Ethnic Networks and Enterprise Credit: The Serahules of The Gambia

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Abstract

This work analyzes the effects of ethnic heterogeneity on credit and entrepreneurship in The Gambia. We develop a model of credit transactions based on ethnic density, which shows that where formal credit markets fail denser ethnic groups will have better access to credit. This work places a special emphasis on the Serahule ethnic group, which is ethnically dense and entrepreneurially successful. Our results show that Serahule-owned enterprises are indeed larger and more profitable. Furthermore, their marginal rate of return of capital is significantly lower than that of enterprises owned by other ethnicities, as one would expect with lower credit constraints.

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Introduction

Sub-Saharan Africa has the most ethnically heterogeneous population in the world. While the implications of this relatively high ethnic heterogeneity for outcomes such as macroeconomic growth (Easterly and Levine 1997) and public good provision (Miguel and Gugerty 2005) have received some attention within the economic literature, the implications for micro-level development issues such as credit and entrepreneurship have received relatively less attention. A number of research papers have examined the intersection between ethnicity, credit and entrepreneurship in Africa but they have not explored ethnic heterogeneity within the indigenous African population (Biggs et al 2002; Fafchamps 2000, 2003; Fisman 2003). We explore the interaction between ethnicity and entrepreneurship in The Gambia, focusing on the implications to possible differential access to credit due to differences in ethnic networks between the Serahule[1] ethnic group and other ethnic groups.

The nature of the relationship between two individuals who are from the same immediate family is very different from any two unrelated individuals. By extension, the nature of the economic relationship between any two individuals from one ethnicity will likely be different from that of two unrelated individuals especially in ethnically heterogeneous sub-Saharan Africa. Social relations between individuals and households have been shown to help mitigate the effects of certain market failures such as moral hazard and adverse selection (Udry 1994). Sub-Saharan Africa's paucity of formal financial intermediation and well-functioning credit markets means that informal lending and borrowing would characterize most credit markets. Given that most individuals in sub-Saharan Africa do not have the necessary capital to start a business and credit transactions are frequently affected by moral hazard, shared ethnic group membership might

[1] Also known/spelled as the Sarahule, Sarakole, Saraculeh, Serahuli, or Maraka.

serve an important role in credit markets. In the case of small enterprises, a retail trader often needs to take some goods on loan from a wholesaler as a result of the small size of her working capital (Fafchamps 2003). However, the likelihood of receiving trade credit may depend on interpersonal connections such as ethnicity since a supplier is in a better position to know about the credit-worthiness of a retailer who is from the same ethnic group in places with no formal credit reporting bureaus.

The interpersonal nature of the transactions in general among businesses in Africa has already been well documented. In a study of six African countries (Burundi, Cameroon, Cote d'Ivoire, Kenya, Zambia and Zimbabwe), Bigsten et. al (1999) shows that there are rarely any contracts involved in market exchanges among African firms. The study reports that in areas without strong court systems, businesses tend to rely more on social networks, which are often based on ethnicity. So in the absence of a well-functioning judicial system, the repayment performance of a credit contract may depend on the entrepreneur's social relationship and ethnic proximity to the borrower. Because of these reasons, the nature of the relationship between agents in the economy matters a great deal to the success of business contracts as well as the business itself. So an important factor which affects entrepreneurship in sub-Saharan Africa is likely to be missed if the effect of ethnicity is ignored.

A number of articles have analyzed the link between ethnicity and entrepreneurship within Africa. Some of the studies in the literature go back decades (Marris 1971; Macharia, 1988) but they tend to be mostly descriptive. In the more recent literature (Biggs et al 2002; Fafchamps 2000 and 2003; Fisman, 2003; Mengistae, 2001), the availability of better data (in terms of detail information on relevant entrepreneurial and household variables) covering

multiple countries allows a more rigorous analysis of the interaction between ethnicity and entrepreneurship.

Fafchamps (2000 and 2003) study the role of ethnicities on business relations in Africa. In his 2003 work for example, he focused on a specific type of business, agricultural traders, in Benin, Malawi and Madagascar. The main endogenous variable is trade credit, which is essential since many of these small-scale agricultural traders do not always have sufficient capital. The business network of a trader (defined as the number of contacts she has) has a significant, positive effect on trade credit. More relevantly, the ethnicity of a trader has no direct effect on obtaining trade credit, once one has controlled for network size. However, this does not imply that ethnicity is not significant among these traders. As the author makes clear, it is entirely possible that traders from certain ethnicities have access to credit within their ethnic network thereby removing the need to demand trade credit from suppliers.

In the Fafchamps (2000) work on enterprises in Kenya and Zimbabwe, he found that access to trade credit is influenced by ethnicity divided into African, Asian, and European. However, limitations in the data could not allow him to attribute the differential access to credit to ethnic discrimination or other unobserved differences in firm characteristics that may be correlated with ethnicity. It could be that firms owned by Asians and Europeans had better collateral or better-educated managers to begin with, which would enable them to access credit irrespective of the ethnicities of suppliers. If some of these unobserved variables are correlated with ethnicities, it is impossible to tell if the better credit access enjoyed by Asian-owned firms is the result of ethnic discrimination. Fisman (2003) tries to differentiate between these two effects by looking at the relationships between a firm and all its suppliers. His data set comes from five African countries: Ghana, Kenya, Tanzania, Zambia and Zimbabwe. Using a fixed-effect

estimator, Fisman (2003) found that a firm is more likely to get trade credit from suppliers of the same ethnic group.

The above works provide strong evidence for the importance of ethnic affiliation for access to credit and entrepreneurship. However, they have focused on ethnic differences between the indigenous population on the one hand and the Asian and European/white-owned businesses on the other hand, and ignored the heterogeneity within the indigenous population. It is this heterogeneity in the indigenous African population that has been the focus of work (e.g., Easterly and Levine, Miguel and Gugerty) that asserts the difficulties of development in ethnically heterogeneous Africa. While that work sees ethnic heterogeneity as a detriment to a well functioning economy and polity, a recent book by Robert Bates (2008) suggests that ethnic heterogeneity is an outcome of weak political and economic institutions rather than a cause of them. Our work investigates whether ethnic heterogeneity can serve a useful role in economic transactions when economic institutions are missing or weak. In particular we ask what effects ethnic heterogeneity among African groups have in credit markets and entrepreneurship?

This work contributes to the literature by focusing on the effects of ethnic heterogeneity among the indigenous ethnic groups in The Gambia on credit and entrepreneurship. We place a special emphasis on the Serahule ethnic group, which has long been noted in the literature for its business successes (Curtin 1975; Easterly 2001; Easterly 2005; Lovejoy 1978). The Serahule ethnic group is one of the eight main ethnic groups in The Gambia but has a disproportionate presence in entrepreneurship. Our work provides the first empirical evidence of the dominance of this Serahule ethnic group that has been asserted in several recent publications without accompanying evidence (Easterly 2001; Easterly 2005).

Having identified the importance of ethnicity on entrepreneurship in The Gambian economy, we develop a theoretical model of the effects of ethnic networks on access to credit. This model shows that with missing contract enforcement mechanisms (e.g., courts) access to credit will be a function of wealth levels and the density of ethnic interactions. We develop from this a number of implications, which we test and find to be consistent with household data from The Gambia.

Our results show that Serahule-owned enterprises are indeed larger (in revenues, capital and number of workers) and more profitable. Furthermore, the marginal rate of returns for Serahule enterprises is significantly lower than that of enterprises owned by other ethnicities. High marginal rate of return, even after controlling for numerous household and enterprise variables, is suggestive of credit constraints. If credit constraints were not present, then profit maximization predicts that the households should increase their investment up to point where the marginal rate of return equals the cost of capital, which is the interest rate on loans. This particular point implies that Serahule-owned enterprises are less credit constrained, which suggests that their ethnic network may ease their access to credit in ways not available to other households from different ethnic groups.

