents changed their behavior with the higher payoffs. The CRRAs shown on Table 5 therefore use the 40/100 payoffs for all three groups. A higher CRRA indicates more aversion to risk. The lottery exercise produces results which run counter to expectations. SME owners are the more risk averse than either own account or wage workers.

We obtain results more in line with expectations by asking more general questions about the willingness to take risks. Respondents were asked how willing they were, on a scale of one to ten, to take risks in life, and how willing they were to take financial risks. SME owners are the most willing to take risks (6.9 for life risks and 5.6 for financial

risks), and wage workers least willing to take risks (6.2 for life risks and 5.3 for financial risks). These ranking are more in keeping with expectation. By these measures, own account workers are intermediate between wage workers and SME owners.

Each of the surveys contains questions developed by industrial psychologists to measure aspects of the entrepreneurial personality. These are shown on Table 6. The appendix shows the actual questions, grouped in the manner they are used in the literature and in this paper. Responses to all questions are coded on a scale of one to five, with one indicating “strongly disagree” and five “strongly agree.” In some cases, the question is reversed with respect to the characteristic being measured, so that strongly disagree indicates having the trait and strongly agree indicates not having the trait. These are adjusted in calculating the variables.

The first three rows measure work centrality (Mishra et al, 1990), tenacity (Baum and Locke, 2004) and achievement (McClelland 1985). Work centrality is measured by a single question related to the importance of work in life. Tenacity measures the extent to which individuals persist in difficult circumstances. Achievement is measured as the sum of five questions related to the satisfaction obtained from doing well and a feeling of competition with others.

All three of these are measures of personal motivation in work and life. The responses show a consistent pattern: Both SME owners and wage workers are more motivated than own account workers. In all three cases, the rank ordering of responses shows that SME owners are the most tenacious and work-motivated, and own account workers are least tenacious and motivated, with wage workers placed in between. These data point to motivation and determination as important determinants of firm size.

The next two measures are power motivation (McClelland 1985) and internal locus of control (Rotter, 1966). Power motivation is measured with three questions related to planning and deciding what other people should do and control over events. Internal locus of control is a measure of the willingness to take risks and put oneself in unfamiliar circumstances. With respect to power motivation, own account workers are similar to SME owners, and both have a stronger desire to be in control than wage workers do. The pattern with respect to staying in situations which are familiar is interesting. Here we find that SME owners are more willing to put themselves in

unfamiliar situations than are either own account or wage workers, who do not differ in this attitude.

The third set of variables measures polychronicity, impulsiveness and organization. Polychronicity is the willingness to juggle tasks rather than focusing on a single task at a time (Bluedorn et al. 1999). Impulsiveness is measured by three questions on the Barratt Impulsiveness Scale relating to the speed of decision making and savings behavior. Organization is measured by a single question asking whether the respondent's family and friends would call him/her organized. Own account workers are more impulsive and less organized than either SME owners or wage workers. They are, however, more comfortable juggling tasks than wage workers.

The final attitude measure relates to optimism, which has been found to have a mixed association with the success of firms. (See, for example, Landier and Thesmar, 2006.) We measure optimism with six questions related to expectations of good or bad events occurring in life. We find that SME owners are the most optimistic, followed closely by own account workers. Wage workers are the least optimistic.

The entrepreneurial attitudes questions show interesting patterns and differences with respect to the position of own account workers. The willingness to juggle tasks and the desire to be in control separate own account workers from wage workers. Motivation and tenacity separate SME owners from own account workers. The former are clearly important to running a business. But the latter may determine whether the business is large or small.

### *Logit regressions*

Table 7 report results from logistic regressions distinguishing own account workers from SME owners on the one hand and wage workers on the other. The logits allow us to separate males and females and to confirm the importance of variables when conditioning on other variables. There are very few female SME owners in the sample, so we present only the own account / wage worker regressions for females. We split the results into two sections for purposes of exposition, with Table 7A focusing on ability and family / childhood background variables, and Table 7B focusing on entrepreneurial attitudes. Both sets of variables come from the same regressions.

