How does relationship-based governance accommodate new entrants? Evidence from the cycle rickshaw rental market

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Indian School of Business, Economic and Political Weekly

8 February 2012

How does relationship-based governance accommodate new entrants? Evidence from the cycle rickshaw rental market

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February 8, 2012

Abstract

A large theoretical and empirical literature suggests that the salience of network-based ties in contract enforcement under relation-based governance systems limits market expansion. This paper illustrates the incorporation of new agents into market exchange under conditions of informal contract governance using a case study of the cycle-rickshaw rental market in a city in central India. Our analytical model formalizes features of this market through a higher penalty of default for migrants that introduces a gap between the *ex ante* risk for out-of-network agents and the *ex post* risk. The model predicts a sorting equilibrium such that migrants are more likely to participate in the rental contract. We test this prediction using primary survey data with multi-dimensional measures of migrant status and find that it is a significant predictor of rental contract participation, even controlling for credit access and other variables that moderate the rickshaw driver's ability to own a cycle-rickshaw.

Keywords: Urban informal sector, Contract enforcement, Rural to urban migration.
JEL Codes: L14, L92, O15, O17, O18, J61, R23.

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†Economic and Political Weekly, Hyderabad, India. Email: sood.ashima@gmail.com. This study was made possible through a grant from the Einaudi Center for International Studies and the South Asia Program at Cornell University. Additional support was provided by the Raipur regional office at ActionAid India. We are thankful to the staff at the ActionAid Raipur and Bilaspur offices, especially Alok Satpathy, Siddheshwarji and Rajkumar Pandey for their help and guidance. We owe a special debt of gratitude to the late Mrs. Rita Maini and her family for generously hosting stay in Bilaspur. This paper benefitted from thoughtful comments from Kaushik Basu, Leora Friedberg, Sanjay Jain, Ravi Kanbur, John Pepper and Erik Thorbecke at various stages of the project. Finally, we thank participants at the Annual Conference on Contemporary Issues in Development Economics at Jadavpur University for their comments. All errors are our own.

1 Introduction

A large literature, both theoretical and empirical, looks at informal contract governance in historical contexts and developing country settings (Dixit 2003; Dixit 2009). A central concern is identifying conditions under which relation-based governance, "whereby most transactions are based on personal and implicit agreements, and the state is generally not able to enforce contracts impartially" (Li 2003), allows effective enforcement of contractual or specified rights. Such "self-enforcement" of implicit contracts (Dixit 2009) can occur through bilateral mechanisms between contracting parties. When bilateral mechanisms break down (Greif 1993), multilateral mechanisms such as community sanctions where community members are able to share "local" information about and punish defaulters are used for contract enforcement (Li 2003). Reputation mechanisms are key to third party enforcement of this kind though theoretical work has shown that multilateral community sanctions can be sustained with minimal information flows (Kandori 1992), albeit with infinite life spans for players as pointed out by Greif (1997).

A key finding in these conditions, reiterated in both the theoretical and empirical literature, is that there are limits to the size of the market within which such forms of contract governance are effective (Fafchamps 2002; Kandori 1992; Dixit 2003). Dixit (2003) and Li (2003) explain this through the small or negligible fixed costs since start-up costs for a business are next to nothing because the earliest partners are close acquaintances, even family. At the same time, the marginal costs of relation-based systems are high and rising as the trade expands to incorporate unknown, more distant, agents, transaction costs and the costs of monitoring second-party activity increase disproportionately.

Summarizing evidence from several studies from Sub-Saharan Africa, Fafchamps (2001) shows that personal trust helps facilitate exchange under these circumstances, but that it is often based on long-standing relationship-based networks of various kinds. How then can new agents be incorporated into such trust networks?

Dixit (2009) generalizes these ideas to the concept of distance, howsoever understood as geographic, ethnic or socio-economic. In this theoretical framework, only if agents are sufficiently close neighbors is honesty self-enforcing.

This paper presents a case study of an urbanized and expanding market setting with pervasive entry of new agents, in this case, migrants from rural areas. Multilateral self-governance through

community sanctions is inoperable and at the same time, rule-based and third party enforcement of contracts through the state is not possible, because the market is *de jure* illegal under existing municipal laws.[1] Under these conditions, through an analytical model tested using primary field data, we show how new agents are incorporated into exchange relations.

Our findings introduce a new dimension into current understandings of the importance of networks because more distant agents, i.e., migrants are incorporated into rental transactions with garage owners at greater rates than residents who might have closer ties. In this market, near-competitive market conditions discourage information-sharing and bilateral contract enforcement is the norm in the absence of effective community sanctions or state presence.

In this paper, we consider the question of contract enforcement in informal rental markets, using the cycle-rickshaw rental market as an example. In many cities in India, the cycle-rickshaw is a ubiquitous form of local public transport. The cycle-rickshaw sector provides employment to a large number of workers.[2] The driver either owns the rickshaw he drives, or rents it from a garage, a roadside establishment that owns anywhere from five to five hundred cycle-rickshaws and rents them out for nominal daily fees. The driver retains his earnings, while the garage maintains the rickshaw and stores it overnight. Given the risk of default on principal, i.e., theft, as well as on rental payment, this market shares some aspects of the rural credit market. To a degree the rickshaw rental can be said to resemble a credit transaction.

While cases of actual theft are not very common, the possibility of theft clearly guides the garage owner's decisions. The presence of migrant rickshaw drivers in the urbanized environs of the cycle-rickshaw market is the complicating factor. How do garage owners moderate the risk of default associated with renting to migrants?

Previous studies of similar rental markets have largely focused on contract choice. In the context of the jeepney market in the Philippines, Hayami Kikuchi and Otsuka's (1986) pioneering paper showed that, as community relationships enforcing contracts become weaker, contracts shift from share to leasehold contracts. In a similar market for land rentals in Guatemala, Macours (2004) studies joint contract and partner choice and shows that under conditions of weak property rights, landowners prefer partners from their own ethnic networks. In contrast, contract choice in the rick-

[1] Fafchamps (2001) also explains that when transactions are small and either party has few assets, legal enforcement can be prohibitively expensive or downright infeasible.

[2] While few rigorous estimates of sector size as a whole are available, either on a national or city level, one relatively well-grounded estimate puts the number of cycle-rickshaws in the Delhi region alone at a 100,000 (Kurosaki, Sawada, Banerji, and Mishra 2007).

shaw rental market shows little or no variation, even though rule-based governance has not emerged as a credible alternative.

Our paper focuses on partner choice. In this setting, the choice between anonymous or relation-based contracting corresponds to the choice of migrant versus resident partners. *Ex ante*, we expect greater trust between garage owners and drivers who are from the city, compared to migrants. Nonetheless, interviews of garage owners in Bilaspur suggest they do not price discriminate or ration rickshaws on the basis of migrant status.