The Serahule Ethnic Group in The Gambia

The Serahule ethnic group makes up about 9% of the Gambian population[2]. Historically within virtually every ethnic group in West Africa, social stratification in occupations or livelihood existed. While each ethnic group had its clerics, farmers, blacksmiths, traders,

[2] The other ethnic groups and their percentages are: Mandinka (37%), Fula (20%), Wolof (15%), Jola (11%), Serahule (9%), Serer (3%), Aku (3%) and Other (2%).

warriors, etc., the Serahules were unusual in their concentration in trade (Curtin 1975). The Serahules in The Gambia are an offshoot of a much larger ethnic group called the Soninke. Their traditional homeland straddles the Sahelian region and forested regions of Southern-West Africa. While the Soninke also practice sedentary agriculture, they were and still are primarily merchants. They were among the first sub-Saharan groups that traded with the North African traders and eventually controlled most of the trade between the region and the Muslim world (Lovejoy 1978). As a result, they were among the first ethnic groups in the region to adopt Islam and today, virtually all Serahules are Muslims (Curtin 1975; Manchuelle 1997). When the Europeans arrived in the region a few centuries after the start of the trans-Saharan trade, their trade with the local population was again dominated by the various Serahule/Soninke groups (Curtin 1975; Wright 1977). This domination of trade routes persisted despite the vast areas with poor transportation infrastructure.

The Data

The data set for this work comes from two nationally representative household surveys carried out by the Central Statistics Department in The Gambia. The surveys, conducted in 1992 and 2003, are repeated cross-sections. The 1992 survey covered 1,391 households while the 2003 survey contains 4,942. Unfortunately, not all these households have the variables used in the main analyses. Most of our analysis uses data from 2003 since the 1992 does not have durable household assets, which we use to construct our wealth variable.

Table 1 presents the summary statistics of several key household variables. About 44% of all household have at least one enterprise. Households with enterprises are larger and have smaller average years of schooling but have significantly higher average household income.

There are no significant differences in the age of household head or the rate of female headship. The average household size for those with enterprises is 9.86 versus 7.87 for those without. Households with enterprises have a lower average for years of schooling, probably because many non-entrepreneurial households are likely to be headed by highly educated, salaried individuals. The average years of schooling of individuals (aged seven years and above) within household is unsurprisingly low at 3.06 years, and the average for household heads is only slightly above this figure at 3.38 years. While the average total household income is higher for entrepreneurial households, the distribution of wealth (using asset ownership as a proxy) is very similar for both groups (Figure 1).

Table 1: Household Characteristics for Enterprise and non-Enterprise Owners.

	Obs.	All Households	Does not Operate an Enterprise	Operates an Enterprise	Diff. Between 3 & 4 Significant?*
	1	**2**	**3**	**4**	**5**
Household Size	2502	8.75 (6.83)	7.87 (6.23)	9.86 (7.38)	Yes
Own Enterprise	2499	0.45 (0.50)			
Average Years of Schooling in Household[§]	2496	3.06 (3.06)	3.32 (3.37)	2.82 (2.64)	Yes
Rural Dummy	2496	0.47 (0.50)	0.50 (0.50)	0.40 (0.49)	Yes
Total Household Income[‡]	1589	50,997.14 (164726.70)	35,703.24 (107358.30)	70,986.35 (215391.50)	Yes
Years of School Of Household head	2496	3.38 (4.90)	3.84 (5.23)	2.91 (4.42)	Yes
Age of Household Head	2499	46.40 (14.15)	45.69 (14.48)	46.92 (13.53)	Yes
Female Household Head	2499	0.14 (0.35)	0.14 (0.35)	0.14 (0.35)	No

[‡]in 2003 Dalasi ($1=27Dalasi)
[§]For individuals 7 years and above.
*Whether the differences between enterprise (column 4) and non-enterprise (Column 3) households are statistically significant at the 95% level.

To come up with a measure of wealth, we use principle component analysis to create an asset index to proxy wealth[3] (Moser, 2006; McKenzie, 2005). Principle component analysis is a data reduction technique of providing a simple, scalar measure when one has a large number of discrete assets. It works well in this setting because while we have data on durable asset ownership, there is no information on their prices or depreciated values. Other measures of wealth such as size or value of land owned is not available.

The asset data are all dummy variables, indicating whether households own those assets or not. The ownership of higher-valued assets tend to increase with the value of the index, while assets whose ownership is correlated with lower overall asset levels will reduce the value of the index. Figure 1 shows the distribution of the asset index using all 11 assets (*wealth11*). As can be seen some of the scoring factors turned are negative, which is the case,for two assets: bicycle and radio. Having negative values of the index is not uncommon (McKenzie, 2005) when the data set includes both urban and rural areas.

[3] The eleven durable assets are: car, motorcycle, bicycle, telephone, TV/VCR, radio, air conditioner, refrigerator, generator, electric/gas cooker and washing machine.

Figure 1: Distribution of Asset Index (*wealth11*) for Enterprise and non-Enterprise Households. There is no statistically significant difference in means.

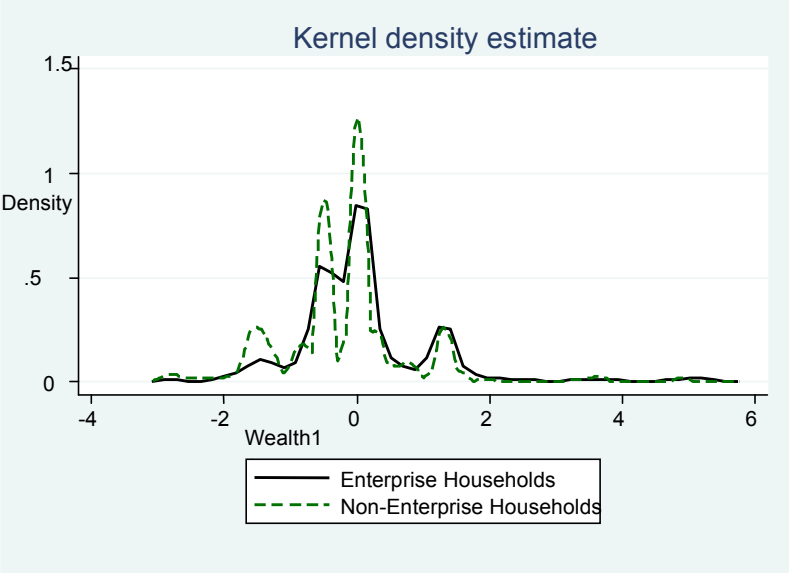
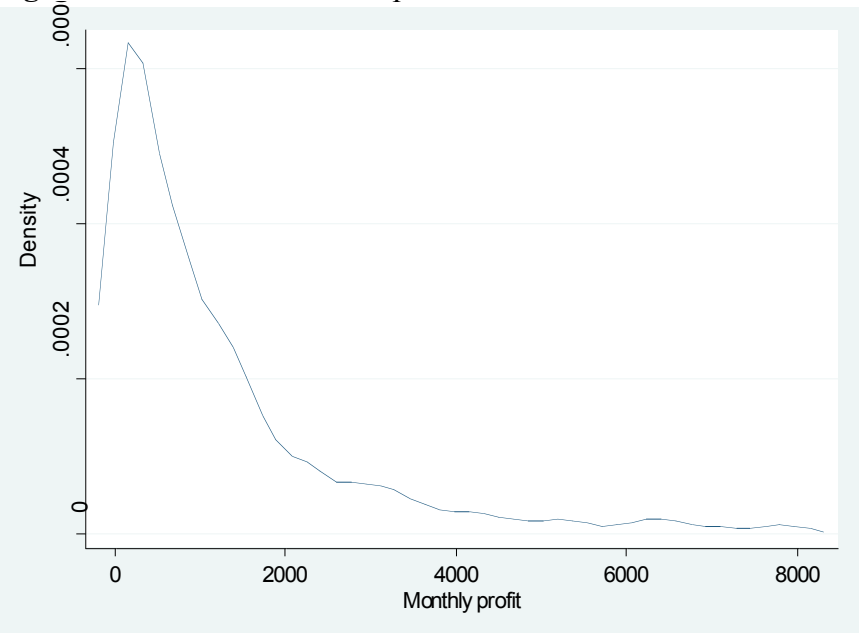