The first column on Table 7 shows factors affecting the likelihood of being an SME owner rather than an own account worker in the sample of males which excludes wage workers. SME owners are older and have significantly higher schooling and ability, the latter measured by scores on the Raven, digitspan and cognitive reflection tests. Their fathers were more likely to be self employed. SME owners also say they were taller relative to their peers at age 12, had fewer neighbors who were poor, and that a higher percentage of their peers sat for the O-level exams. Somewhat surprisingly, they say their families were less likely to know a doctor, lawyer, or banker when they were age 12. Notably, we find no difference in willingness to take risks, measured as the first principal component of the overall life risk, financial risk, and CRRA calculated from the lottery exercise. In sum, SME owners are older and more able, and by most measures come from a somewhat more privileged background than own account workers.

Compared with own account workers, male wage workers (Column 2) are insignificantly younger and have somewhat higher ability than own account workers, measured both by years of schooling and by the three ability tests. Their fathers were much less likely to have been self employed. They also come from neighborhoods in which a larger share of their peers took the O-level exams. Again, we find no difference with respect to willingness to take risks. Thus, for males, own account workers have the lowest ability measures, and come from neighborhoods with lower schooling levels. However, own account workers report that their families owned more assets and were better connected, in the sense of knowing teachers, bankers and other officials when they were 12 years of age.

For female wage workers, the selection on ability appears to be stronger than for male wage workers. Again, own account workers have lower ability than wage workers, but we find that both the schooling and tested ability measures are significant at least at the .05 level. The magnitude of the coefficients is as large as in the male SME equation. (Compare Column 3 with Column 1.) Female wage workers are significantly younger than female own account workers. This stronger selection into wage work among females could be the result of the types of wage jobs available to those in the sample. For males, these jobs are most often physically very taxing. For females, they are more likely to be

garment or other light manufacturing. In any case, it appears that the positive selection into wage work is much stronger for females than for males.

Table 7B shows the variables measuring attitudes. Again, recall that the coefficients in 7A and 7B come from a single regression. Compared to SME owners, own account workers are less competitive and have a greater desire to remain in control. They are also less organized and somewhat more optimistic. Many of the same factors separate own account workers from wage workers, and in the same direction. Wage workers have less desire to be in control, are less optimistic and better organized than own account workers. Compared with own account workers, wage workers say that work is more important in their life. Among females, the only strong differentiation is the desire of own account workers to maintain control of their environment. Wage workers are very slightly more motivated by achievement than are own account workers.

In sum, the logistic regressions allow us to control for age and gender and examine differences in background and attitudes among workers in the three groups. For males, the data indicate that the own account workers are optimistic, unorganized, power-motivated, low ability underachievers. For females, self employment appears to involve much more negative selection on ability. Female wage workers are younger and have less desire to control their environment.

### *Species Classification*

Tables 1 through 7 differentiate the characteristics of own account workers from those of SME owners and wage workers one characteristic at a time. While there are some clear patterns, looking at the data in a disaggregated manner makes it difficult to clearly classify own account workers as being more like SME owners or wage workers on the whole. In other words, we are still short of being able to say whether Tokman or de Soto's portrait of own account workers is more accurate. We next turn to techniques of species classification borrowed from biology to classify the own account workers.

Discriminant analysis is a tool commonly used by biologists to separate animals or plants into species on the basis of easily measured characteristics. The basic idea is to find the particular combination of the set of measured variables which best separates individuals into their distinct species. There are two main uses for this in practice. The

first is similar to our logit regressions above, studying the set of variables to characterize the nature of differences between species. The second use is to then use the fitted combination of measured variables to predict the species of new animals or plants for which only this vector of measured variables has been observed. This is particularly useful in cases where the species of an animal can only be truly verified after exhaustive and expensive testing, possibly resulting in killing the animal. Observing certain characteristics of the animal instead allows it to be accurately classified without taking such expensive and extreme measures.