Note that in the urban environs of this market, the most salient networks are those of locality. To a large extent, networks of caste overlap with these spatial or neighborhood networks. In a larger study of Delhi slums, Mitra (2006) evaluates the role of different kinds of networks in the urban labor market, including caste, kinship and ethnicity bonds as well as more formal NGO and employment exchange networks. He argues that these networks tend to be localized, leading to the labor market becoming segmented.

An associated garage study, and interviews of garage owners revealed that they were rarely from Scheduled Caste groups, the largest caste group among rickshaw drivers. Interestingly, garages that catered in larger measure to drivers from within neighborhood networks reported higher rates of default (Sood 2008). The dimensions along which matching occurs is beyond the scope of this paper though related work (Sood 2008) looks at aspects of driver sorting across garages.

It is worth noting that almost by definition anonymous, cash-and-carry transactions of the type described by Fafchamps (2002) are not feasible in the rickshaw rental market. The rickshaw rental market can thus said to be in state of transition from personal to impersonal exchange in the sense of Fafchamps (2002) – while some agents (resident drivers) can switch partners with negligible penalty, others (migrants) cannot. And paradoxically, it is precisely the possibility of self-enforcing contracts through personal exchange that allows migrants to enter the rickshaw rental market. As Allen (1983) shows if default means exclusion from the capital market, contracts are enforceable. In our site, such exclusion is more credible for migrants relative to resident drivers.

We propose an analytical model that formalizes these features of the market. As with Greif (1993), this model attempts to work with a parsimonious set of assumptions that do not depart substantially from the empirical evidence. We build a two-sided model of partner choice which shows that, contrary to intuition, migrant drivers represent a lower *ex post* risk of default to garages. We

formalize this notion through a differential penalty which is higher for migrants than for residents. Realizing this, garage owners prefer to rent to migrants, especially those with stronger attachment to their place of origin. With realistic conditions on information sets, we derive a sorting equilibrium such that rickshaw drivers that are more "migrant" are more likely to participate in the cycle-rickshaw rental contract.

In order to test the predictions of this model, we draw on primary data collected from a sample of rickshaw drivers and garage owners in the central Indian city of Bilaspur. We test empirically the theoretical predictions with a reduced form model using the primary survey data. We construct a multidimensional measure of migrant status , recognizing the variation in degree of affiliation with local networks. Qualitative interviews suggested the non-negligible impact of seasonal and commuter migrants in the cycle-rickshaw rental market. In this study, we take the multiple aspects of migration seriously and analyze the migrants' distance from the place of origin, the frequency of visits home and the length of time since migration as distinct measures of migration status, since each has different implications for rental and ownership behavior.

We specify a test for the determinants of renting with particular attention to the multiple dimensions of migrant characteristics. Our empirical results confirm that migrants are more likely to rent cycle-rickshaws compared to residents. In addition, our results highlight the importance of considering multiple dimensions of migration. We show that the probability of renting increases with the distance of migration as well as greater attachment shown by the migrant to the place of origin. Our results also show that long time migrants who rarely visit home display characteristics of residents and are less likely to participate in the rental market.

Our explanation of ownership and renting patterns draws attention to the role of the supply side of the rental market in determining who is able to participate in the rental market. It can be contrasted to "demand-side" explanations of renting behavior, which highlight constraints on ownership, whether through credit access or costs associated with owning. While we control for credit access as well as rickshaw driver characteristics and costs, our results still show that being a migrant is a significant predictor of renting, even holding these other variables constant. These results suggest that relationship-based governance mechanisms can under certain conditions, and in the present case, near-competitive conditions on both sides of the market, be flexible enough to allow the absorption of new agents and hence market expansion.

Informal sector activities across a range of industries in India labour under policy environment that at their best can be described as benign neglect and at their worst as downright hostile. The cycle-rickshaw rental market is typical in this regard (Mitra 2002). As described above, in Bilaspur, the applicable Madhya Pradesh Ordinance 20 of 1984 effectively casts the garage into illegality by mandating that subject to certain minor exceptions, "No person shall keep or ply or hire a cycle-rickshaw... unless he himself is the owner thereof." Versions of this provision exist in municipal rule books in several cities (Singh 2000; Menon 2000) and appear to derive from the 1960 Cycle Rickshaw Bye Laws of Delhi. While a 2010 judgment of the Delhi High Court struck down the validity of this provision in Delhi (Venkatesan 2010), it continues to operate elsewhere. Our findings support long-standing activist arguments that the cycle-rickshaw rental market especially benefits migrant drivers (Kishwar 2001), and suggest the need for an overhaul of the legal framework guiding this sector.

This paper is organized as follows. In section 2, we develop a theoretical model for the rickshaw driver's and the garage owner's decisions in the presence of default risk. Following this in section 3, we discuss the market setting and data collection process. Section 4 details the econometric specification and present the results of the estimation exercise. The last section offers policy conclusions and suggests direction for future research.

2 Theoretical framework

This section develops a two-sided model of rental contract participation that formalizes observed features of the cycle-rickshaw rental market. The objective of the model is to generate stylized hypotheses that can be tested with the data in the next section.

In this model, migrant status is modeled as a continuous variable to allow for variation in the degree of attachment to the place of origin seen in the data. We further argue that ownership of the rickshaw imposes costs, and these are higher for migrants than residents. This model distinguishes between an *ex ante* and *ex post* concept of risk through a differentiated penalty on default for migrants and residents. This distinction offers insight into how relation-based contract enforcement mechanisms operate in an urban context with the influx of new agents without pre-existing network affiliation (Fafchamps 1996).

To disentangle the relationship of risk of default with migration status, note that *a priori* the garage owner can be expected to have a higher *ex ante* level of trust with the resident, given multiple

direct and indirect personal links with the resident through the neighborhood network. Evidence from studies of contract enforcement in a variety of developing markets suggests that exchange tends to be limited to such personalized network connections in relation-based contracting due to the advantages of information sharing and monitoring (Fafchamps 2001).

We argue that this risk is moderated by countervailing factors. Indeed, a number of garages in our study catered specifically to commuter and seasonal migrants. To understand this seeming contradiction, note that a rickshaw driver's entry into the rental contract is regulated through referrals by mutual acquaintances. To the extent that migrant rickshaw drivers have a smaller network of such acquaintances, they are restricted to a much smaller set of garages from where they may hire a rickshaw. As a result, defaulting at any given garage may bar the migrant's access to the rickshaw rental market more comprehensively than it would a resident rickshaw driver with a larger network of potential referrals. This cost is formalized here through a differential penalty based on migrant status that is known to both garage owners and rickshaw drivers. Our conceptual framework combines these *ex ante* and *ex post* notions of default risk.

Our framework predicts a single rental rate in the presence of default risk and migrants. The evidence on explicit price discrimination on the basis of migrant basis is decidedly mixed. This is *not* because the migrant status of the rickshaw driver is not *ex ante* evident to the garage owner, which would make price discrimination difficult. Interview data shows that garage owners indeed have prior information about the migration status of the rickshaw drivers they transact with, though it is not perfect. To the extent that migrant status is not a binary indicator, the degree of migrant status may not be easily gauged. For instance, a resident may not disclose the number of visits he makes to the place of origin. Nonetheless, garage owners do appear to be broadly informed about which drivers are commuters or seasonal participants in the rickshaw market.