Figure 2 shows enterprise profits obtained by subtracting the monthly expenditures of the enterprise from the monthly revenue.[4] Most enterprises make a profit, however, a nontrivial proportion reported losses in the past twelve months. The average monthly profit is D4184 (D21,436 and D2,621 for Serahule and non-Serahule enterprises respectively) The profit distribution is skewed to the left with a few outliers of large profit levels.

[4] The monthly expenditure categories are hired labor, raw materials, land/building rentals, rental of machinery, maintenance & repairs, electricity & water, taxes & licenses and other expenses. The monthly revenue categories are income from cash sales, value of in kind payments received, rental of enterprise machinery, and other enterprise-related revenues.

Figure 2: Distribution of Enterprise Profit.



Theoretical Framework

We present a simple theoretical model to help illustrate how differences in ethnic networks can result in differences in enterprise outcomes. There are potentially many channels through which this can occur but we focus on differences in the degree of access to credit. Credit constraints are ubiquitous in developing countries and social institutions that can relax these constraints may be among the significant explanatory variables in entrepreneurial outcomes. The key variable in our theoretical model is ethnic network density, by which we mean the ease with which information travels within an ethnic group. The information could be business-related or serve other non-business but culturally important functions.

In an environment with weak judicial and law enforcement such as most of sub-Saharan Africa, moral hazard will be a problem in credit transactions. With missing or weak enforcement mechanisms the frequency and quantity of credit transactions between unrelated agents can become very limited. A relatively high ethnic network density may allow more transactions by

providing a mechanism for limiting moral hazard. Unlike transactions between unrelated agents, mutual membership in an ethnic network is likely to reduce moral hazard problems because information transmission and lack of complete anonymity or un-relatedness can subject agents to social sanctions that can discourage opportunistic behaviors.[5]

Let the profit function (π_j^P) of the entrepreneurial household *j* with wealth level *w* that borrows total capital, (*K*-*w*) from an informal lender and pays it back be:

$$\pi_j^P = g(K) + (1+r)(w - K) \qquad (1)$$

where *K* is the total capital required for production in enterprise, the function $g(\cdot)$ is increasing and concave[6] in *K, r* is the interest rate and the price of output is normalized to 1 since it does not play an important part in this model. Our model focuses on enterprises that are net borrowers and therefore assume that $w - K < 0$. The above equation (1) assumes that the loan received by the entrepreneurial household is repaid. The standard first order conditions for equation (1) without strategic behavior would have the enterprise using capital, *K*, up to the point where its marginal product is greater than or equal to the interest rate (i.e., $\frac{\partial \pi}{\partial K} : g'(K) \geq r$).

However, the household has the option of not paying back the loan through strategic default. While defaulting means that the entrepreneurial household gets to keep all the revenue from the operations, there are potential costs in terms of probability of the capital being successfully re-possessed through the formal justice system and/or social sanctions. The

[5] We focus on informal borrowing and abstract from formal borrowing from banks. This simplification is fairly innocuous since the level of formal borrowing is low (5%). This level of formal borrowing would be even lower in rural areas.

[6] The concavity of $g(K)$ implies that the marginal returns are decreasing in the level of *K*.

importance of the latter depends on whether the borrower and the lender come from the same ethnic network and the density of the network of that particular ethnic group.

Let φ represent ethnic network density of a particular ethnic group and let $q(\varphi)$ represent the degree of the social punishment, where $q'(\varphi) > 0$, $q''(\varphi) > 0$ and $q(0) = 0$. The ease of information flow in a dense ethnic network ensures that households that default face substantial social costs in addition to the probability of getting caught through the formal judicial system[7]. In the default case, the profit function of household j, $\mathrm{E}\left(\pi_j^D\right)$, is:

$$\mathrm{E}\left(\pi_j^D\right) = g(K) - p(K - w) - \mathrm{I}_q(m = h) \cdot q(\varphi) \qquad (2)$$

where p ($0 < p < 1$) is the probability of the loan being successfully repossessed and I_q is an indicator function (m and h index ethnic networks),

$$\mathrm{I}_q = \begin{cases} 1 & if \quad m = h; \text{lender } i \text{ from ethnic } m \text{ \& borrower j from } h \\ 0 & if \quad m \neq h \end{cases}$$

That is, $q(\varphi)$ plays a part if the borrower and lender are from the same ethnic group (m=h). In other words, the effectiveness of the ethnic network in discouraging opportunistic behavior depends on whether the borrower and lender come from the same ethnic network.

We assume that the lender in this model is risk-neutral and would always lend if the borrower is able to repay either because of the latter's wealth and/or mutual membership in some ethnic network. We assume that the ethnicity and wealth of the borrower can be observed by the lender. Also, the lender cares about the borrower's ethnicity only to the extent that it increases

[7] Another way of thinking about this is that the profitability of an entrepreneur suffers because when she defaults, the bad reputation puts her at a disadvantage within the community as a result of current and future potential profit-enhancing information being withheld from her.

the likelihood of repayment, all else being equal. So let the expected earning function of the lender $\left(E\left(\pi_i^{LD}\right)\right)$ be:

$$E\left(\pi_i^{LD}\right)=\begin{cases}\left(K-w\right) & \textit{if} \quad \text{no lending} \\ \gamma\left[(1+r)\left(K-w\right)\right]+(1-\gamma)0 & \textit{if} \quad \text{lending occurs}\end{cases} \tag{3}$$

where γ is the probability that the loan is repaid. The lender would earn $(1+r)(K-w)$ if he lends and is repaid, and zero if the borrower defaults. The lender would earn no return on his money if he does not lend. So the lender would prefer to lend if the probability of repayment exceeds the discount factor (for a one-period loan): $\gamma > \frac{1}{(1+r)}$. For some plausible values of interest rates ranging from 20% to 30%, this implies that repayment rates of 77% to 83% will induce the lender to make loans. As will be shown, the probability of repayment by the borrower will depend on her wealth, the density of ethnic network she belongs and whether she and lender share that ethnic network.

Proposition 1 examines how the density of an ethnic network facilitates the ease with which a borrower can obtain credit from a lender.

