The entrepreneurship myth in small-scale service provision: Water resale in Maputo, Mozambique

Valentina Zuin, Leonard Ortolano and Jennifer Davis

ABSTRACT

About 20% of the urban population in sub-Saharan Africa relies on resellers of utility water for their water supply, yet the practice has received little attention either in the academic literature or in sector policy. This study uses primary data collected from more than 200 resellers in Maputo, Mozambique, through in-person surveys, participant observation and focus group discussions. Despite the widely held assumption that all small-scale water providers are profit-maximizing entrepreneurs, this study suggests that this model does not characterize resale behavior in Maputo. Instead, three non-mutually exclusive motivations provide more persuasive explanations for why households resell utility water: (1) earning cash to meet daily subsistence needs; (2) obtaining a form of informal social insurance to deal with future needs; and (3) solidifying embeddedness in social relationships by satisfying the social norms of their communities. These findings suggest that programs and policies typically designed for small-scale providers may be inappropriate for water resellers.

Key words | Mozambique, small-scale providers, sub-Saharan Africa, urban water supply, water access, water resale

INTRODUCTION

For decades, governments, donors and policy makers in the urban water sector have focused on installing household connections and public standpipes to deliver water to underserved populations. Small-scale water service providers (SSPs) were typically ignored. Over the past decade, however, practitioners and researchers alike have recognized the importance of SSPs in filling service gaps where a water utility is not present (Njiru 2004; Allen et al. 2006; McGranahan et al. 2006; Keener et al. 2010; Hailu et al. 2011). SSPs include providers with widely different characteristics: cart and tanker truck vendors, kiosk operators, households with private connections who re-sell to neighbors, and small-scale network operators who develop their own water sources and distribution networks (Snell 1998; Solo 1999; Collignon & Vézina 2000; Kariuchi & Schwartz 2005; Baker 2009). Prior research and most current sector policy related to SSPs focuses primarily on small-scale network operators (SNOs). Compared with other SSPs, SNOs make considerable private investment in water infrastructure; they also offer services similar to those provided by a water utility (i.e. in-home connections and standpipes). As such, SNOs provide a relatively permanent water service and are more likely to be viewed as part of a long-term strategy to meet urban water needs (Conan n.d.; Solo 1999; Kariuchi & Schwartz 2005; Valfrey-visser et al. 2006; Baker 2009; Thompson 2010; Blanc & Botton 2012). With the exception of Güida (2009), most literature on SNOs assumes they are profit-maximizing entrepreneurs, seeking to grow their businesses through investment, innovation and customer service (Snell 1998; Solo 1999; Collignon & Vézina 2000; Njiru 2004; Güida

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SSPs, particularly water resellers. These ‘providers’ are households that have individual water connections to a utility piped network and who supply water to their neighbors. Household-level resale has been neglected in research both on water supply service provision and on water use by households. One explanation for the paucity of literature on resale, and for policy makers’ lack of engagement with this practice, is the uncertain legal status of water resale in many settings: in some places it is illegal, but more often its legal status is ambiguous. Whereas no known survey of the legality of water resale exists, the formal legalization of water resale has been documented for two cities: Jakarta, Indonesia, and Abidjan, Côte d’Ivoire (Crane 1994; Mitter 1999; Water and Sanitation Program 2002). Notwithstanding the lack of attention from practitioners and researchers, water resellers play an important role in service provision in many cities, especially in sub-Saharan Africa (SSA). Approximately 18% of households in SSA rely on water provided by their neighbors (WHO and UNICEF 2010). Low-income households rely disproportionately on neighbor resale for their water supply (Keener et al. 2010). A small number of recent studies conclude that households who patronize resellers receive water supply services that are comparable to or better than those using public standpipes, in terms of standard sector performance indicators such as price per cubic meter and time spent fetching water (Keener et al. 2010; Zuin et al. 2011).

This paper, which is based on empirical research conducted in Maputo, Mozambique, differs from prior research on water-sector SSPs in that it focuses exclusively on water resellers. The investigation evaluates the extent to which resellers in Maputo exhibit entrepreneurial behavior, and thus the extent to which analytical frameworks used to understand SNO behavior are relevant for analyzing water resellers. This study also explores several non-mutually exclusive alternative explanations for households’ engaging in resale that are unrelated to entrepreneurship. These alternative explanations include obtaining cash for daily subsistence; investing in a form of social insurance; and solidifying embeddedness in social relationships by satisfying community norms. The paper concludes by discussing the implications of the study findings for water planning and policy in Maputo and similar settings.