While explicit rental rates are often fixed by rental period as Geertz (1978) suggests, garage owners do in fact allow for bargaining on a range of other parameters that may indicate some form of price discrimination, for instance, rebates, payment periods, and rental periods. But even garage owners who admitted to offering rebates on the basis of length of association did not list migrant status as a factor in price discrimination. One possible explanation is that since existing clients of the garage introduce new drivers, it is difficult for the garage owner to discriminate given the possibility of information sharing between the introducer and the new driver.

An equilibrium with self-selection is shown to arise, in which for any given rental rate, migrants are more likely to rent than residents.

2.1 Rickshaw driver's problem

In this section, we consider the rickshaw driver's problem. Given a rental contract, the rickshaw driver functions essentially as an entrepreneurial agent, i.e., the comparative returns from renting versus an alternative occupation determine his participation in the contract, the relevant alternative for this purpose being ownership of the cycle-rickshaw. Following Hallagan (1978), we focus our attention on the relative returns from owning versus renting, assuming labor input or effort choice is fixed.

In addition to the purchase price P, the rickshaw driver who buys the cycle-rickshaw incurs a cost $C(m)$, where m is a measure of the migrant status of the rickshaw driver. Assume that $0 \leq m \leq 1$, with $m = 1$ representing the pure migrant and $m = 0$ representing the pure resident. We expect that $C(0) > 0$ and $C'(.) \geq 0$, and $C''(.) \leq 0$.

The cost $C(m)$ can be conceptualized in several ways. Most directly, it can be seen as the cost of storing the cycle-rickshaw, which is higher for migrants. It can also be seen as the rupee cost equivalent for the psychic attachment to the cycle-rickshaw market, foregoing possibilities of alternative employment.[3] Also, $C(m)$ indicates higher gains that accrue from trade between more distant agents (Dixit 2009). It is also worth considering migrant status, m, in greater detail.

While Harris and Todaro (1970) spawned a considerable literature on the analysis of one-way rural-to-urban migration, except for the work of anthropologists like Breman (1993, 1996) there was little recognition of patterns of seasonal migration, particularly in the South Asian context. Farrington and Deshingkar (2009) provide a recent compilation of studies on seasonal and temporary migration but the focus remains largely on the sites where seasonal migrants originate. Our data contributes to a more nuanced formalization of the role of such migration, conceptualized as a multi-dimensional variable, in receiving labor markets.

We model it as a continuous variable rather than discrete. On the one hand, this formalization allows for analytical tractability and can be easily extended to the case where migrant status is a discrete

[3]Note that the costs of ownership also include the costs of maintenance, and depreciation, which interviews conducted concurrently with the survey, suggest are substantial. However, since they are not expected to vary with migration status, they are parametric to $C(m)$.

variable. More pertinently, empirical evidence indicates that migrant status is a multi-dimensional variable that reflects a matter of degree rather than kind. For example, while some long-time residents retain village ties, other recent migrants have severed all connections to their place of origin. Closer ties to the place of origin may increase storage costs during visits home for instance, as well as allow a continuing connection to the rural and agricultural economy. The empirical analysis in the next section parses the multiple dimensions of migrant status measured in variables such as annual visits to the place of origin and years in the city.

The per-period rental rate of the cycle rickshaw is R. If the cost of ownership is incurred in the present period, the rickshaw driver will choose to buy the cycle-rickshaw if

$$P + C(m) \leq R \tag{1}$$

We argue that since $C(1) > C(0)$, an equilibrium can exist with an R^* such that $P + C(0) < R^*$ and $P + C(1) > R^*$. Further, if $C''(.) \leq 0$, there exists a unique $m^* > 0$ such that $P + C(m^*) = R^*$.

2.2 Garage owner's problem

Consider that risk of default is perceived to be a function of the rickshaw driver's type, $\theta \in [0, 1]$, where higher θ corresponds to higher levels of dishonesty.[4]

While the garage owner can observe m, he cannot observe θ. Instead, he conditions his expectations of θ on m, i.e., $\theta(m)$. It is reasonable to assume that θ is an increasing monotonic transformation of m ($\theta'(m) \geq 0$). This captures an *ex ante* notion of risk where migrants are believed to be more likely to be dishonest.

Alternatively, consider the benefit from defaulting, which is also the corresponding loss to the garage owner, written as $B(\theta(m))$. Arguably the benefits from defaulting would be higher for a migrant because he can take a stolen rickshaw to a market in another city. On the other hand, the universe of possibilities available to the resident is more limited since he is restricted to the local market. $B(.)$ can be expected to be a non-decreasing function of θ such that $B(0) = 0$ and $B(1) = b > 0$.

If the rickshaw driver is caught, he suffers a penalty $L(m)$, where $L'(m) \geq 0$. Without loss of generality, assume that $L(0) = 0$. In effect, $L(m)$ is the discounted present value of future losses. Like Lindbeck, Nyberg, and Weibull (1999), we express this loss in the present period. We assume that

[4] Although we will not be able to directly observe θ in the data, we include it in the theoretical model for completeness.

$L(m)$ is known by both garage owner and rickshaw driver.

Note that we need not assume that $L(m)$ is imposed by the garage owner; indeed it is socially incurred and includes the transaction costs of finding a new garage and establishing a relationship with the new garage owner, which can be expected to be higher for migrants. Thus, $L(m)$ does not require information-sharing or collective action since it can be a decentralized outcome of the introduction mechanism that mediates entry into the market (Fafchamps 2001; Fafchamps 2002). Although in their study of Kenyan-Asian businessmen, Biggs et al (2002) note information sharing, even among putative competitors, we found no evidence of such information sharing in the case of the Bilaspur cycle-rickshaw rental market.

The rickshaw driver then faces two sets of decisions.

1. He rents if

$$P + C(m) \geq R \tag{2}$$

2. If he has rented, he does not default if

$$L(m) > B(\theta(m)) - R \tag{3}$$

Then knowing the rickshaw driver's problem, the garage owner maximizes his profits:

$$\max_R R - EB(\theta(m)) \tag{4}$$

such that the participation constraint (2) and the no-default constraint (3) hold.

For simplicity, we solve for the case when $\theta(m) = m$, i.e., the type of the rickshaw driver is perfectly known.[5] Assume that all second-order conditions for equilibrium hold. Then solving these equations for equilibrium yields $R^* = P + C(m^*)$, i.e., the optimal rate of rental and the migrant who is just indifferent between renting and owning is simultaneously determined.

First, consider the polar cases. Say equilibrium occurs at $m^* = 0$, i.e., the rickshaw driver is a resident. Then, the associated penalty incurred by the driver $L(0)$ is 0.