Proposition 1: *There exists a level of wealth ($\hat{w}$) for entrepreneurs above which, a lender will offer a loan to an entrepreneur. Furthermore, that level of wealth is decreasing in the density of the ethnic network ($\hat{w}'(\varphi) < 0$) and the strength of the formal legal system.*

Define $\hat{w}$ to be the level of wealth where the borrower is indifferent between repaying and defaulting. That is, $g(K)+(1+r)(\hat{w}-K) \geq g(K)-p(K-w)-\mathrm{I}_q(m=h)\cdot q(\varphi)$. Repayment becomes optimal if

$$\pi_j^P \geq \mathrm{E}\left(\pi_j^D\right) \Rightarrow$$

$$g(K) + (1+r)(\hat{w} - K) \geq g(K) - p(K - \hat{w}) - \mathrm{I}_q(m = h) \cdot q(\varphi) \tag{4}$$

$$\Rightarrow \hat{w} \geq K - \frac{\mathrm{I}_q(m = h) \cdot q(\varphi)}{1 + r - p} \tag{5}$$

For all households with wealth below $\hat{w}$, the lender will not to extend credit. Lending is only available for entrepreneurial households for whom wealth is equal to or higher than $\hat{w}$. As equation (5) shows, this threshold level of wealth is decreasing in the density of an ethnic network (φ) and the strength of the judicial system (*p*). Therefore, if an entrepreneur and a creditor share a dense ethnic network, this threshold wealth is lower for a given *r* and *p*, than if their ethnic group is less dense or they do not share an ethnic affiliation.

Lemma 1: *The amount of credit received by the entrepreneur is an increasing function of her ethnic network density if the creditor and the lender share the same ethnic group.*

From equation (5), we can derive the following equation:

$$K - w \leq \frac{\mathrm{I}_q(m = h) \cdot q(\varphi)}{1 + r - p} \tag{6}$$

The above equation can also be re-arranged as follows:

$$K \leq w + \frac{\mathrm{I}_q(m = h) \cdot q(\varphi)}{1 + r - p} \tag{7}$$

Equation (6) shows that the amount of credit an entrepreneur can borrow and the total level of investment are both positive functions of the density of her ethnic network. Suppose that φ^y and φ^z represent the densities of two different ethnic networks and further assume that $\varphi^y > \varphi^z$.

Then by equation (7), an entrepreneur in group *y* borrowing from a creditor in the same group will be able to borrow more than another entrepreneur in ethnic group *z* borrowing from a credit in group *z* with the same wealth level (given *r* and *p*). That is:

$$(K - w)q(\varphi^y) \geq (K - w)q(\varphi^z) \tag{8}$$

That is, joint membership in the same ethnic network with one's creditor is helpful in this situation if the density of the ethnic network is high. Because capital undergoes diminishing marginal returns and the amount of borrowed capital is an increasing function of ethnic network density, then the marginal returns to capital should fall for less constrained enterprises. In other words, holding other variables constant, the marginal returns to capital should be lower for enterprises whose owners belong to a denser ethnic group. It is also worth pointing out that despite the likelihood of ethnically dense entrepreneurs getting better access to capital, all firms in this environment are likely to be credit constrained due to the ethnic enforcement of contracts being less certain than that of commercial banks operating with effectively functioning court systems.

The implications of this model are that: a) the amount of money an enterprise is able to borrow is increasing in the entrepreneur's wealth level; b) an enterprise owner in a dense ethnic group will be able to borrow more money than one from a less dense ethnic group. Entrepreneurs who are able to optimally borrow money will invest in capital up to the point where the marginal product of capital equals or is close to the going interest rate. In contrast entrepreneurs with wealth levels below $\hat{w}$ will be constrained and will operate enterprises with higher marginal products of capital. Also the degree of density of an entrepreneur's ethnic group

would affect his ability to borrow and therefore the marginal product of capital in his enterprise would be negatively related to the density of his ethnic group.

Network Density of The Serahule Ethnic Group

A key variable across ethnic groups in our preceding theoretical framework is ethnic network density. While we do not have an objective variable measuring ethnic density, we provide some evidence to show how the Serahules have a relatively higher network density than other ethnic groups in The Gambia. First of all, they are a relatively small ethnic group (9% of the population), but unlike other ethnic groups that are spread out, they are highly concentrated in a single region of the Gambia, Region 6, where they represent 19% of the population (see Table 5). They speak a distinct language, which is spoken by only a few people outside of their ethnic group. They have a high rate of endogamy (marriage exclusively within the ethnic group) (Van Dusen Lewis 1978). And their participation in the formal wage sector is limited due primarily to their relatively low levels of formal schooling.

Table 5: Ethnic group distributions across all regions in The Gambia.

	Gambian Regions						
	Banjul & KMC	Western Region	North Bank Region	Lower River Region	Central River Region	Upper River Region	
	1	2	3	4	5	6	average
Mandinka	0.32	0.40	0.42	0.58	0.32	0.34	**0.40**
Fula	0.19	0.17	0.22	0.21	0.34	0.37	**0.25**
Wolof	0.21	0.12	0.25	0.05	0.24	0.02	**0.15**
Jola	0.15	0.21	0.01	0.04	0.03	0.001	**0.07**
Serahule	0.05	0.03	0.02	0.03	0.01	0.19	**0.06**

These percentages do not add up to 100% because several very small ethnic groups and immigrants from neighboring countries make up the remaining (approximately) 8%.

By definition, an important part of the "density" of an ethnic network is its size. A large ethnic group is unlikely to have high density simply because the sheer size in numbers promotes anonymity. Certain norms and practices are therefore hard to enforce informally since frequent social interactions between any two parties may be unlikely. In addition to smaller size, the likelihood of frequent social interactions between individuals within one ethnic group will be positively affected by spatial concentration. Even if an ethnic group is small in size but it is geographically spread out, then its ethnic network density will be weakened. Vast distances in Sub-Saharan Africa where transport networks are thin could easily create anonymity through the delaying of information transmission. Geographic distance is particularly important in the Gambia because communication is hampered by bad roads and the relatively low penetration of modern information technology such as telephone and internet beyond urban areas.[8] The importance of proximity in rural Africa in facilitating informal loans is also underscored in Udry (1990) and Udry (1994).

The Serahule ethnic group also has a distinct language from the ethnic groups around them. Because the ethnic group is small and it is concentrated in one region, few non-Serahules speak the language. The cohesive power of speaking one, distinct language as a minority group can further reinforce other factors that contribute to ethnic network density such as smaller size and regional concentration.

Relative to the other ethnic groups, the Serahule ethnic group has a high endogamy rate, which means that marriage across ethnic lines for this group is considerably less frequent (Van Dusen Lewis, 1978). By itself, a high endogamy rate may not necessarily mean much for ethnic

[8] The data used in this work were collected before cell phone networks existed in The Gambia, especially during the 1992 round of data collection.

network density in any significant sense. However, when a small and geographically-concentrated ethnic group has a high endogamy rate, the likelihood of relatedness between individuals becomes relatively high. Anonymity or lack of at least some distant family ties would be expected to become relatively rare between any two individuals in this ethnic group. High endogamy rate is also likely to increase what Bowles and Gintis (1998) referred to as the "parochialism effect" by creating high exit and entry costs for members and non-members respectively.

Endogamy is not the only characteristic that raises the cost of entry and exit. For non-Serahules, the differences in family names and language across ethnic groups would be a big barrier to breach. And an individual Serahule would have an incentive to remain inside the ethnic network and respect ethnically-prescribed norms because the costs that he would face upon exit in an alternative livelihood such as the formal wage sector would be quite high. That is because the average formal schooling of Serahules are lower relative to other ethnic groups and formal schooling is typically a prerequisite for entrance in the formal wage sector.

And finally, the Serahule ethnic group has been historically strong in the entrepreneurial sector. Given that this historic familiarity in trade, certain "best practices" are likely to have survived years of being tested and may be passed down through generations. The fact of regional concentration, high endogamy rates and distinct languages may reduce the rate in which some of this knowledge might diffuse into the networks of other ethnic groups.