STUDY SITE, SAMPLE FRAME AND METHODS

Maputo is the capital and principal port of Mozambique, located on the coast of the Indian Ocean in southern Africa. The city’s population was 1.1 million inhabitants in 2007 (Instituto Nacional de Estadística (INE) 2009), having increased by more than 13% since 1997. Maputo’s rapid growth, combined with high rates of poverty, has resulted in the majority of residents living in unplanned areas with limited water supply services and basic infrastructure.

In 2007, Mozambique’s Water Regulatory Council (Conselho de Regulação do Abastecimento da Água, or CRA 2007) estimated that about one quarter of the city’s residents rely on their neighbors for water supply. Moreover, despite its ambiguous legal status, water resale has become more widespread over the past 15 years. Public standpipes are poorly maintained, and the city’s water utility has been unable to expand the distribution network to keep pace with population growth. Consequently, a significant fraction of the population, especially in Maputo’s poorest and most densely populated neighborhoods, has no alternative but to rely on neighbors who have utility connections. In 2011, CRA legalized water resale on a pilot basis in three of the six neighborhoods where this study took place. As part of the pilot, selected resellers were allowed to register and to benefit from a special tariff that was 31% lower than the average charge for regular domestic consumers (10 MZN or US$0.36/cubic meter versus 14.6 MZN or US $0.52/cubic meter, for those billed in the lowest block of the domestic tariff). In 2012, CRA took the unprecedented step of sponsoring a television campaign to inform households that selling water that is legally obtained from the utility to one’s neighbors is permissible. In addition, CRA has catalyzed a debate in Mozambique’s water sector.
regarding whether water supplied by resellers should be considered by the government as ‘adequate water service’.

This research uses primary data collected in 2010 and 2012 within six of Maputo’s peri-urban neighborhoods (combined population =106,000). Neighborhoods were purposively chosen in partnership with CRA to represent the range of conditions found in Maputo’s peri-urban areas in terms of water supply services and socioeconomic and demographic characteristics. In both 2010 and 2012, resellers were identified using systematic sampling procedures (every fourth household) and/or based on suggestions from local informants. The ambiguous legal status of water resale in Mozambique necessitated caution in obtaining information from resellers and their clients, especially with respect to sensitive topics such as volumes of water sold and profits. To assuage fears that resellers might have had about being interviewed, the study team took a number of deliberate measures including: allowing resellers to decide the time at which they would be interviewed; having enumerators introduced by well-respected neighborhood guides; and using a long oral consent protocol that specifically mentioned resale and reassured resellers that all data collected would be anonymized.

In 2012 a total of 772 households with private connections to the city’s water utility were interviewed; of these, 167 (22%) self-reported that they were regular water resellers. Ninety-one (54%) of these resellers had been interviewed in 2010; in 2010, however, only 60 reported that they were regularly reselling water. Another 76 (46%) resellers were added to the sample in 2012. Of these, 34 (45%) started reselling between 2010 and 2012, whereas the remaining 42 (55%) had been reselling before 2010. Unless otherwise specified, this paper is based on cross-sectional analyses of the 2012 data. Zuin et al. (2011) provide additional detail about the sample frame, household selection procedures and survey administration.

In addition, during the period between the two household surveys, participant observation was carried out by the lead author at seven reseller households, for seven to ten consecutive days each. These resellers were all located in one study neighborhood and were purposively selected to maximize variation in number of clients, proximity to public standpipes, use of water meters, and extent of participation in the government’s water resale legalization pilot program. Resale-related activities were observed between 4:00 and 4:30 am (when resale typically began) to between 11:00 am and 1:00 pm (when water distribution in the network ended). The household member in charge of resale activity was also interviewed. Finally, four focus group discussions with a total of more than 40 resellers were conducted to better understand the history of water resale in each neighborhood, as well as the motivations of resellers and challenges they faced. Full informed consent procedures were completed in all data-collection exercises, and the research protocol was approved by the Institutional Review Board of Stanford University, USA and the Mozambican INE.

Household survey data were analyzed using descriptive statistics and independent t-tests. A binary logit regression model was used to identify household characteristics associated with a higher probability of self-identifying as a water reseller. Evidence from focus group discussions and participant observation is presented where appropriate to support or clarify household survey findings. In order to explore alternative hypotheses regarding why households might choose to resell piped water, evidence obtained from all data collection activities was examined for extent of consistency with testable implications of each hypothesis. This exercise was exploratory: the goal was simply to present and evaluate both consistent and contradictory evidence, rather than reach a conclusion regarding the relative contribution of each of these explanations to resellers’ motivations.

CHARACTERISTICS AND PRACTICES OF WATER RESELLERS

Among the 772 sampled households, the average number of family members is 6.5. Almost all (97%) own their home, and 78% have lived in their neighborhood for more than 20 years. More than 80% use an improved sanitation facility; 96% own a television, 83% a refrigerator and 18% a car. The median per capita income in sample households is US$1.50 per day.