We apply these techniques to classifying another elusive animal, the own-account worker. Logistic discriminant analysis is first used to obtain the combination of observed characteristics which best separates the wage workers from the SME owners. This fitted model is then used to predict the “species” of each own account worker, enabling us to characterize them into wage workers and SME owners. Estimation was carried out in STATA 10.0.

Table 8 shows the results of classifications using different subsets of variables. We use four overlapping groups of variables in the classification analysis. Gender, age and education are included in each of the groups. In addition to these variables, the first group of variables includes the three ability tests: Raven, digitspan and CRT. The second group includes family background variables, including whether the respondent’s mother and father owned a business, the percentage of neighbors who were poor, the percentage of the neighborhood cohort sitting for the O- and A-level exams, and others listed on Table 8. The third group focuses instead on entrepreneurial attitudes: risk, achievement, work centrality, and others. The final group includes combines all of the variables from the first three groups.

We show first the percentage of the SME and wage workers properly classified by each set of variables. Classifying using only age, gender, education and the three ability variables results in a correct classification of 74 percent of the SME owners and 69 percent of the wage workers. Family background alone allows us to classify 74 percent of both wage workers and SME owners correctly. Attitudes by themselves classify a slightly lower percentage of the respondents correctly: 73 percent of SME owners and 70 percent of wage workers. Using both sets of variables combined results in 79 percent of SME

owners and 78 percent of wage workers being classified correctly. Since a coin flip would classify 50 percent correctly, we might think of this as close to a 60 percent improvement over random classification.

Do the characteristics of the own account workers lead them to be classified as SME owners or wage workers? In all cases, the majority of own account workers are classified as wage workers. The largest percentage—almost 77 percent—are classified as wage workers when we use the ability measures alone. The largest percentage are classified as SME owners—37 percent—when we use only family background. Using all of the variables, we classify 70 percent of the own account workers as wage workers and 30 percent as SME owners.<sup>10</sup>

The species classification analysis suggests that ability and attitudes differentiate own account workers from SME owners more than family backgrounds do. While the majority of the own account workers have characteristics more like wage workers than SME owners, a significant minority are more like SME owners than wage workers. Given the large number of own account workers in low-income countries, this suggests the possibility of job creation from the sector should not be ignored.

### **Who Grows the Enterprise?**

One criticism of the analysis to this point is that the comparisons between wage worker, own account workers and SME owners are based on separate cross sectional samples. We note that this is the standard in the literature. But for variables measuring attitudes, we should be concerned that outcomes may have influenced attitudes. That is, successful entrepreneurs may be more likely to report that work is central to their life, even if they were no more likely to say that before they entered business. Ideally, we would like to measure attitudes prior to the decision to enter self employment and the realization of the success of the business.

We can use the panel aspect of the survey of own account workers to examine growth of enterprises across time. The panel covers a period of two and a half years, from the April 2005 survey through the October 2007 survey. One of the screening criteria for

---

<sup>10</sup> If we limit the sample only to males, we classify 63 percent of the own account males as wage workers and 37 percent as SME owners using the full set of characteristics.

the panel was that the enterprise had no paid workers. Therefore, in the baseline survey, no firms hire paid workers. By the October 2007 survey, just under nine percent of the firms had hired one or more paid employees. Is this transition from non-employer to employer associated with the same factors which differentiate own account workers from SME owners in tables 1 through 8? If the same variables are association with growth in the panel, then the case for a causal relationship is somewhat stronger.<sup>11</sup>

Table 9 shows the results of logistic regressions on the determinants of employment growth in the microenterprise panel. The dependent variable takes a value of one for the 8.8 percent of the sample adding at least one paid labor between April 2005 and October 2007, and zero otherwise. Given the relatively small number of enterprises that add employees, we limit the number of variables included on the right hand side in any specification. We find neither parental background nor childhood conditions to be significant in any specification. The specification in the first column measures ability as the first principal component of years of schooling and the scores on the Raven, digitspan and cognitive reflection tests. The four entrepreneurial attitudes variables are measured as in Table 6.