Beyond the ethnographic literature, our data also show key observable differences between Serahule and non-Serahule households and entrepreneurs. Table 3 shows significant differences in household sizes between Serahule and no-Serahules. They also have substantially

larger households and much higher household income. Very few Serahule work in the formal wage sector which is most likely because formal educational attainment in their community is relatively low (2.65 average years of schooling versus 3.08 average years of schooling). On average, the proportion of Serahule living in rural areas is similar to non-Serahules.

Table 3: Household Characteristics by ethnic groups (the unit of observation is the household). Notice the differences in household size, income and average schooling.

	Non-Serahule			Serahule		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Household Size	2272	8.55	6.52	224	12.86	10.76
Household Income	1681	45,535	102,515	178	153,940	572,006
Average yrs of schooling in household‡	2272	3.08	3.08	224	2.65	2.58
Proportion of Rural	2272	0.47	0.50	224	0.47	0.50
Proportion of household who are salaried	2272	0.15	0.25	224	0.08	0.18

*monetary figures are in 2003 Dalasis ($1=D27)
‡This is the average years of schooling attained by individuals in household who are 7 years and above. Age 7 is the official age at which children can enter grade 1 in Gambia.

Empirical Results

In this empirical section, we begin with some evidence that demonstrates significant differences between Serahule and non-Serahule owned enterprises. Further analysis will show that Serahule-owned enterprises have larger capital than other enterprises and lower marginal products of capital, which we interpret as meaning they are less credit constrained. We also demonstrate that this difference in degree of credit constraints cannot be attributed to factors such as demographic, wealth or human capital differences across households relative to other ethnic groups.

Table 4 shows the various ways in which Serahule-owned enterprises outperform enterprises owned by other ethnic groups. In all measures of size, their enterprises are significantly larger. The average value of their capital is twelve times higher than the average of other enterprises and average revenue is approximately eight times higher. Similarly, average Serahule profit is seven times higher. Figures 3a and 3b show the distribution of capital for Serahule-owned enterprises and those owned by other groups. The average number of workers in non-Serahule enterprises is approximately one while that of Serahule enterprises is approximate two. Similarly, the average age of a Serahule-owned enterprise (10 years) is three years higher than that of other enterprises.

The characteristics of the manager of the enterprises are more similar across ethnicities. The average years of education of managers between the two groups are approximately equal and that difference is statistically insignificant. Both Serahule-owned and other enterprises have exactly the same proportion of female managers (0.35). If one uses age to proxy for manager experience, then the managers of Serehule enterprises have a three-year advantage on average.

Table 4: Enterprise and Manager Characteristics of Serahule and non-Serahule enterprises. These figures cover only households that have an enterprise.

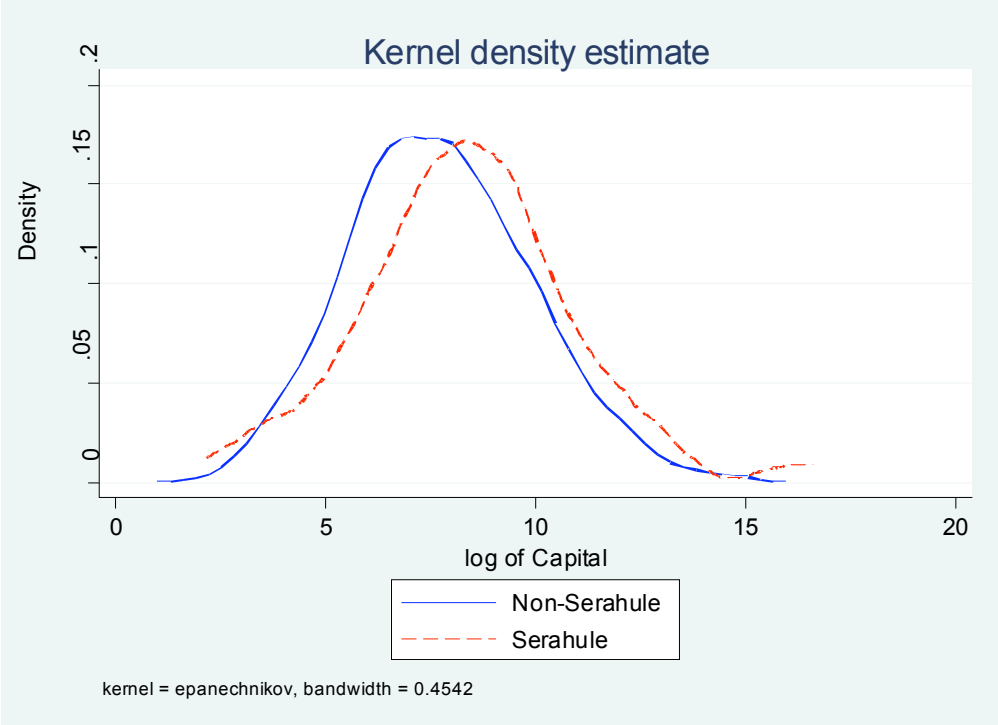
	Serahule		Non-Serahule		Is the Diff. Between the Groups Significant?‡
	Obs.	Mean	Obs.	Mean	
	1	2	3	4	5
Enterprise Characteristics					
Capital	128	304,457	1323	25,888	Yes
Profits	103	21,436	1378	2,621	Yes
# Workers	130	1.92	1382	1.19	Yes
Monthly Revenue	131	17,845	1318	2,117	Yes
Enterprise Age (months)	129	115.22	1311	88.27	Yes
Manager Characteristics					
Average Education of Manager	93	2.19	1341	2.00	No
% managed by Female	133	35%	1332	35%	No
Age of Manager (yrs)	133	43.62	1341	40.15	Yes

*monetary figures are in 2003 Dalasis ($1=D27); ‡The difference is tested at the 95% level.

Capital Ownership

The theoretical model presented above shows how there would be a positive link between membership in a high density ethnic network with easier access to capital. Specifically, Lemma 1 suggests that membership in a dense ethnic networks has a positive effect on the total amount that can be borrowed. The easier access to credit for households within a dense ethnic network allows them to have larger investments for a given wealth level. As a result, we would expect enterprises owned by the densest ethnic group, the Serahule, to have higher investment levels. We test this by estimating non-parametric distributions of the log of capital by enterprise across different ethnic groups. Figures 3a and 3b show that Serahule-owned enterprises have significantly higher level of investments than the population as a whole as well as any other specific ethnic group.