Overall, the 167 sampled resellers appear quite similar, in terms of socioeconomic and demographic characteristics, to the 605 non-selling households (see Table A1, which can be found in the Supplemental Material available online at http://www.iwaponline.com/washdev/004/065.pdf). In order to identify individual and household characteristics...
associated with a higher likelihood of self-identifying as a water reseller, a binary logit model was estimated (Table 1). All else held constant, a household that reports reselling water is almost twice as likely as a non-resale household to have lived in their neighborhood for at least 20 years ($p = 0.02$). Resellers are somewhat poorer and perceive themselves as having a weaker social safety net compared with non-resellers. For example, households that resell water are 1.4 times less likely to own a gas stove ($p = 0.05$), and 1.7 times less likely to report that they are able to rely on their family in case of financial need ($p = 0.07$).

Resellers also place greater emphasis on relationships with their neighbors. They were 1.6 times more likely to report that having a good relationship with neighbors is ‘very important’ ($p = 0.05$), and 3.1 times more likely to say they feel pity for households without a private water connection ($p < 0.01$). Finally, compared to other households with connections, resellers were 3.3 times less likely to say they believe that reselling is prohibited, or to have a water meter (both $p < 0.01$). Measures of educational attainment or civic engagement were also tested but not found to be significantly associated with reseller status.

**Business practices and perceptions of water resellers**

The 167 resellers interviewed had an average of 4.8 clients (median =3) and sold 28 (median =20) 20-liter jerricans of water per day, which is equivalent to an average of 16.8 cubic meters of water per month. About 43% of resellers charged by the jerrican; one quarter charged a flat monthly fee; and 20% used both charging methods. Prices charged by resellers, regardless of their location, were quite uniform. The average price per jerrican was 1.05 MZN (median = 1 MZN, standard deviation = 0.24), and the average monthly fee was 86 MZN (median = 80 MZN, standard deviation = 28.3). Almost all data on client numbers, sales and pricing were obtained through in-person interviewing of resellers by enumerators; only 8% of resellers had any written records related to their revenues, expenditures or clients’ debts.

Resale is a part-time activity. On average, interviewed resellers provided water for 4.5 hours per day (median = 3), and only 31% offered water to clients throughout the day. Reselling is limited in part by the intermittent water supply available in Maputo’s piped network. In addition, resellers may limit their activity to early-morning hours because of concerns about being detected by utility staff or other authorities. In 2012, 30% of interviewed resellers believed resale was illegal, and 53% feared being caught reselling by water utility staff. Focus group participants explained that the perception of water resale being illegal has its origins during the colonial period before Mozambique gained independence in 1975. During that period, the public water and electricity utility, Serviços Municipais de Table 1 | Binary logit model of household/respondent characteristics associated with being a reseller

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$\beta$</th>
<th>$\text{Exp}(\beta)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owns a gas stove</td>
<td>$-0.39^*$</td>
<td>0.7</td>
</tr>
<tr>
<td>Has lived in the neighborhood for more than 20 years</td>
<td>$0.65^{**}$</td>
<td>1.9</td>
</tr>
<tr>
<td>Feels ‘pity’ for neighbors without private water connection</td>
<td>1.13***</td>
<td>3.1</td>
</tr>
<tr>
<td>Believes that maintaining good relationships with neighbors is ‘very important’</td>
<td>$0.46^{**}$</td>
<td>1.6</td>
</tr>
<tr>
<td>Believes that water resale is prohibited</td>
<td>$-1.37^{***}$</td>
<td>0.3</td>
</tr>
<tr>
<td>Could rely on help (e.g. financial or emotional support) from family if needed (in case of death or illness)</td>
<td>$-0.58^*$</td>
<td>0.6</td>
</tr>
<tr>
<td>Have any meter (verified by the enumerator at the end of the interview)</td>
<td>$-1.08^{***}$</td>
<td>0.3</td>
</tr>
<tr>
<td>Report that they have regularly helped their neighbors ‘some’ or ‘a lot’</td>
<td>$0.70^{**}$</td>
<td>2.0</td>
</tr>
<tr>
<td>Constant</td>
<td>$-1.44^{**}$</td>
<td>0.2</td>
</tr>
</tbody>
</table>

$N = 686$. Cox & Snell $R^2 = 0.16$

Notes: Standard error in parentheses. All independent variables are dummies.

$^*0.05 < p < 0.1$.

$^{**}0.01 < p < 0.05$.