The results in column 1 are consistent with those in Table 7 with respect to ability and motivation. Higher ability owners are more likely to have added employees, as are owners who are motivated by personal achievement. Moreover, owners with lower power motivation—that is, those more willing to give up some control over their situations—are more likely to grow. In the second regression, we add the owner's age at the time of the baseline survey, and a variable indicating the owner is female. We find that older owners are less likely to grow. On the surface this appears to conflict with the results from Table 7. However, Table 7 measures a stock, or cumulative hazard, while Table 9 measures a flow or hazard, so the results with respect to age are actually not inconsistent. But, the ability measure loses significance once we control for age. Years of schooling and age are negatively correlating, reflecting the trend of increasing education across time. The achievement and power motivation variables remain significant with little change in

---

<sup>11</sup> Some of the questions were asked in later rounds, so one could still argue that they post-date the growth experience. For example, entrepreneurial attitudes were included in the survey administered in October 2006. Not enough firms grow after this point for analysis of growth following the responses to be possible.

magnitude. Note also that enterprises owned by females are much less likely to add paid employees.

Employment growth is much more common among enterprises operating in the manufacturing and services sectors, and very uncommon among retail shops. The first two regressions include a dummy variable indicating the enterprise is a retail shop. The third column drops the retail shops from the sample. The results are very similar when the sample is limited to manufacturers.

Our species analysis classified about two-thirds of the own account workers as wage workers and one-third as SME owners. Did a larger percentage of those classified as SME owners add employees? The answer is yes: 13.8 percent of those classified as SME owners added at least one paid employee, compared with 7.8 percent of those classified as wage workers, a difference significant at the .06 level. Not only do we find a difference in rates of growth, but the nearly 14 percent of SME-type enterprises that add employees in less than three years time is much larger than comparable growth rates in the United States suggested by Davis et al (2007).

### **Concluding Remarks**

Are own account workers more like wage workers, or more like owners of larger enterprises? The simplest answer to this question comes from our discriminant analysis. We find that roughly two-thirds of the own account workers should be classified as wage workers rather than entrepreneurs. The more detailed analysis uncovers several interesting patterns. Most significantly, we find that ability, motivation and a competitive attitude are very important in differentiation SME and microenterprise owners. Controlling for these factors, family background and measures of childhood wealth and well being are much less important.

The classification analysis suggests that capital is not the only, and perhaps not even the primary constraint to growth for the majority of the own account workers. The data thus shed light on the recent concern with the lack of dynamism among recipients of microfinance. Microlenders are concerned that few enterprise owners grow large enough to graduate to more formal lending programs. Our data suggest one explanation for this: the majority of the microenterprise owners are more like wage workers than larger

enterprise owners in both cognitive ability, personality, and ambition. Indeed, on average they place less emphasis on work than even wage workers. For a substantial part of the microenterprises, the lack of growth is likely to derive from a lack of ability or desire to grow, rather than a lack of finance.

While we find that only a minority of the own account workers have characteristics making them like SME owners, the percentage of own account workers who transition from non-employer to employer status in less than three years is far from trivial. These results have important implications for policies directed at the vast army of own account workers in Sri Lanka, and perhaps in other low-income countries as well. They suggest the need for a set of differentiated policies. For the majority of own account workers unlikely to grow, policies should focus on increasing income. But to the extent that we can identify those with greater prospects for growth, policies toward them should aim to aid the transition to employer status. We view the analysis of these data as only a first step in the design of differentiated set of policies for the sector. We need a much more nuanced and detailed understanding of those in the sector before appropriate policies can be devised.

## References

Banerjee, Abhijit and Esther Duflo 2004, "Do Firms want to Borrow More? Testing Credit Constraints Using a Directed Lending Program," working paper MIT.