However, in this case, $R^*(0) = P + C(0)$ which is weakly less than $P + C(1)$ by the monotonicity condition on $C(.)$. Looking at the conditions we derived, an equilibrium obtains where R is low

[5]The results generalize straightforwardly to the case where θ is monotonically increasing in m.

enough to attract both migrants and residents.

Now, say $m^* = 1$, i.e., the rickshaw driver is a perfect migrant. Then, the lower bound on the garage owner's profits is $L(1)$. Further,

$$R = P + C(1) \geq P + C(m) \text{ for all } m \text{ and} \tag{5}$$

$$P + C(1) \geq P + C(0) \tag{6}$$

In this case, we have a stable equilibrium with only perfectly migrant rickshaw drivers participating. Therefore, for any $m = m^*$, and given the penalty function $L(.)$, an R^* can be found such that

- $m > m^*$ participate in the rental contract, and
- $m < m^*$ do not participate.

This result can be straightforwardly extended to the case where $\theta(m)$ is an monotonically increasing function of m.

There are two notable directions in which this model can be extended. First, although our static, one-period framework captures repeated interactions in the penalty function, learning about types in the rental transaction may occur over time, changing perceptions of trust-worthiness and possibly the differential penalty. Perceptions of trust-worthiness beliefs about the risk of default based on migrant type, $\theta(m)$ may also differ among garage owners. This would allow for sorting of migrant types across garages. The empirical evidence suggests that garages do indeed sort in this way, with some catering exclusively to migrants, and others predominantly to residents. Data from interviews with garage owners also offers instances of geographic clustering among rickshaw drivers.

The empirical analysis in the next section attempts to identify and further parse the multiple dimensions of migrant status posited in the analytical model.

3 Market and data

Situated in the central Indian state of Chhattisgarh, which was carved out of the larger state of Madhya Pradesh in November 2000, Bilaspur had a population of over 200,000 according to the 2001 census.

It is the second largest city in the state spread over an area of over 30 square kilometres and the seat of the state's High Court, as well as headquarters of a district by the same name (Corporation 2009).

Like much of the urban informal sector, baseline data on the cycle-rickshaw sector in Bilaspur was difficult to obtain. Matters are complicated by the *de jure* illegality of the market. As in several other Indian cities (Singh 2000), the applicable Madhya Pradesh Ordinance 20 of 1984 mandates that subject to certain minor exceptions, "No person shall keep or ply or hire a cycle-rickshaw... unless he himself is the owner thereof."

The law is weakly enforced, however, and the Officer-in-charge of the Rickshaw and Tonga department of the Municipal Corporation of Bilaspur (MCB) issues permits for rickshaw ownership for a small fee and thereby maintains a limited register of garages. We supplemented this data with a census of garages. The results are described in Table 1.

Given the absence of baseline data, semi-structured interviews with garage owners and rickshaw drivers as well as discussions with rickshaw drivers helped establish key institutional features and stylized facts about the market, which we were then able to follow up in the design of the quantitative survey component of the study (Rao 2002; Udry 2003). We also conducted a garage study of rental transactions at 10 garages, stratified by size and type. Table 2 provides an estimate of rickshaw purchase prices and costs of ownership obtained from these interviews. The rental rate ranges between Rs. 15 to 20 for a 24-hour rental period.

Among the key issues to emerge from the qualitative data was the numerical strength of temporary migrants. Both small and large garage owners reported seasonal migration patterns from nearby states such as Madhya Pradesh and Orissa. A subset of garages catered predominantly to renting to commuter migrants from surrounding rural areas. Capturing such transient populations in households surveys is notoriously difficult. Instead, intercept point sampling methods, also called time-and-space sampling methods, can be more successful and cost effective at reaching such hidden populations (Kalsbeek 1986; Kalton 2001; McKenzie and Mistiaen 2007). In an intercept point survey, individuals in the target group are sampled during set time periods at a pre-specified set of locations where they are likely to congregate.

In this case, we approached drivers at different times of the day over a week at the railway station, the inter-state bus terminal and a sample of randomly selected rickshaw stands as they waited for customers. A randomly selected sample of congregated drivers was then surveyed.[6]

[6]This sampling approach introduces bias into the data from a number of sources. First, we can account for selection

Using this methodology, we administered a short survey to 645 drivers in December 2003. In January 2004, the same team of investigators administered a longer survey to a smaller sample of some 176 respondents. The questions in this round were taken from a large-scale survey of rickshaw-pullers in the entire National Capital Region (which includes Delhi and the larger surrounding area) conducted over 2000-02 by the Jan Parivahan Panchayat (JPP).[7] The combined sample yields 821 independent observations.

Column A in Table 3 reports summary statistics pertaining to the entire rickshaw driver sample, with Columns B and C reporting the summaries for subsamples of drivers who own their rickshaw (owners) compared to those who rent from a garage (renters). Finally, Column D compares the difference in reported means between owners and renters. A key empirical feature of our study is that we do not treat migrant status as a binary variable. Instead, our preliminary fieldwork indicated that rickshaw-drivers differed widely, not only in their place of origin, but also in the strength of their ties to it, as well as how long they had spent at the place of destination.

Less than 40 percent of all rickshaw drivers claim the city of Bilaspur as their place of origin. Another 31 percent come from villages within Bilaspur district and 16 percent from villages within the state. Being one of the largest cities in Chhattisgarh state, it is not surprising that Bilaspur attracts migrants from within the state. What is significant is that out-of-state migrants comprise 15 percent of rickshaw drivers. While many of these come from neighboring districts in Madhya Pradesh, specifically Shahdol, some migrants also arrive from Orissa and Maharashtra.[8]

Migrant drivers return on average nearly 26.4 times to their place of origin every year, or once every two weeks. The patterns of travel are significantly different for drivers whose place of origin is outside Bilaspur city but within Bilaspur district. Figures 1, 2 and 3 show that the number of visits home is influenced by non-resident rickshaw drivers who travel daily by train, by bus or by foot from their place of residence to the city. This difference also shows up in comparisons between owners,

neither into the rickshaw driving profession nor into migration using this methodology. Second, we miss drivers who are not driving at the time of year that we sample. In particular, migrant drivers who return to their place of origin for agricultural or other village activities in the winter are not in the sample, undercounting the number of migrant drivers. A related source of bias is due to the cross-sectional nature of the data collection. If owners are more likely to stay within the profession, then a single cross-section survey will oversample owners compared to renters. The precise magnitude of differential attrition cannot be estimated or corrected without panel data. Finally, we miss more productive drivers who are likely to be driving a customer and oversample less productive drivers who disproportionately refuse customers. If more productive drivers are more likely to own their rickshaws, we will undercount ownership in the sample.

[7] In translation, the People's Transportation Tribunal. The JPP is an activist arm of the action research NGO Lokayan and has been one of the actors at the forefront of the policy debate described above.