$^{***}p < 0.01$.
Água e Energia (SMAE), selectively enforced prohibition against resale by allowing only licensed (and mostly white) households to resell. When the new water utility, Águas de Moçambique (AdeM), was created in the mid-1990s, no specific policies or guidelines were established with respect to water resale. This perception of illegality of resale appears to be reinforced by interactions that resellers have had with utility staff, some of whom have threatened resellers with disconnection of their water taps and/or fines. At least one reseller reported regularly being asked to pay ‘fines’ to water utility staff in order to be permitted to continue reselling. Others reported utility staff threatening to disconnect them or to send them to prison. In other cases, utility staff reportedly just asked to be ‘offered a soft drink’. These requests and threats were cited as the principal reason why resellers generally operate in the early morning hours, ‘when the utility staff sleeps’. One reseller recounted telling her clients ‘that they can get water only when they come very early, because I don’t want to have problems with AdeM’.

Incentives to resell, as well as the profitability of water resale, are both highly influenced by the amount that resellers are charged for the water they obtain from the utility. At the time of the 2012 survey, the first 5 cubic meters of water consumption were sold for a flat fee of US$2.67 (US $0.53/m³). The price/m³ for water usage between 5 and 10 cubic meters was US$0.70, and US$0.93 for usage above 10 cubic meters. Overall, 90% of resellers reported being charged for the water they consume. However, a substantial share of interviewed resellers appeared not to pay bills based on actual water used, either because they did not have a functioning meter and/or received a bill based on estimated consumption; 29% (N = 48) did not have a meter at all; 6% (N = 10) had a non-functioning meter; 19% (N = 31) had a meter whose status could not be determined because water was not flowing in the piped network at the time of the interview. Among the 89 (53%) resellers who shared their water bill with enumerators, 37% were charged based on their actual consumption; the rest received a charge based on a usage estimated by the utility. Many resellers believe they are not accurately charged for the water they use. One reseller said, ‘AdeM [the water utility Água de Moçambique] charges you according to what they think’, and another noted, ‘I don’t know why they come and do the meter reading, if they then bring you a bill that is estimated or that is just reflecting what they think’. Resellers’ limited understanding of how their water bills are calculated might also be because AdeM charges consumers using an increasing block tariff, which many households find difficult to understand (Zuin et al. 2012).

Water resale appears not to be very profitable for many sampled resellers. When asked directly, 38% of resellers said that they generate profits for their household from resale (Table 2). Among these resellers, the average self-reported monthly profit was US$13.31 (median = US$9.89). The study team calculated profit margins for all resellers using information collected about sales and tariffs for the six months prior to the interviews. Estimated profits vary greatly depending on the assumptions employed; however, regardless of the assumptions used, at most 60 to 70% of those interviewed were likely generating positive net revenues. Among these, the estimated average monthly profit was

### Table 2 | Monthly profits, water bills and water sales by sample resellers (N = 167)

| Percentage (N) of resellers with (self-reported) profit | 38% (N = 146) |
| Average (standard deviation) monthly self-reported profit (among those with positive profits), US$ | 13.31 (16.30) |
| Median monthly self-reported profit (among those with positive profits), US$ | 9.89 |
| Percentage (N) of resellers with a positive calculated monthly profit | 68% (N = 145) |
| Average (standard deviation) monthly calculated profit (among those with positive profits), US$ | 21.09 (24.20) |
| Median monthly calculated profit (among those with positive profits), US$ | 11.94 |
| Average (standard deviation) monthly water bill, US$ (among respondents who presented a bill, N = 89) | 16.19 (17.81) |
| Median monthly water bill, US$ (among respondents who presented a bill) | 9.7 |
| Average (standard deviation) number of cubic meters of water sold per month | 16.8 (14.6) |
| Median number of cubic meters of water sold per month | 12.0 |

*Monthly profits were calculated using data collected from resellers regarding the number of jerricans sold to each neighbor per transaction; number of transactions per week; and prices charged (per jerrican or on a monthly fee basis). Monthly values were computed using data from the six months prior to the interview.
US$21.09 (median = US$11.94). These earnings can be put in perspective: with a monthly profit of US$21.09, a household could buy four small loaves of bread (breakfast for about eight people) per day for a month. By contrast, SNOs in Maputo were found to have average monthly profits of US$305 (Bhatt 2006).

For the typical sampled reseller, profits from resale account for a very small share of total household income. In 2010, 67% of resellers reported that net revenue from resale amounted to ‘nothing’ or ‘almost nothing’. Another 25% reported that net revenues contributed between 20 and 40% of their household income. These findings are corroborated by data about other sources of household income. In 2012, 84% of resellers had at least one household member working full-time in another occupation or receiving a pension; 48% had at least one member working part-time.