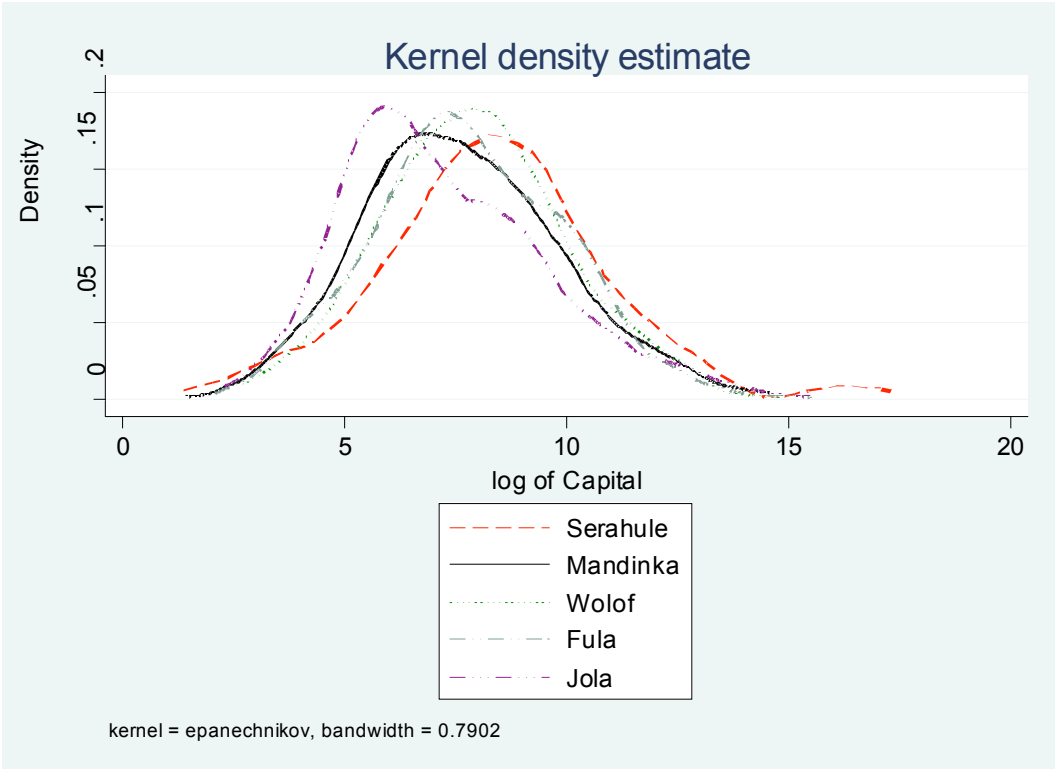
Figure 3a: Kernel Densities of log of Capital for Serahule and non-Serahule Enterprises.



Serahule Mean: 8.33 & Non-Serahule Mean: 7.73

Difference between the means of two groups is statistically significant at 95% significance level**.**

Figure 3b: Kernel Densities of log of Capital for Serahule and other Ethnic Groups.



Econometric Results

A key consequence of being less credit constrained is that, controlling for other variables, the less credit constrained enterprises should have a lower marginal rate of return to investment because their ability to increase investments should make their marginal returns approach the cost of borrowing capital. To test this prediction, we estimate the following profit equation:

$$\pi_i = X_i'\gamma + \delta_1 Cap_i + \delta_2 Cap_i^2 + \lambda_1 S_i + \alpha_1 R_{6i} \cdot S_i + \alpha_4 Cap_i \cdot S_i + \mu_i \quad (9)$$

Where π_i is enterprise profit, X_i is a vector of household and enterprise variables, S is a dummy for membership in the Serahule ethnic group, Cap_i is capital investment and $Cap_i \cdot S_i$ is the interaction between capital investment and the Serahule dummy. The inclusion of the quadratic term for capital allows us to determine if the marginal rate of return to capital changes with the level of investment while the interaction term with the Serahule variable tests differences in the marginal rate of returns of capital by ethnic group.

To ensure as much as possible that our estimates do not suffer from omitted variable bias, we include controls in X in equation (9). To control for human capital differences, we include the years of schooling of enterprise manager. By controlling for both the age of manager and the enterprise age, we control for the possibly role of learning. We include regional dummies (in addition to a rural dummy) to control for possible regional effects that could be driving differences in profit through differences in regional markets or concentrations of ethnicities. We control for differences in sectors by including dummies for the primary/extractive, manufacturing/processing and service sectors[9]. And finally, by including household size and its

[9] The excluded industry dummy in all estimations is the Service sector.

squared term as the explanatory variables, we can control for the possible labor advantage of employing own household members instead of hiring on the labor market.

We use both OLS and IV regressions in estimating equations (9). The IV estimation is necessitated by the possibility that enterprise capital may be correlated with unobserved manager ability. We instrument capital, its squared term and interaction with the Serahule dummy with the mean tax assessment rates in district and population density in district (we also include district population density squared – so there are a total of three excluded instruments).

A main justification for using the mean tax assessment rates in district is that tax collection rates in developing countries are low (Tanzi and Zee, 2001). For example, only 49% of enterprises in this data set claimed to have been taxed in the preceding 12 months. Among the major reasons for the low tax assessment rates are the limited administrative capacity of the Gambian tax collection system and the small size of many enterprises. Even if administrative capacity of tax authorities were higher, the small size of many of the enterprises would still make it difficult for authorities to locate all the small enterprises. Consequently, only the largest and the most visible enterprises tend to be taxed. Since the size of an enterprise is reflected in the size of its capital, the likelihood of being taxed should be correlated with enterprise size, which satisfies one of the key requirements as a valid instrument. The mean value of this variable (mean tax assessment rate) is 30.16%, the standard deviation is 11.72%. We use the mean district tax assessment rates rather than an individual enterprise tax payment indicator with the implicit assumption that doing so may limit the degree to which the exogeneity condition is violated through active individual concealment of business assets.

Mean tax assessment rate in district is not a perfect instrument. Specifically, we rely on the critical assumption that the likelihood of paying tax has very little or no direct relation to the ability of the enterprise owners. It may be possible that high ability individuals may also be more able to evade tax authorities than low ability ones, but we believe that tax evasion is more likely related to family connections to the government, which are not directly related to ability. Another potential concern is that there could be reverse causality in that tax collection rates may be responding to investments rather than the other way round. We believe this is unlikely since it would require a lot of information on the part of tax authorities, which is incompatible with their low administrative capacity.

The other instrument is district population density. Densely populated areas should be highly correlated with capital investments because sparsely populated areas should be less able to support larger enterprises, which require large investments. For example, the median capital investment level of enterprises (conditional on positive investment) in rural areas is only 53% of the median investment level of enterprises in urban areas in the sample (D1505 versus D800). And the direction of causality is likely to run from population density to investment levels. While some individual entrepreneurs may move around, given that Gambia has among the lowest levels of urban migration in Africa, it is unlikely that the overall population movement across districts is responding to pre-existing investment levels. It is also unlikely that there is any significant correlation between unobserved ability and population density. For example, there is no particular reason why all high-entrepreneurial-ability individuals would end up living in highly dense areas since high ability would be an advantage in all activities (for example, farming, wage work, entrepreneurship, etc.) and not necessarily in one or a few activities. And with the exception of the capital city, most areas of the country offer a mixture of economic activities.

Regression Results

The profit function regression results are presented in Table 7. As the results clearly show, the Serahule dummy variable is positive and significant meaning that the Serahule advantage seen in average profits remains when we control for other variables. This provides evidence to support what the literature describes anecdotally as the superior business and entrepreneurial skill of the Serahules.

More relevant to our claim on access to capital, the Serahules have a lower marginal returns to capital at a given investment level (as shown by *Serahule*Capital*) as expected. The Serahules have lower marginal returns to investment at the median level of investment relative to other regions. The marginal returns to capita for all enterprises (Serahules and non-Serahules) are all very high. The average level of investment is D44,679. Therefore, at the mean level of investment, the marginal rate of return to capital for non-Serahule enterprises is 14% per month (using OLS results in column 1 of Table 7) and 58% per month (using the IV results in column 3 of Table 7). For the Serahules, the marginal rate of return to capital is 0.09% per month (using OLS results) and 11% per month (using IV results). The differences in marginal rate of returns to capital between Serahules and non-Serahule enterprises are statistically significant. The fitted marginal rates of returns to capital for Serahule and non-Serahule across different capital levels are graphed in Figure 4.

Given that the monthly lending rates at Gambian banks between 1993 and 2003 range from 2.01% to 2.15% (World Bank 2008), the above marginal rates of return (except for the Serahule OLS result) all exceed the lending rates. The large difference between lending rates and marginal rates of return to capital suggests that most Gambian enterprises are credit constrained.