[8] For instance, a large proportion of migrants from Shahdol and neighboring Mandla are seasonal migrants who arrive for periods as short as a month.

who visit home around 16 times a year, and renters, who visit home more than 28 times a year.

Given this circulation, it is not surprising that not all these individuals are engaged in rickshaw-driving all 12 months of the year. Nearly 16 percent of all individuals in this sample drive less than 12 months and a further 11.4 percent drive fewer than 10 months in a year. In fact, informal discussions with garage owners as well as un-hired rickshaws standing at the garages reveal that these figures may overstate the numbers engaged in rickshaw-driving year round. Many rural migrants retain links to the agricultural economy and return during the sowing and harvesting seasons.[9]

The variable *Years driving* represents the number of years that the rickshaw drivers has been in the profession. While the average owner has been driving for 14.5 years, the average renter has been driving for 10.2 years. At the same time, not surprisingly, owners drive 0.72 months more than renters. Both these variables indicate that drivers with greater attachment to the profession are less likely to be renters, although the direction of causality cannot be conclusively determined. Given the preponderance of migrants, the long average length of stay in Bilaspur for the sample appears surprising. A clue why this might be is obtained by contrasting this to the average migrant's age of arrival to the city, 19 years. Thus, the sample of current rickshaw drivers reports long periods of residence in Bilaspur, despite their migrant status.[10]

The Officer-in-charge of the Rickshaw and Tonga department of the Municipal Corporation of Bilaspur (MCB) issues a driving license that is required for all rickshaw drivers. As of September 2003, 4,624 licenses had been issued. To provide a context for the figure, note that in our survey data, only about 26 percent of all drivers said they had a driving license.

In addition, we asked surveyed rickshaw drivers about any loans they may have taken and for what purposes. It is interesting to note that almost as many renters (21 percent) report having ever borrowed as owners (28 percent), with money-lenders the main source of funds. Credit is deployed for a wide range of consumption and production needs, but only one driver reported buying a rickshaw with borrowed funds. To the extent that this data does not capture implicit credit constraints, we also include a variable capturing availability of formal credit in the place of origin, as the following section explains.[11]

[9]This phenomenon showed up sharply in the garage study in Sood (2008).

[10]Not discussed in this data summary are a rich array of family and personal variables - schooling, marital status, children's schooling, housing, heath status, work effort and fatigue threshold - that capture subjective measures of drivers' welfare.

[11]We do not account for potential omitted variables bias related to social networks, particularly those formed by migrants from similar caste and geographical backgrounds. A driver who is a part of a network is potentially able to

4 Empirical analysis

4.1 Specification

In this section, we test a reduced form of the model presented in Section 2. While our model frames the problem as one of rental contract participation, however, it is also conversely one of the distribution of ownership. *A priori*, we expect that owners and renters would differ significantly in terms of their migration status. At the same time, migrants may rent because lack of access to credit may limit their ability to purchase a rickshaw. In the previous section, we described responses to survey questions about borrowing from all sources. Only one driver in the entire sample reported borrowing for purchase of a cycle-rickshaw.

However, we further address this possible endogeneity in our model by controlling for access to formal sources of credit. Table 4 reports variables representing credit constraints for owners (Column A) and renters (Column B). The first category of variables is from the village directory of the Census of India (2001), representing formal sources of credit such as post offices, banks and credit societies that are potentially available to drivers at their place of origin. Both renters and owners have similar access to post office loans, but there are more banks and credit societies in owners' places of origin – 61 percent of owners have banks versus 53 percent of renters and 64 percent of owners have credit societies versus 55 percent of renters. We further include these access to credit variables in our specification, to see if the impact of migrant status still holds.

Thus, our specification also determines which of the multiple facets of migration have greater impact on rickshaw ownership. To do so, our probit specification is:

$$\phi_i = \begin{cases} 0 & \text{if } \phi_i^* \leq 0 \\ 1 & \text{if } 0 < \phi_i^* \end{cases} \tag{7}$$

where ϕ_i is a binary variable which is 1 if the driver rents the rickshaw he was driving at the time of the survey and 0 otherwise, and

access credit from drivers he knows to buy a rickshaw. Conversely, if a driver seeks a loan outside the network, the lender might conclude that the social network, which had better information on the driver's credit-worthiness, declined to offer him a loan. Thus, in addition to the identity of the driver's social ties, intra-network provision of credit and information flows are also potentially omitted characteristics that might influence the estimates of the coefficients.

$$\begin{aligned}\phi_i^* &= \beta_1 + \beta_2 \mathbf{\Omega}_i + \beta_3 visitshome_i * \mathbf{\Omega}_i + \beta_4 migrantyears_i * \mathbf{\Omega}_i \\ &+ \beta_5 monthsdriving_i + \beta_6 yearsdriving_i + \beta_7 \mathbf{X}_i + \beta_8 \mathbf{credit}_i + \epsilon_i \end{aligned} \tag{8}$$

In this specification,

$$\mathbf{\Omega}_i = \begin{pmatrix} Bilaspur & distt & CG & outsideCG \end{pmatrix}'$$

describes the location of the rickshaw driver's place of origin and is a proxy for the distance of migration. The model tests the relationship between renting a rickshaw (ϕ_i) and the various measures of migration – a measure of the duration of migration ($migrantyears_i$), a discrete measure of the distance of migration ($\mathbf{\Omega_i}$) and a measure of the degree of attachment to the place of origin ($visitshome_i$). An important empirical relationship we examine in the data is differences in renting behavior as a function of both the numbers of annual visits home and migrant type to establish the role of storage costs. We expect that long terms migrants who are from outside Chhattisgarh will resemble permanent city residents, and therefore their renting patterns will match those of residents perhaps due to access to storage resources.

In addition, we introduce three variables that indicate the driver's attachment to the profession and therefore might impact the decision to rent – whether the driver holds a license, the number of months spent driving each year ($monthsdriving_i$) and the length of time, in years, driving the rickshaw ($yearsdriving_i$). Insofar that closer links to the profession decrease the probability of renting rather than owning a rickshaw, we expect a negative coefficient on these variables. We also control for demographic characteristics such as the rickshaw driver's age, education, caste and religious community affiliation ($\mathbf{X}_i$). Finally, it is possible that the tabulation of credit variables presented in Table 4 incorrectly assesses the degree to which drivers are credit-constrained. In this case, liquid assets owned by the driver will impact rickshaw purchase decisions if a driver is unable to access formal or informal credit in the city. The coefficients $\beta_1, \beta_2, \beta_3$ and β_4 are biased if access to credit is correlated with migration status, which can be the case if either credit access varies between rural and urban markets, or if lack of credit caused drivers to migrate. To account for access to formal sources of credit, we introduce binary variables that indicate whether the driver's village of origin had either a bank, a post office or a credit society ($\mathbf{credit}_i$).