Baum, J. Robert and Edwin A. Locke (2004) "The Relationship of Entrepreneurial Traits, Skill, and Motivation to Subsequent Venture Growth", *Journal of Applied Psychology* 89(4): 587-98.

Bennett, John and Saul Estrin (2007) "Entrepreneurial Entry in Developing Economies: Modeling Interactions Between the Formal and Informal Sector," working paper, London School of Economics.

Blanchflower, David and Andrew Oswald (1998), "What Makes an Entrepreneur?", *Journal of Labor Economics* 16(1): pp. 26-60.

Bluedorn, Allen C., Thomas J. Kalliath, Michael J. Strube, and Gregg D. Martin (1999) "Polychronicity and the Inventory of Polychronic Values (IPV)", *Journal of Management Psychology* 14(3/4): 205-231.

Bosch, Mariano and William Maloney, 2007, "Comparative Analysis of Labor Market Dynamics using Markov Processes: An Application to Informality," World Bank Policy Research Working Paper No. 4429.

Bosch, Mariano, Edwin Goni, and William Maloney, 2007 "The Determinants of Rising Informality in Brazil: Evidence from Gross Worker Flows," World Bank Policy Research Working Paper No. 4375.

Bruhn, Miriam, 2007, "License to Sell: The Effect of Business Registration Reform on Entrepreneurial Activity in Mexico," working paper, World Bank

Cabral, Luís and José Mata, 2003, "On the Evolution of the Firm Size Distribution: Facts and Theory," *American Economic Review*, Vol. 93(4), pp. 1075-1090.

Davis, Steven J., John Haltiwanger, Ron S. Jarmin, C.J. Krizan, Javier Miranda, Alfred Nucci, and Kristin Sandusky, 2007 "Measuring the Dynamics of Young and Small Businesses: Integrating the Employer and Nonemployer Universes," NBER Working Paper No. w13226.

de Mel, Suresh, David McKenzie and Christopher Woodruff (2007a) "Returns to Capital in Microenterprises: Evidence from a Field Experiment", *World Bank Policy Research Working Paper No. 4230*.

de Mel, Suresh, David McKenzie and Christopher Woodruff (2007b) "Who does Microfinance Fail to Reach? Experimental Evidence on Gender and Microenterprise Returns", *BREAD Working Paper No. 157*.

Djankov Simeon, Edward Miguel, Yingyi Qian, Gerard Roland, and Ekaterina Zhuravskaya, 2005 "Who are Russia's Entrepreneurs?" *Journal of the European Economic Association*, Vol 3(2-3), pp. 1-11.

Djankov, Simeon, Yingyi Qian, Gerard Roland, and Ekaterina Zhuravskaya, "Entrepreneurship in Brazil, China, and Russia," CEFIR Working Paper No. w0066.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Schleifer 2002, "The Regulation of Entry," *Quarterly Journal of Economics*, Vol. 117(1), pp. 1-37.

Dunn, Thomas and Douglas Holtz-Eakin, 2000, "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links," *Journal of Labor Economics*, Vol. 18 (2), pp. 282-305.

Evans, David S. and Boyan Jovanovic (1989) "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints", *The Journal of Political Economy* 97(4): 808-827.

Fields, Gary, 1975, "Rural-Urban Migration, Urban Unemployment and Underemployment, and Job Search Activities in LDC's," *Journal of Development Economics*, Vol. 2, pp. 165-88.

Fields, Gary, 2004, "A Guide to Multisector Labor Market Models," Working paper, Cornell University,

Frederick, Shane, 2005, "Cognitive Reflection and Decision Making," *Journal of Economic Perspectives*, Vol 19(4), pp. 22-45.

Hurst, Erik, and Annamaria Lusardi (2004): "Liquidity Constraints, Household Wealth, and Entrepreneurship," *Journal of Political Economy*, 112(2): 319-347.

Jovanovic, Boyan, 1982, "Selection and the Evolution of Industry," *Econometrica*, Vol. 50, pp. 649-70.