If enterprises were not credit constrained, investment should increase up to the point where its marginal rate of returns is close to or equal to the cost of borrowing.

The small values of the F-statistics from the first stage regression in Table 7 suggest the instruments for capital may be weak. In the presence of weak instruments, our IV estimates may be biased in the direction of the OLS estimates (Chao and Swanson, 2005). If we assume that capital investments and entrepreneurial ability are complementary and enterprises are credit constrained, as it is likely, then many high-entrepreneurial-ability individuals will be constrained since they would be below their optimal levels of investment (McKenzie and Woodruff 2006). So to the extent that the OLS estimates are biased due to the correlation between unobserved ability and capital investments, the direction of the bias is downwards. This implies that our estimates of marginal rate of returns to investments likely provide a lower bound for true values in The Gambia. We also have no reason to believe that this bias, if it exists, would be stronger or different for one ethnic group over another.[10]

[10] In another relevant study, del Mel, McKenzie and Woodruff (2008) used experimental data to estimate the returns to capital in Sri Lanka. Because the experiment involved administering positive and random shocks to capital (through cash and equipment grants), their estimation of the returns to capital is free of ability bias. The authors found that the estimated returns to capital from experimental data far exceed that of non-experimental data. This result is consistent with the preceding reasoning on the direction of possible bias of the estimated returns to capital.

Table 7: **Profit Function Estimation:**

	OLS	IV	IV
Serahule	7797.09 (3349.51)**	12150.60 (6190.28)**	10710.04 (8134.49)
Serahule*Capital	-0.13 (0.01)***	-0.34 (0.11)***	-0.47 (0.27)*
Serahule*R6	36286.88 (7302.61)***	35491.59 (11697.08)****	94891.24 (17146.00)***
Capital	0.14 (0.005)***	0.42 (0.09)***	0.58 (0.31)*
Capital Sq.	-9.6E-09 (0.00)***		-5.1E-08 (0.00)
Capital*R6	-0.10 (0.03)	-0.06 (0.02)***	
Wealth11			3142.77 (1914.09)*
Wealth11 sq.			-1190.71 (492.43)**
Enterprise Age	-20.17 (16.03)	-37.80 (27.64)	31.89 (38.74)
Enterprise Age Sq	0.01 (0.03)	0.02 (0.06)	-0.08 (0.08)
Age of Manager	-335.36 (307.64)	-1043.11 (517.25)**	-1974.55 (681.44)**
Age of Manager Sq.	3.76 (3.33)	12.29 (5.70)**	21.67 (7.44)**
Female Manager	-2283.64 (1606.51)	2856.99 (2913.53)	-140.35 (3495.61)
Household Size	98.38 (242.82)	-47.86 (398.52)	-438.61 (608.96)
Household Size Sq.	-5.46 (6.20)	-6.03 (9.97)	12.03 (17.75)
Age of Household Head	282.62 (345.30)	837.04 (563.95)	1922.37 (784.03)**
Age of Household Head Sq.	-3.04 (3.30)	-8.23 (5.34)	-19.92 (7.59)**
Rural dummy	-19.37 (1747.82)	4361.40 (2905.03)	8333.78 (4514.53)*
Schooling of Household Head	-364.55 (187.56)*	-676.07 (313.34)**	41.14 (338.14)
Average Schooling of Household	214.51 (321.33)	-841.41 (609.72)	-1122.48 (759.46)
Female-headed Household	-910.81 (2115.34)	1438.29 (3478.35)	2765.53 (4125.76)
Constant	3691.92 (7544.03)	-4926.95 (13018.03)	2934.10 (25928.37)
Observations	1491	1491	905
F-test† Statistic (p-value)		9.85 (0.00)	5.08 (0.00)

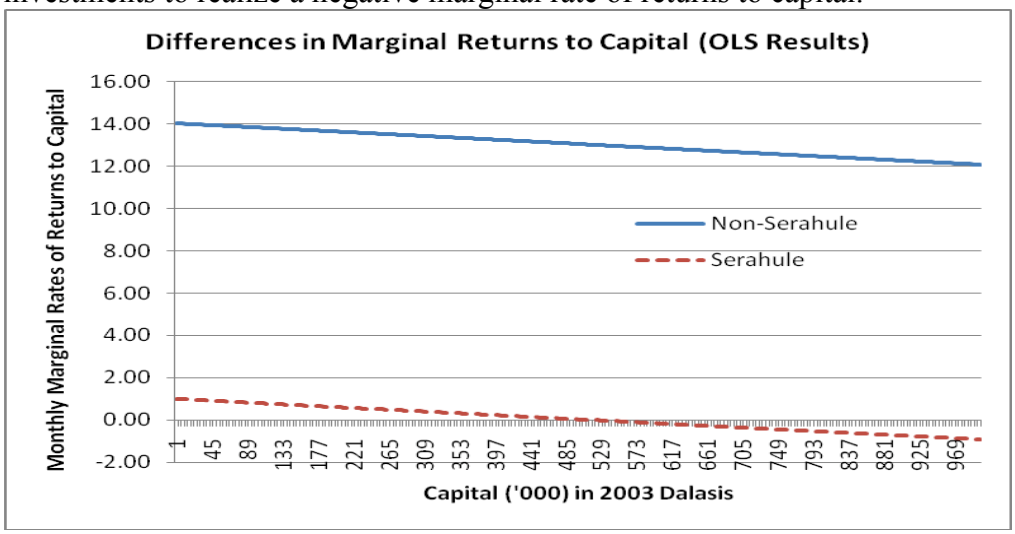
***significant at 1%; **significant at 5% and *significant at 10%.

Regional, and industry dummy variables are included in all regressions. A year dummy is also included except for Model 3, which only includes 2003 data due to missing wealth information.

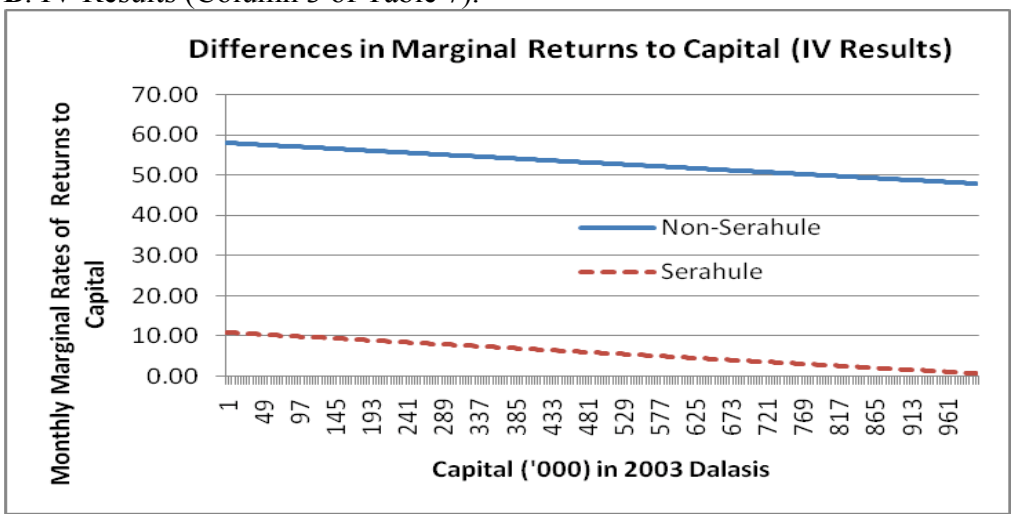
†This is the test of whether the excluded instruments are jointly significant in the first stage estimation. The excluded instruments in the IV estimations are mean tax assessment rates, district population density and its squared term. Note that because the equations are exactly identified (the number of instrumented variables, 3, exactly equal the number of excluded instruments, 3), there is no output for Cragg-Donald Wald F-Statistic or the Hansen-Sargan statistic because both tests require over identification.