4.2 Results

How does the probability of renting vary with different measures of migration? Table 5 contains our primary sets of results. These alternate specifications add progressively increasing nuance to our measure of migrant status and are broadly in line with our prediction that more distant agents are more likely to rent even controlling for other variables. To aid the interpretation of coefficients as probabilities, we report marginal effects of the probit estimates.

Column A in Table 5 reports the results of an abbreviated version of the probit model specified in Section 4.1. This version considers the probability of renting only as a function of the distance that the driver migrated from. The results show that, as expected, city residents are least likely to rent their rickshaw with the probability of renting increasing with the distance of origin. Comparing with those drivers who are from Bilaspur city, renting rates increased by 18.3 percent for those drivers from Bilaspur district, by 43.5 percent for those from the state of Chhattisgarh but outside the district, and by 53.9 percent for those from outside the state. A χ-squared test (not shown) rejects the equality of these coefficients at the 10 percent level.

Adding the annual number of visits to place of origin and the number of years since migration to Bilaspur, has a significant impact on the results, as evidenced in Column B. In this case, we see that only those drivers from outside the state have a statistically higher probability of renting their rickshaw compared to those from Bilaspur city. Instead, much of the impact on probability of ownership seems to be due to other dimensions of migration. Important is the coefficient on *District x visits home*, which implies that an additional annual visit home for a driver from Bilaspur district increases the probability of renting by 3.0 percent. This result is statistically significant at the 5 percent level. Drivers with weaker ties with the city who frequently return home are more likely to rent a rickshaw in the city. The coefficients on *Chhattisgarh x visits home* (+7.4 percent) and *outside Chhattisgarh x visits home* (+4.9 percent) are also positive and in fact larger than the coefficient on *District x visits home*, indicating that frequent trips home are even more likely to enhance renting among these drivers. However, drawing definite conclusions is difficult since the coefficients cannot be statistically distinguished from the null.

A long duration of residence in Bilaspur does not seem to have a large or statistically significant impact on the probability of renting if the drivers are from Bilaspur district or from within the state. However, an additional year since migration to the city has a large, negative and statistically

significant impact on renting (-5.3 percent) for drivers who migrated from outside Chhattisgarh. This suggests that controlling for frequency of annual visits to the place of origin, drivers from outside Chhattisgarh behave like semi-permanent residents and mirror the renting patterns of drivers who reside permanently in Bilaspur.[12]

The main threat to the validity of these results is the effect of factors that might determine the probability of renting, but are omitted from the specification. These factors fall in two groups of variables with different implications for ownership. First are variables such as possession of a driver's license, the number of months that the driver spends annually operating the rickshaw and the number of years that he has been doing so that indicate the attachment of the driver to the profession. We expect that attachment is negatively correlated with rickshaw renting. Second are variables indicating the driver's age, years of schooling, caste and religion that might control for demographic factors that impact ownership. We expect that the probability of rickshaw renting decreases with a driver's age, but do not have a clear prediction for the impact of the other variables.

Column C reports the impact of introducing these co-variates into the specification. We do not observe changes to the results, especially the coefficients on $distt * visitshome$ and $outsideCG * myears$, indicating the essential results reported in Columns A and B are robust to specification. The coefficients associated with *license* and *monthsdriving* are negative, large and significant at the 5 percent level, suggesting that attachment to the profession strongly influences rickshaw ownership. Finally, the coefficients associated with age, caste and religion are all small and statistically insignificant, which is in line with the theoretical ambiguity with these variables.

The final set of variables in Column C represent availability of credit from formal sources in the driver's place of origin. As mentioned earlier, these formal sources are banks, post offices and credit societies in the village of origin (in case of a migrant driver) or in Bilaspur city (in case of a resident driver). Since the main coefficients of interest listed in Column C are robust to the inclusion of these controls, we conclude that inability to access credit is not the chief predictor of participation in rental contracts.

Thus, our findings are broadly in line with the predictions of the analytical model – migrant status is an important predictor of renting, even controlling for other variables.

[12]We tested an additional specification that considers commuter migrants, defined in this case as those drivers who return to their place of origin more than 40 times a year (not shown). However, all commuters rent the rickshaw they drive and therefore show no variation in ownership for commuters, which is consistent with the hypothesis about such drivers presented in Section 2.

5 Conclusion

This paper has attempted to shed light on incorporation of new agents into relation-based exchange, using a case study of the cycle-rickshaw rental market. We have argued that not only do migrant drivers face higher costs of ownership, they face a higher penalty for defaulting, and thus, garages recognize them as better *ex post* risks. We formalize this insight in an analytical model that predicts that for any given rental rate, drivers that are more "migrant" are more likely to participate.

We further tested the prediction of our model with data collected from rickshaw drivers in a small city in central India. A unique feature of our dataset is that it recognizes migrant status as a multidimensional variable, depending not only on place of origin but also length of stay and number of visits home. Even after controlling for other variables, such as credit access, that may explain the observed pattern of rental participation, we were able to confirm that migrant status is a significant predictor of rental participation. Our formulation focuses on the garage's willingness to rent out to rickshaw drivers with certain characteristics, as much as the driver's desire to rent.

A number of studies have suggested that the prevalence of tight networks in relation-based governance constrain market expansion and growth (Macours 2004; McMillan and Woodruff 1999; Cooter and Landa 1984). As Fafchamps (2001) argues often agents in relationship-based networks prefer to deal within their networks. Our findings, however, illuminate a mechanism by which new agents can be incorporated under relation-based contract governance, allowing for market expansion.

As Fafchamps (2001) suggests, the circulation of information can constitute an entry barrier for new agents. The present case study confirm this insight. To the extent that there is little information sharing in the rickshaw rental market, it remains relatively open and welcoming to migrant drivers.

A parallel mechanism is reported by McMillan and Woodruff (1999) in the context of trading relations in Vietnam. They show that when there is "lock-in", i.e., a customer is unlikely to be able to find an alternative partner, more credit is offered. However, the terms on which they define "lock-in" is different. In our case study, it is determined not by specialization or number of competitors, but by the size of the network each driver can access. Migrant drivers who can only access a limited network thus face a higher penalty for default, and thus are more likely to participate in the rental contract.

In terms of Dixit (2009)'s visualization, we can conceive of the rickshaw rental market not just as one large circle, but also as a series of smaller circles, centered around particular agents, overlapping with the larger circle. While our data pertains to only one period of time, the qualitative evidence from

our garage study does suggest that this initial segmentation is overcome as migrants are absorbed into the market and can move between garages.

Note also that our findings closely parallel the theoretical model proposed by Basu and Bell (1991) of fragmented duopoly with resident drivers representing a contested segment and migrants representing the captive segment (Basu 1997; Mishra 1994) without however the prediction of price discrimination.

Dixit (2003) also predicts that such "worlds of intermediate size fare worst" because they are too large for effective community-based contract enforcement and at the same time too small for more formal governance structures. Testing this prediction is outside the scope of this paper, though transaction data from our garage study shows levels and pattern of default to be fairly pervasive, though interestingly, in line with our formalization, default rates for migrant drivers tended to be somewhat lower.