**ENTERPRENEURIAL BEHAVIOR BY RESELLERS**

Economic theory suggests that, if water resellers were profit-maximizing entrepreneurs, they would have entered the resale market in response to a perceived business opportunity. Entrepreneurial resellers would also be expected to take steps to increase their profits and grow their customer base, and to exit the market if they found it unprofitable for an extended period. In this section we summarize the results for interviewed resellers regarding these three dimensions of entrepreneurial behavior: market entry in response to opportunity, actions to increase profits and market exit in response to persistent losses.

First, most interviewed resellers were motivated to begin reselling as a result of appeals from their neighbors without water connections (Figure 1). When asked an open-ended question about the primary reasons that their household began reselling, 78% \( (N = 131) \) reported that they were asked by their neighbors to supply water. As one reseller explained, ‘Once your neighbors see that you have water [i.e. a private connection], they immediately come and ask [for water]’. Few responses had anything to do with entrepreneurialism; 12% of resellers \( (n = 20) \) reported reselling water because it represents a ‘business opportunity’. More commonly, resellers mentioned ‘feeling pity for those who do not have a water connection’ (54%, \( n = 90 \)). More than a quarter mentioned ‘helping [others] now in anticipation of receiving help in the future’ (28%, \( N = 47 \)). Roughly one in five responded that they were motivated simply by ‘wanting to help others’ (22%, \( N = 36 \)). No respondent mentioned reselling to increase his or her household’s prestige.

Indeed, water resellers rarely described these transactions as ‘selling’. During participant observation it was noted that resellers used expressions such as ‘giving water’, ‘helping others with water’, or ‘helping others and being helped in return’ (referring to the payments they receive). Resellers never spoke about ‘clients’ or ‘customers’ who ‘buy’ water, referring to them instead as ‘neighbors’.

Second, most surveyed resellers have made few investments to provide clients with higher levels of service. For example, only 7% of resellers had invested in a storage tank that would allow them to offer around-the-clock sales (rather than being limited to the hours when water is available in the network). None of them invested in multiple taps or a garden hose that could facilitate the filling of jerricans. In theory such amenities could give a reseller a competitive advantage in attracting new customers and/or being able to charge higher prices. Only 11% \( (N = 19) \) of resellers interviewed said they took steps to increase their customer base.

Even absent capital investment, resellers who were behaving entrepreneurially might provide a more personalized or professional service, such as filling their clients’ jerricans while they are at home or at work. Evidence suggests, however, that a reseller’s job consists principally of letting neighbors use the water tap on their premises.
Only 16% fill jerricans for clients who are at work, and 10% fill jerricans for clients who are home but not willing or able to spend time queuing. More common is resellers’ informing clients that water is available after a service interruption (49% of respondents), and helping clients lift full jerricans to their heads so they can be carried away (40%).

Third, the interviewed resellers’ motivations to leave the market appear generally unrelated to their financial success (or lack thereof). As noted above, about two-thirds of resellers were found to make any profit, and for most this represented a small fraction of total household income. Among the 61 resellers interviewed in both 2010 and 2012, 37% continued to resell despite reporting that they operated at a loss during both years. Further, average monthly profits earned by resellers in 2010 who left the market before the 2012 survey were not significantly lower than those who continued reselling in 2012 (US$27.50 versus US$31.90, p > 0.10). These results suggest that factors other than low or negative profits motivated these resellers to stop their activities.

It might be argued – particularly given that only 8% of resellers maintain written records of their revenues and clients’ debt – that many resellers earning low or negative profits continue reselling because they are unaware of their situation. However, a considerable fraction of resellers seem to have a good understanding of whether they are making profits (Table 3). More than half of the resellers (52%, n = 38) that reported operating at a loss were also found to operate at a loss based upon study team calculations; only 8 (18%) of 44 resellers that reported a profit were calculated to operate at a loss. These results suggest that awareness of making or losing money from reselling does not seem a particularly important factor influencing resellers’ activities.

In sum, evidence from this sample of resellers suggests that most were not driven to enter the market in pursuit of a business opportunity; few exhibit the type of investment behavior and customer service orientation expected of entrepreneurs; and a substantial share continue to resell water despite earning low or negative profits. These results imply that the decision to resell must have explanations other than profit maximization. The remaining sections of this paper consider whether available evidence is consistent with the following non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-mutually exclusive motivations to resell: (1) obtaining non-

**WATER RESALE SUPPORTS SUBSISTENCE NEEDS**

Whereas revenue earned from water resale may be small, it may be highly valued because it provides a reliable source of cash to deal with day-to-day liquidity constraints. Petty trade and informal activities have become increasingly significant for household survival in urban sub-Saharan Africa (Rogerson 1997; Little 1999; Hansen & Vaa 2004; Lyons & Snoxell 2005a; Bryceson 2006). Urban households regularly engage in many informal activities simultaneously in order to reduce their economic vulnerability and to ensure daily cash revenues sufficient for food and other basic necessities (Potts 1997; Dercon 1999; Lyons & Snoxell 2005b; Alvi & Dendir 2009). Such informal activities can help meet basic needs in the short term, even if they are not profitable in the longer term (Marie 2000).