Landier, Augustin; Thesmar, David, 2006, "Financial Contracting with Optimistic Entrepreneurs: Theory and Evidence," working paper, Stern School of Business, NYU.

Lazear, Edward P., 2005, "Entrepreneurship," *Journal of Labor Economics*, Vol 23 (4), pp. 649-80.

Lucas, Robert E. Jr, 1978, "On the Size Distribution of Firms," *Bell Journal of Economics*, Vol. 9, pp. 508-523.

Lusardi, Anna-Maria and Olivia Mitchell (2006) "Financial Literacy and Planning: Implications for Retirement", *PRC Working Paper Series No. 2006-1*

Maloney, William, 1999, "Does informality imply Segmentation in Urban Labor Markets? Evidence from Sectoral Transitions in Mexico," *World Bank Economic Review*, Vol. 13, No.2, pp. 275-302.

McClelland, D.C. (1985) *Human Motivation*. Glenview, IL: Scott, Foreman.

Mishra, S., R. Ghosh, and R. Kanungo (1990) "Measurement of Family Involvement: A cross-national study of managers", *Journal of Cross-cultural Psychology* 21(2): 232-48.

Rubalcava and Turuel, 2004, "The Role of Maternal Cognitive Ability on Child Health," InterAmerican Development Bank, working paper R-497.

Tokman, Victor, 2007, "Modernizing the Informal Sector," UN/DESA Working Paper No. 42.

Wagner, Joachim, "Are Nascent Entrepreneurs Jacks-of-All-Trades? A Test of Lazear's Theory of Entrepreneurship with German Data" (October 2003). IZA Discussion Paper No. 911

Woodruff, Christopher, 2007, "Self Employment: Engine of Growth or Self-Help Safety Net?" in Paci and Serneels, Eds., *Employment and Shared Growth*. Washington, DC: The World Bank

Table 1

<b>Measures of ability</b>	SME	Sig	Own	Sig	Wage
	Owners	SME/SLMS	Account	SLMS/WW	Workers
Years of schooling	11.5	***	9.3	***	10.4
Score on digitspan recall test	7.2	***	5.9	***	6.5
Score on Raven test	3.1	***	2.7		2.8
Cognitive reflection test	0.39	***	0.21		0.25
First PC of Raven, digit, CRT	0.49	***	-0.36	***	-0.04
Financial literacy (3 questions)	1.40	**	1.26		1.23

Notes: See text for variable description.

Significance of difference in means indicated by asterisks: \*\*\* - significant at the .01 level; \*\* - significant at the .05 level ; \* - significant at the .10 level.

Table 2

<b>Parents</b>	SME	Sig	Own	Sig	Wage
	Owners	SME/SLMS	Account	SLMS/WW	Workers
Father's years schooling	8.4	***	7.4		7.7
Mother's years schooling	8.1	***	7.1		7.3
Father owned business	53%	***	37%	***	17%
Mother owned business	6%	***	11%	***	3%
% father SE at age 12	57%	***	48%	***	32%
% fathers day workers at 12	13%	*	17%	***	33%

See the notes to Table 1

Table 3A

<b>Neighborhood at Age 12:</b>	SME	Sig	Own	Sig	Wage
	Owners	SME/SLMS	Account	SLMS/WW	Workers
% of neighbors who "got by with dil"	20%	***	27%		27%
% of cohort took O-Levels	81%	***	60%	***	77%
% taking A-levels	42%	***	25%	***	35%

Table 3B

<b>Individual / family at age 12</b>	SME	Sig	Own	Sig	Wage
	Owners	SME/SLMS	Account	SLMS/WW	Workers
Family owned radio	69%	*	63%	*	57%
Family owned bicycle	59%		55%		48%
Family owned vehicle	22%	***	3%		3%
House had dirt floor	14%		12%	***	37%
Your family "got by with difficulty"	28%	***	39%	***	49%
Relative height at age 12	6.06	***	5.42		5.44
Family knew doctor	39%	***	27%	**	22%
Family knew lawyer	27%	***	12%	*	6%
Family knew banker	22%	***	12%	***	8%