From a policy perspective, our findings offer evidence that informal systems of governance have greater flexibility and potential for growth than hitherto realized. In particular, they suggest that the cycle-rickshaw rental market in Bilaspur and other cities across India offers an easy source of capital for new migrants into the city.

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Table 1: **Garage data**

	MCB data	**Study data**
Total garage rickshaws	2,658	3,738
Number of garages	130	176
Mean size	20.4	21.2
Largest	93	130
Median	12	12
Bottom quartile (size cut-off)	7	7
Top quartile (size cut-off)	30	30.5

Note: Differences between MCB and study data are explained partly by underreporting of rickshaws at garages listed with MCB, and partly by garages located outside the municipal boundaries of the MCB. Source: 2002-03 data from the Municipal Corporation of Bilaspur combined with survey data.

Table 2: **Capital requirements**

	Lowest	**Highest**
Monthly variable costs (Rs.)	150	300
Purchase price for new rickshaw (Rs.)	4000	5500
Purchase price for second-hand rickshaw (Rs.)	1500	4000
Rental rate for 24 hour period (Rs.)	15	20

Notes: (1) Monthly variable cost include spare part maintenance and replacement costs but does not include mechanic's salary or labor charges, even where applicable. Per month salary for mechanics hired by garage owners range from Rs. 1500-3000. (2) Garages do not report the implicit cost of storage since most of the garages operate on encroached land owned by the government. (3) In absence of accounts, garage owners reported rounded numbers in all cases. Source: Interview data from Bilaspur.

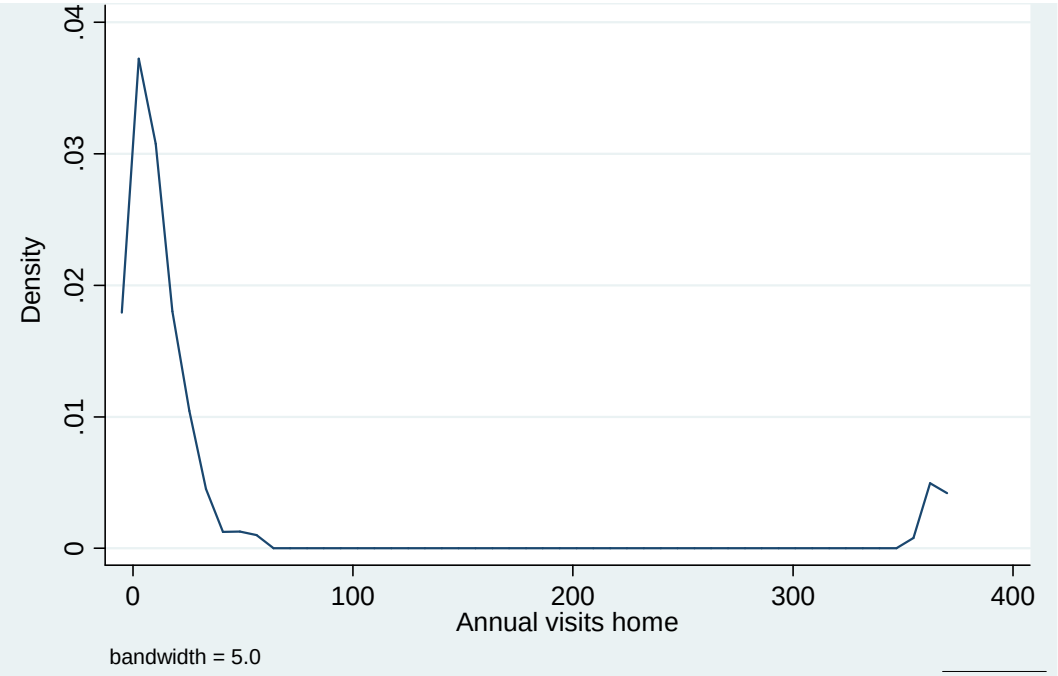

Figure 1: **Distribution of annual visits home for district migrants**

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Table 3: **Summary statistics**

	A: All drivers			B: Owners			C: Renters			D: Difference
	Obs	Mean	Std Dev	Obs	Mean	Std Dev	Obs	Mean	Std Dev	Mean
Place of origin										
Bilaspur	302	38%		73	49%		229	36%		14%
District	244	31%		46	31%		198	31%		0%
Chhattisgarh	125	16%		16	11%		109	17%		-6%
Outside Chhattisgarh	121	15%		13	9%		108	17%		-8%
Age (years)	820	32.4	9.7	151	35.8	9.8	669	31.6	9.5	4.18
License (%)	645	26%		118	57%		527	19%		0.38
Education (years)	818	3.4	3.6	151	2.7	3.4	667	3.6	3.6	-0.83***
Years driving	819	11.0	9.3	151	14.5	9.6	668	10.2	9.1	4.30***
Months driving	768	11.3	1.9	149	11.8	0.8	619	11.1	2.1	0.72***
Annual visits home	463	26.4	78.1	74	15.5	59.1	389	28.4	81.1	-12.93**
Age at arrival (years)	334	19.0	10.9	60	20.6	9.6	274	18.7	11.1	1.89
Years in Bilaspur	351	12.5	11.6	59	15.2	10.8	292	11.9	11.7	3.30***
Family occupation										
Agriculture	72	42%		12	36%		60	44%		-7%
Labor	59	35%		14	42%		45	33%		10%
Rickshaw	21	12%		5	15%		16	12%		3%
Others	18	11%		2	6%		16	12%		-6%
Caste and religion										
Other Backward Classes	176	35%		30	32%		146	36%		-4%
Scheduled Caste	181	36%		44	47%		137	34%		13%
Scheduled Tribe	89	18%		9	10%		80	20%		-10%
Others	52	10%		10	10%		42	10%		0%

Notes: *Annual visits home*, *age at arrival* and *years in Bilaspur* reported only for migrant drivers. Other category of *Caste and religion* includes Upper Caste Hindu, Muslim and Christian drivers. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Source: Primary survey data collected 2003–04.