Survey data from sampled resellers are consistent with this ‘subsistence needs’ explanation. When asked an open-ended question regarding the principal benefit from being a reseller, the most common response (given by 28% of resellers) was the cash generated on a daily basis from their clients. In addition, resellers were asked directly whether daily revenues from water sales are important to their household, and 55% answered affirmatively. One reseller explained that, ‘What you get is not enough to … buy all you needed for the day, but it is enough to buy bread and something like tomatoes’. Finally, when resellers were asked an open-ended question about how they use their

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**Table 3** | Number (%) of resellers earning a profit in the month prior the interview, self-reported versus study team calculations (N = 117)

<table>
<thead>
<tr>
<th>Study team calculation</th>
<th>Earns no profit</th>
<th>Earns some profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported by reseller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earns no profit</td>
<td>38 (52%)</td>
<td>35 (48%)</td>
</tr>
<tr>
<td>Earns some profit</td>
<td>8 (18%)</td>
<td>56 (82%)</td>
</tr>
</tbody>
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revenues from resale, the majority (76%) reported using their daily cash to make small purchases of bread and other basic food items.

Resellers with liquidity constraints might have trouble saving to pay future bills. This appears to be the case. Resellers report greater difficulty compared with non-reselling households with water connections in paying their entire water bill at the end of the month (50% versus 30%, p < 0.01). Perhaps because many resellers do not receive their bill regularly, receive higher bills on average, and some do not trust how utility staff calculate their bills, the average debt owed to the water utility is high (US$132, median = US$50). Finally, resellers who charge only by the jerrican have fewer assets than resellers who charge a monthly fee, suggesting that poorest resellers use water resale as a way to generate cash to meet daily needs. For example, resellers who charge by the jerrican are significantly less likely to have a gas stove (35% versus 52%, p = 0.03), a fan (46% versus 70%, p < 0.01) or a car (6% versus 17%, p = 0.03).

### WATER RESALE AS SOCIAL INSURANCE

A second explanation for why Maputo households may engage in water resale centers on informal social insurance. Literature on informal social insurance in a developing countries context suggests that, if a household anticipates needing help from neighbors at some point in the future (e.g. providing a ride to the hospital or borrowing a phone) responding to those neighbors’ requests for reselling water now can increase the likelihood that they receive help when needed in the future. Fafchamps (1992) finds that informal social insurance mechanisms built around delayed reciprocity tend to emerge whenever socioeconomic conditions make individual survival extremely uncertain. Similarly, Marie (2000) argues that ‘giving [now] is taking out insurance in the far or distant future’. As a result, poor households may prioritize insurance against future crises over higher earnings in the present (Scott 1976; Bernet et al. 2012).

Other researchers suggest that the reciprocity is not necessarily direct. For example, the person receiving assistance is not always expected to give back something equivalent to what is received. She may also not provide help to the same individual who assisted her household in the past, but rather to another individual in the community (Fafchamps 1992; Molm et al. 2007). Furthermore, assistance is not always financial in nature; it can also involve emotional support during a crisis, such as a dispute, marriage, illness or death (Boswell 1969).

The economics literature suggests that very poor households are more vulnerable to economic shocks such as the sudden loss of income, and hence they have greater need for insurance compared with better-off households (Cox & Jimenez 1998; Moser 1998; Dercon 1999, 2004; Morduch 1999). If resellers engage in water resale as a form of social insurance, it is expected that they would be the poorest and most vulnerable among households with a private water connection. Survey results indicate that resellers were indeed less wealthy than non-resellers (i.e. connected households who do not engage in resale). A relatively higher percentage of reseller households relied principally on income from irregular, temporary or seasonal sources (14% versus 10%, p = 0.06). A smaller share of reseller households had at least one member employed full-time or receiving retirement benefits (84% versus 90%, p = 0.08). Further, households reselling water owned fewer assets, and had lower per capita income, although no significant differences were observed in per capita expenditures between the two groups (Table A1, which can be found in the Supplemental Material available online at http://www.iwaponline.com/washdev/004/065.pdf).

Another implication of the social insurance hypothesis is that households with relatively weak social networks would be more incentivized to begin reselling, under the assumption that resale transactions would gradually help establish a ‘safety net’ for the reseller. This idea was explored by comparing the perceived ability to rely on social networks for help between resellers who entered the market within the two years prior to interview (N = 71) and non-resellers. Households that had been reselling water for more than two years were eliminated from the analysis, under the assumption that this period of engagement with neighbors would have strengthened the resellers’ networks and thus their perception of having support available when needed.