See the notes to Table 1

Table 4

<b>Labor History</b>	SME Owners	Sig SME/SLMS	Own Account	Sig SLMS/WW	Wage Workers
Previously wage worker	45%	***	33%	***	77%
Previously overseas	7%		5%	*	2%

See the notes to Table 1

Table 5

<b>Attitudes toward risk</b>	SME Owners	Sig SME/SLMS	Own Account	Sig SLMS/WW	Wage Workers
CRRA from lottery	0.47	***	0.16		0.10
Overall life risk	6.87	***	6.47	**	6.18
Financial risk	5.6		5.64	**	5.28

See the notes to Table 1

Table 6

<b>Psychology</b>	SME Owners	Sig SME/SLMS	Own Account	Sig SLMS/WW	Wage Workers
Work centrality	3.5	***	3.2		3.3
Tenacity (2 qs)	8.3	***	7.8	**	8
Achievement (5 questions)	20.1	***	18.6	***	19.1
Power motivation (3 qs)	9.2		9.2	***	8.5
Locus of control (3 questions)	9.2	***	9.6		9.6
Impulsiveness (3 questions)	7.2	***	7.6	**	7.3
Polychronicity (3 questions)	7.5		7.6	***	7.1
Organized	4.2	***	3.8	***	3.9
Optimism	20.7	*	20.4	***	19.8

See the notes to Table 1

Table 7A  
Logistic Regressions for Choosing SME or Wage Work Instead of Own Account Work

	(1)	(2)	(3)
	MALES SME/ SLMS	WW/SLMS	FEMALES WW/SLMS
Age	0.048*** (.012)	-0.013 (.010)	-0.043*** (.013)
Years of Schooling	0.194*** (.054)	0.092* (.051)	0.174** (.076)
Ability (PC of 3)	0.472*** (.120)	0.234** (.115)	0.495*** (.158)
Father owned a business	0.530** (.242)	-1.44*** (.258)	-0.664** (.318)
Risk aversion (Lottery)	-0.095 (0.101)	-0.081 (0.099)	-0.094 (0.118)
Height @ 12	0.188*** (.073)	0.078 (.066)	-0.142* (.082)
% neighbors poor@ 12	-0.009* (.005)	-0.002 (.004)	-0.007 (.005)
% O-Levels	0.019*** (.004)	0.015*** (.004)	0.027*** (.006)
Family had contacts @ 12	-0.187** (.075)	-0.194** (.084)	-0.122 (.097)
Assets owned @ 12 (PC of 6)	0.013 (.124)	-0.368*** (.132)	-0.096 (.158)

Regression results continued on Table 7B ...

Table 7B  
Logistic Regressions for Choosing SME or Wage Work Instead of Own Account Work

	(1)	(2)	(3)
	MALES		FEMALES
	SME/ SLMS	WW/SLMS	WW/SLMS
Work Centrality	0.192 (.133)	0.228* (.122)	0.153 (.165)
Tenacity	0.166 (.128)	0.089 (.108)	-0.042 (.128)
Achievement	0.276*** (.064)	0.060 (.054)	0.114 (.073)
Power motivation	-0.134* (0.069)	-0.158*** (0.061)	-0.324*** (0.083)
Locus of control (3 questions)	-0.126* (.068)	-0.065 (.062)	0.026 (.084)
Impulsiveness (3 questions)	-0.01 (.075)	0.016 (.073)	-0.177* (.092)
Polychronicity	0.069 (.059)	-0.098* (.057)	-0.006 (.071)
Organized	0.472** (.202)	0.521*** (.182)	-0.043 (.198)
Optimism	-0.089* (.046)	-0.117*** (.043)	-0.039 (.050)
Firm-Period Observations	549	469	357
Pseudo R-Square	0.35	0.22	0.31