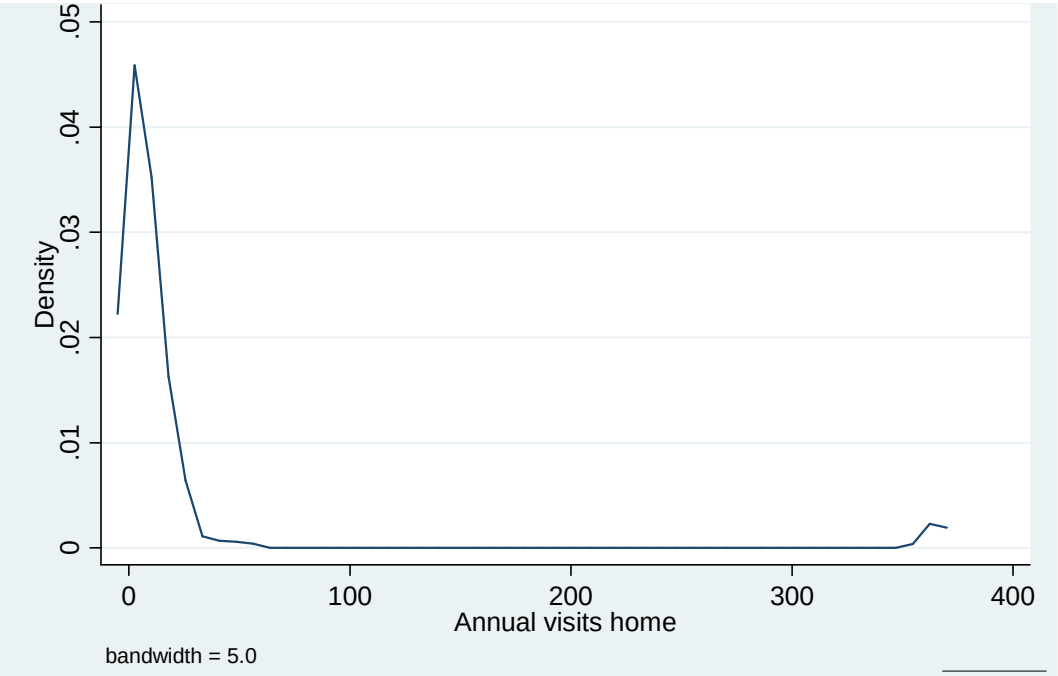

Figure 2: **Distribution of annual visits home for Chhattisgarh state migrants**

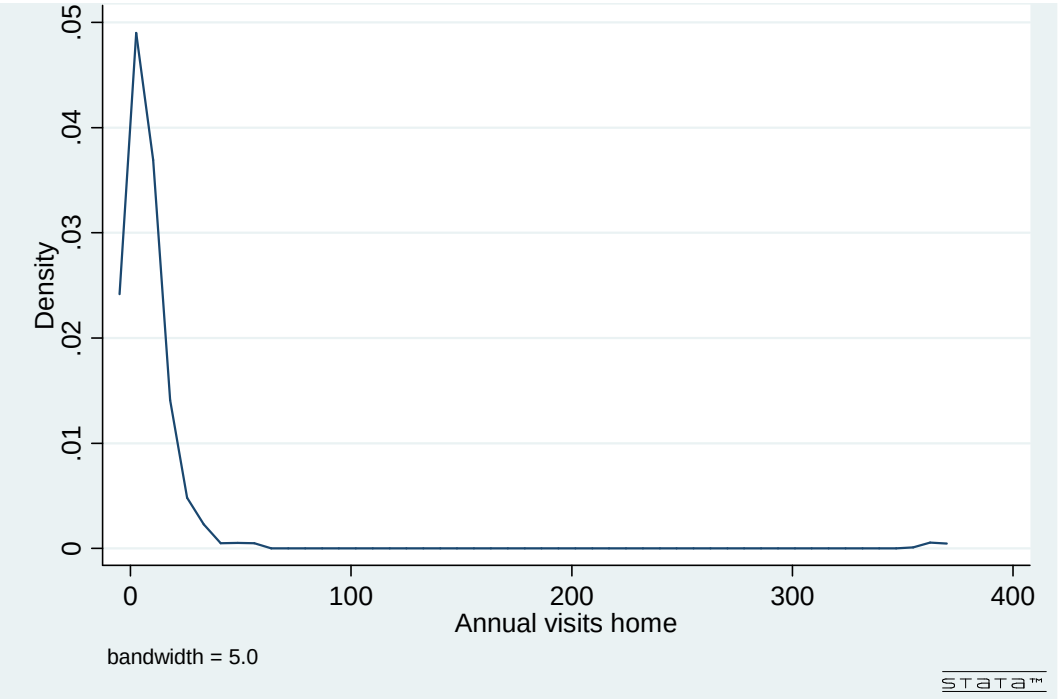

Figure 3: **Distribution of annual visits home for migrants from outside Chhattisgarh**

Table 4: **Access to credit**

A: Owners			**B: Renters**		
	Obs	Mean		Obs	Mean
Credit availability in place of origin					
Post office	130	74.1%	Post office	523	72.5%
Bank	129	62.3%	Bank	523	56.0%
Credit society	129	63.8%	Credit society	523	57.1%
Credit use					
Ever borrowed	32	28%	Ever borrowed	127	21%
If borrowed:			*If borrowed:*		
From whom?			From whom?		
Moneylender	5		Moneylender	14	
Village acquaintance	1		Garage owner	2	
Village chief	1		Neighbor	2	
			Acquaintance	1	
			Landlord	1	
			Uncle	1	
How much? (Rs.)	9	8811	How much? (Rs.)	27	3426
Why?			Why?		
Family illness	4		Family illness	10	
Wedding	2		On need	3	
Buy rickshaw	**1**		Wedding	3	
Roofing	1		Consumption	2	
For children	1		Delivery	2	
Money stolen	1		Roofing	1	
			Festival	1	
			Gambling loss	1	
			House construction	1	
			Household expenses	1	
			Money stolen	1	

Source: Village directory of Census of India (2001) and primary survey data collected (2003-04).

Table 5: **Results of renting vs. ownership test**

Dependent variable: Probability of renting			
	(A)	**(B)**	**(C)**
District	0.183	-0.404	**-1.183*****
	(0.122)	(0.264)	(0.458)
Chhattisgarh	**0.435*****	0.398	-0.206
	(0.163)	(0.423)	(0.587)
Outside Chhattisgarh	**0.539*****	**0.765***	0.564
	(0.172)	(0.430)	(0.595)
District x visits home		**0.030****	**0.043****
		(0.014)	(0.021)
Chhattisgarh x visits home		0.074	0.077
		(0.052)	(0.071)
Outside Chhattisgarh x visits home		0.049	-0.004
		(0.051)	(0.047)
District x migrant years		0.008	0.020
		(0.012)	(0.017)
Chhattisgarh x migrant years		-0.018	0.002
		(0.017)	(0.022)
Outside Chhattisgarh x migrant years		**-0.053*****	**-0.060****
		(0.020)	(0.031)
Months driving per year			**-0.199*****
			(0.069)
Years driving			0.014
			(0.012)
Age			**-0.025****
			(0.011)
Years of schooling			0.029
			(0.024)
License			**-0.837*****
			(0.163)
Muslim			-0.352
			(0.477)
OBC			0.262
			(0.203)
SC			-0.201
			(0.199)
ST			**0.556***
			(0.336)
Post office			0.360
			(0.311)
Bank			0.278
			(0.457)
Credit society			**-0.752***
			(0.437)
N	792	596	431

Notes: Reported coefficients are from the estimation of equation (8). *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Standard errors are reported in parentheses. Residence in Bilaspur city is the omitted category. Source: Primary survey data