Results from this comparison are ambiguous. ‘New’ resellers were less likely than non-resellers to report being able to rely on the help of a colleague (49% versus 62%,
A third potential explanation for a household’s decision to engage in resale, and one that partially overlaps with the social insurance argument, is the household’s involvement or ‘embeddedness’ in a web of social relations that affects the actions it takes (Granovetter 1985; Tigges et al. 1998; Putnam 2000). The hypothesis is that households that engage in reselling do so for complex reasons, including feelings of pity and empathy as well as an effort to respect community norms; i.e. the standards or expectations of appropriate behavior in particular situations that are enforced through informal social sanctions and that exist in all human societies (Fehr & Fischbacher 2004; Coleman 2006). These social relationships and norms can help explain behavior by resellers that appears to be inconsistent with actions to enhance economic self-interest (Blau 1986; Uzzi 1996; Hyden 2004, 2007).

Among the interviewed resellers, many expressed feelings of pity and compassion toward neighbors who do not have a connection to the piped water network. In comparison to non-resellers with connections, all else equal, resellers were 3.1 times more likely to report feeling pity for households without a connection (Table 1). Indeed, 54% of the sampled resellers said, without prompting, that pity was their principal motivation for engaging in resale. As one reseller explained,

‘What really motivates me is pity: people ask me, and I give them, for them to be able to survive. Standpipes are far. I feel responsibility. I am old, and they are young and they don’t have anything. I don’t do this because it is business’.

Similarly, almost all resellers (95%) agreed that they are motivated at least in part by feelings of empathy for households without network connections. As one reseller explained, ‘I spent long hours fetching water when my children were little. I know what it [water fetching] means’. Another said ‘Before I got my own connection, I used to

\[ p = 0.06 \) or fellow church members (68% versus 79%, \( p = 0.07 \)) in case of illness or death. However, no difference exists between the share of new resellers versus non-resellers reporting confidence in their ability to call on family members (89% versus 91%, respectively) or friends (66% versus 69%) in such situations (both \( p > 0.50 \)). Moreover, new resellers were significantly more likely to feel they can rely on their neighbors for help as compared to non-resellers (84% versus 73%, \( p = 0.02 \)). We also repeated the comparison presented here between those who had been reselling for more than versus fewer than two years and obtained similar findings.

A final implication of the social insurance explanation is that a substantial proportion of resellers should report being motivated to provide water to their neighbors because they expect they will in turn receive help if needed in the future (i.e. delayed reciprocity). This was the case among sampled resellers; 28% of resellers said, without being prompted, that a primary motivation to engage in resale was to increase the likelihood of receiving help in the future (Figure 1). As one reseller explained, ‘Today it is my neighbor who doesn’t have anything, but tomorrow that person can be me… Family is far. When you get sick or somebody dies in your family, you need your neighbor’.

Some survey evidence is not consistent with this expectation of reciprocated assistance in the future. Resellers – in comparison to non-resellers – are no more likely to say that they feel that helping their neighbors today will enable them to receive help when they need it (53% of both resellers and non-resellers provided this answer). This suggests perhaps that support provided to neighbors is not conditioned on direct reciprocity, and that households provide support regardless of whether they believe that assistance will be reciprocated by those they have helped. Further, contrary to what would be expected if resellers were motivated by their anticipating needing help in the future, resellers (in comparison to non-resellers) are no more likely to report feeling they are likely to need help from their neighbors. One explanation for this finding is that the typical household in these communities feels highly dependent on its neighbors: nearly three-quarters (73%) of both resellers and non-resellers report being likely to need future help from neighbors. Consequently, anticipating needing help might not, on its own, be sufficiently important to motivate a household with a water connection to obtain informal social insurance by engaging in resale.

SOCIAL EMBEDDEDNESS AND WATER RESALE

A third potential explanation for a household’s decision to engage in resale, and one that partially overlaps with the social insurance argument, is the household’s involvement or ‘embeddedness’ in a web of social relations that affects the actions it takes (Granovetter 1985; Tigges et al. 1998; Putnam 2000). The hypothesis is that households that engage in reselling do so for complex reasons, including feelings of pity and empathy as well as an effort to respect community norms; i.e. the standards or expectations of appropriate behavior in particular situations that are enforced through informal social sanctions and that exist in all human societies (Fehr & Fischbacher 2004; Coleman 2006). These social relationships and norms can help explain behavior by resellers that appears to be inconsistent with actions to enhance economic self-interest (Blau 1986; Uzzi 1996; Hyden 2004, 2007).