Table 8  
Species Classification Analysis

Variable set used in classification:	SME / Wage Worker Sample		SLMS Sample	
	% SME owners correctly classified	% WW correctly classified	% Classified as SME owner	% classified as wage worker
Ability measures only (1)	74.0%	69.3%	23.4%	76.6%
Family background only (2)	73.6%	75.4%	37.5%	62.5%
Entrepreneurial attitudes only (3)	73.3%	70.4%	29.2%	70.8%
All variables combined	78.9%	78.1%	29.6%	70.4%

Notes: All variable groups include age, gender and years of schooling

(1): Ability measures are scores on Raven, digitspan and cognitive reflection tests

(2) Variables measure whether father and mother had a business, the percentage of respondent's cohort sitting for the o-level exams, and at age 12: relative height, % of neighbors poor, respondent's family poor, dirt floor, index of household assets and family connections

(3) Variables include Work centrality, tenacity, achievement, power motivation, locus of control, impulsiveness, polychronicity, optimism, organized person, and trust.

Table 9  
Logistic Regressions for Addition of Paid Employees

	(1)	(2)	(3)
	SLMS Employment Growth		
Ability	.245*	0.146	0.114
	(.142)	(.146)	(.148)
Age		-0.041**	-0.040**
		(.016)	(.017)
Achievement	0.229***	0.220***	0.222***
	(.075)	(.076)	(.077)
Power motivation	-0.199**	-0.163*	-0.149*
	(0.085)	(0.088)	(0.089)
Organized	-0.200	-0.213	-0.244
	(.231)	(.232)	(.235)
Optimism	-0.002	-0.015	-0.014
	(.050)	(.051)	(.051)
Female		-0.802***	-0.851***
		(.332)	(.341)
Firm-Period Observations	517	517	395
Pseudo R-Square	0.05	0.13	0.08

Note: Standard errors in parentheses. The regressions in columns 2 and 3 also include a variable indicating the enterprise is a retail shop.

## Appendix: Entrepreneurial psychology survey questions

Responses to all questions are on a scale of 1 to 5, with 5 indicating “Agree Strongly” and 1 indicating “Disagree Strongly”

### Impulsiveness:

I plan tasks carefully. ( Scale reversed)

I make up my mind quickly.

I save regularly (Scale reversed)

### Passion for work

I look forward to returning to my work when I am away from work

### Tenacity

I can think of many times when I persisted with work when others quit.

I continue to work on hard projects even when others oppose me

### Polychronicity:

I like to juggle several activities at the same time

I would rather complete an entire project every day than complete parts of several projects (Scale reversed)

I believe it is best to complete one task before beginning another (Scale reversed)

### Locus of control:

It is difficult to know who my real friends are.

I never try anything that I am not sure of.

A person can get rich by taking risks (Scale reversed)

### Achievement:

It is important for me to do whatever I'm doing as well as I can even if it isn't popular with people around me.

Part of my enjoyment in doing things is improving my past performance.

When a group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it.

I try harder when I'm in competition with other people.

It is important to me to perform better than others on a task.

### Achievement (work):

It is important for me to do whatever I'm doing as well as I can even if it isn't popular with people around me.

Part of my enjoyment in doing things is improving my past performance.

### Achievement (competitive):

I try harder when I'm in competition with other people.

It is important to me to perform better than others on a task.

Power motivation:

- I enjoy planning things and deciding what other people should do.
- I find satisfaction in having influence over others.
- I like to have a lot of control over the events around me.

Work centrality:

- The most important thing that happens in life involves work.

Organized person:

- My family and friends would say I am a very organized person

Optimism:

- In uncertain times I usually expect the best
- If something can go wrong for me, it will (Scale reversed)
- I'm always optimistic about my future
- I hardly ever expect things to go my way (Scale reversed)
- I rarely count on good things happening to me (Scale reversed)
- Overall I expect more good things to happen to me than bad