Figure 4: Fitted Marginal Rates of Returns to Investments from Table 7.

A. OLS Results (Column 1 of Table 7). Only 0.13% of the sample have large enough capital investments to realize a negative marginal rate of returns to capital.



B. IV Results (Column 3 of Table 7).



Robustness Checks

One potential issue that the preceding empirical section did not directly address is that of selection into entrepreneurship. It is possible that the rates of entrepreneurship between Serahule and non-Serahule enterprises are significantly different. To the extent that such different rates of entrepreneurship exist, they might account for some of the result.

Addressing the selection issue empirically would require a two-stage estimation strategy. The first stage would estimate the likelihood of entrepreneurship and the second stage would estimate the effect of ethnic networks on profits, thereby addressing the possibly non-random selection issue. To implement this two-stage estimation, one needs a variable that determines selection into entrepreneurship but has no direct effect on enterprise profit. Unfortunately, despite having a thorough set of variables describing both households and enterprises, our dataset contains no variable that can be argued to plausibly affect entry into entrepreneurship but not affect profit.

Instead to test the robustness of our results we provide results for the determinants of entrepreneurship by including ethnic group dummy variables. If entrepreneurship were ethnically determined one could be concerned that there were ethnic factors determining entrepreneurship that might bias our estimates of profitability. The results of a probit model testing the determinants of entrepreneurship are presented in the appendix. None of the ethnic group dummies are statistically significant. One possible explanation for this result is that the kinds of enterprises across ethnic groups may not be exactly the same. Specifically, some ethnic groups with less dense networks may still have comparable level of entry into entrepreneurship but their

enterprises could have significantly less capital to begin with or depend relatively less on hired workers.

Another type of bias comes from the potential selection on ability being different across ethnic groups even if selection into entrepreneurship is not ethnically determined. Again we do not have instruments or natural experiments that would allow us to control for selection, but we can still surmise the direction of the possible bias in the effect of ethnic network density. The potential bias comes from the fact that the marginal individual or household that finds entrepreneurship optimal in a high density network may choose a different livelihood than if they belonged in a low density network. This is because a highly dense network would raise expected profitability due to its positive effect on easing access to scarce credit. As a result, the distribution of observed entrepreneurs within a low density network would be skewed towards high ability individuals who persist in entrepreneurship without benefiting from a high density ethnic network. Thus a regression estimation of the effect of ethnic network density on profit that does not take into account the differential selection into entrepreneurship is likely to under-estimate the effect of ethnic network density. As with potential problems with weak instruments, our results are downward biased pushing us in the direction of finding no network density effect.

Conclusions

The dominance of the Serahule ethnic groups has been noted in both the historical literature in West Africa and more recently in a few economic papers. However, none of these studies have provided data and statistical analysis to bear on this phenomenon. Our work not only confirms that dominance of this ethnic group in The Gambia but provides some evidence on one of the likely mechanisms for the relative success of the Serahule ethnic group.

Specifically, our work shows that Serahule enterprises are larger in every way and especially in size of capital. Given the uniform paucity of formal financial intermediation, Serahule-owned enterprises have likely been able to ease their credit constraints through their relatively denser ethnic network. The evidence for a smaller degree of credit constraints is their lower marginal rate of returns to capital. The marginal rate of return to capital for both Serahules and non-Serahule is much higher than lending interest rates at Gambian banks but the former have a significantly much lower marginal rate of return to capital, suggesting they are less capital constrained.

More generally (beyond this model), higher network density also likely means that an entrepreneur has better access to other resources and information that increases profitability. Just as higher network density may limit moral hazard problem in credit borrowing on the entrepreneur's part, information about business opportunities is likely to travel faster in a denser network than within a less dense network. So the dominant position in entrepreneurship of an ethnic group, even if was the result of an historical accident, can be continually reinforced and may persist for a long time. We find evidence consistent with such an effect in the higher profitability of Serahule firms relative to other ethnic groups. It is hoped that future work can unpack some of the other mechanisms by which ethnic differences might aid or hinder entrepreneurship.

The model also has implications for a recent strand of the literature in development that is concerned with the effect of ethnic heterogeneity. Starting with Easterly and Levine (1997), a small literature has sprouted and has focused on the effect of ethnic heterogeneity on various aspects of development. While most of the literature has seen ethnic heterogeneity as a potential detriment to development, the model presented in this work implies that the effect of ethnic

heterogeneity may be positive and the presence of diversity among ethnic groups may allow some ethnic groups to overcome some market imperfections.

This work differentiates the Serahules from other indigenous ethnic groups, unlike previous papers that addressed ethnicity and entrepreneurship in Africa. The results contribute to the recent research on the effect of ethnic heterogeneity on various economic outcomes. The research to date has ascribed large negative effects on ethnic heterogeneity. Our results show that the story may be a little more complicated since ethnic heterogeneity may allow some groups to lessen the adverse effects of market failures such as credit.

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Appendix

Table A1: Likelihood of Entrepreneurship using a *Probit*. Marginal effects evaluated at the mean (for dummy variable, the change is from 0 to 1) are reported. Robust and clustered standard errors are in parentheses. All data from 2003. In column 1, the excluded ethnic category is *Other*.

	1	**2**	**3**	**4**	**5**	**6**
Wealth11	0.05 (0.02)**	0.05 (0.02)**	0.05 (0.02)**	0.05 (0.02)**	0.05 (0.02)**	0.05 (0.02)**
Wealth11 Sq.	-0.01 (0.00)*	-0.01 (0.00)*	-0.01 (0.00)*	-0.01 (0.00)*	-0.01 (0.00)*	-0.01 (0.00)*
Household Size	0.03 (0.01)***	0.03 (0.01)***	0.03 (0.01)***	0.03 (0.01)***	0.03 (0.01)***	0.03 (0.01)***
Household Size sq.	-0.0004 (0.00)**	-0.0005 (0.00)**	-0.0005 (0.00)**	-0.0005 (0.00)**	-0.0004 (0.00)**	-0.0005 (0.00)**
Rural	-0.23 (0.07)***	-0.25 (0.07)***	-0.25 (0.07)***	-0.25 (0.07)***	-0.23 (0.07)***	-0.25 (0.07)***
Female Head	-0.02 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.02 (0.03)	-0.02 (0.03)
Age of Household Head	0.004 (0.01)	0.003 (0.01)	0.003 (0.01)	0.003 (0.01)	0.004 (0.01)	0.003 (0.01)
Age of Household Head Sq.	-0.0001 (0.00)	-0.0001 (0.00)	-0.0001 (0.00)	-0.0001 (0.00)	-0.0001 (0.00)	-0.0001 (0.00)
Schooling of Household Head	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**
Average Schooling in Household	-0.01 (0.01)*	-0.01 (0.01)**	-0.01 (0.01)*	-0.01 (0.01)**	-0.01 (0.01)*	-0.01 (0.01)**
Serahule	0.04 (0.05)	0.04 (0.05)				
Mandinka	-0.02 (0.04)		-0.04 (0.04)			
Wolof	0.04 (0.04)			0.03 (0.04)		
Fula	0.06 (0.04)				0.0.6 (0.04)	
Jola	-0.03 (0.04)					-0.04 (0.04)
Regional Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1953	1953	1953	1953	1953	1953
Log Likelihood	-1378.99	-1387.76	-1386.75	-1387.49	-1379.95	-1387.02

***significant at 1%, **significant at 5%, *significant at 10%.