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Similarly, almost all resellers (95%) agreed that they are motivated at least in part by feelings of empathy for households without network connections. As one reseller explained, ‘I spent long hours fetching water when my children were little. I know what it [water fetching] means’. Another said ‘Before I got my own connection, I used to

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Before I got my own connection, I used to
buy from my neighbors. There were many people and long queues there, so sometimes I had to go to a standpipe by the school that was very far. Such empathy might be reinforced by resellers’ physical proximity to unconnected households and their similar socio-economic conditions (Kolm 2006; Madsen et al. 2006; Platteau 2010). Indeed, when asked to compare their household’s wealth with that of their neighbors, 91% said that they do not feel richer than households without a connection. However, resellers’ perceptions do not match other survey results: resellers are richer on average than households without connections, as measured by monthly household expenditures (US$276 versus US$230, p < 0.01) and asset ownership (81% versus 48% own a fridge, p < 0.01).

An important social norm within the communities surveyed is sharing of goods and services among neighbors, one that can help explain why some households engage in water resale. Survey respondents were asked to think about all the forms of exchange in which they engage with their neighbors, such as borrowing a hand cart or keeping a neighbor’s food in their freezer for them. Compared to households who do not resell water, resellers reported having more frequent exchanges with their neighbors (1.9 times per week, p < 0.01). In addition, resellers were significantly more likely to report that they participate in these exchanges ‘somewhat’ or ‘very’ frequently (92% versus 82%, p < 0.01). The same results are obtained when comparing only ‘new’ resellers (those who started reselling within the two years prior to interview) with non-resellers and when analyzing data from the 2010 survey.

Social and self-sanction emerged as an important motivation for sampled resellers. More than three-quarters (76%) reported that they would feel badly if they refused to resell, suggesting that sharing water with less fortunate neighbors is a widespread community expectation. Resellers also reported fearing that not sharing with neighbors who request water could lead to negative consequences other than being refused aid in the future. For example, half of resellers reported that not selling water to their neighbors could result in damage to their reputations; 36% said it could lead to conflicts with neighbors; 28% worried about being victims of witchcraft; and 26% feared vandalism. These results are consistent with findings by Platteau (2010), who found that the decision to share with others might result from fear of sanctions that go well beyond not receiving help in the future.

One implication of the embeddedness explanation is that households who are relatively more exposed to social norms and expectations would be more likely to engage in resale (Fafchamps 1992 in other contexts). Survey evidence is consistent with this idea among study participants. For example, households who resell water tend to have less privacy compared with non-resellers, which results in more exposure to neighbors’ requests and perhaps greater feelings of obligation to share visible goods. In particular, resellers were more likely to have property without surrounding walls (16% versus 10%, p = 0.07). Moreover, among respondents who did have walls on their property, resellers were less likely to have walls made of cement (72% versus 59%, p < 0.01). Instead, their walls tended to be made of less durable materials such as corrugated metal sheets or reeds, thus providing less privacy to their household.

Households with relatively longer tenure in a community would also be expected to have greater exposure to social norms compared with more recent arrivals. Overall, 78% of the households in the sample lived in the neighborhood for more than 20 years. A greater share of resellers, however, have lived in their neighborhood for more than 20 years (87%, compared with 76% of non-resellers, p < 0.01). In addition, resellers versus non-resellers have had a private water connection for an average of 14 and 9 years, respectively (p < 0.01).

**CONCLUSIONS**

Small-scale providers of water have often been described by the literature as entrepreneurs with profit-maximizing motivations. Information collected for this study suggests that most water resellers in peri-urban Maputo do not behave as entrepreneurs, nor are they motivated principally by profits. Instead, households engage in water resale because it provides income essential for meeting daily needs; offers a form of social insurance to deal with future needs; and fulfills expectations for social norms in their communities. This is the first known study to explore resellers’ motivations in depth. If subsequent research reaches similar conclusions, then many of the standard policy prescriptions normally
applied to small-scale water providers would be inappropriate for water resellers. For example, government efforts to facilitate access to credit—a common strategy to support small-scale water providers in low-income countries—would likely have little impact on resellers in Maputo.

Findings from this research further suggest that introducing programs and policies that reduce resellers’ vulnerability might better support households that resell water and the urban poor whom they serve (Berners et al. 2012; Grimm et al. 2012). Such interventions might include legalizing water resale and ensuring that resellers receive a bill reflecting their actual water consumption. In addition, tariff structure deserves scrutiny in cities where a substantial share of the urban poor is served by water resale. An increasing block tariff, which is commonly justified as a way of ensuring affordable service to low-income households, can actually result in resellers and their clients paying relatively higher unit prices for water. More broadly, this research reinforces earlier findings that resale constitutes an important water supply option in urban Africa. Whether and under what conditions resale should be viewed as a ‘mainstream’ strategy for serving low-income households are important topics for future research.

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