Job Categories and Geographic Identity: A Category Stereotype Explanation for Occupational Agglomeration

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However, labor markets can pool even when propinquity to employers is not beneficial. I argue that
particular types of work become associated with specific geographical locations. This association
becomes a categorical stereotype – which leads employers to prefer employees from particular
geographic regions because they will seem more appropriate – a form of "spatial signaling." I test
this theory in an online, virtual marketplace for freelancing services. I find that the greater the
association between a particular job category and a country – what I term job specific geographic
identity– the more likely any freelancer from that country will win a job in that category. I also find
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Job Categories and Geographic Identity:
A category stereotype explanation for occupational agglomeration

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ABSTRACT

I examine the phenomenon of occupational agglomeration – the observation that workers with similar skills tend to co-locate geographically. Extant explanations point to the fact that industries also tend to agglomerate – thereby creating a need for a particular type of employee to locate there. However, labor markets can pool even when propinquity to employers is not beneficial. I argue that particular types of work become associated with specific geographical locations. This association becomes a categorical stereotype – which leads employers to prefer employees from particular geographic regions because they will seem more appropriate – a form of "spatial signaling." I test this theory in an online, virtual marketplace for freelancing services. I find that the greater the association between a particular job category and a country – what I term *job specific geographic identity* – the more likely <u>any</u> freelancer from that country will win a job in that category. I also find this effect is stronger when a freelancer has no previous relevant experience but a bad experience by a buyer (at this job/country intersection) can eliminate this positive effect. This effect holds net of other explanations such as spatial mismatch, knowledge spillovers, and input cost advantages.

Keywords: Occupational Agglomeration, Job Categories, Space, Labor Markets

INTRODUCTION

While industrial agglomeration has been a phenomenon of interest to both sociologists and economists (Marshall 1920, Weber 1909 (1928), Krugman 1991, Sorenson and Audia 2000, Stuart and Sorenson 2003), occupations tend to cluster geographically as well (Gabe and Abel 2009). These can be seen as generally related occurrences – to the extent that particular employers require employees with a specific set of skills, and that propinquity to where one works is preferred, then the tendency for industries to agglomerate may also lead occupations to cluster geographically as well. Some explanations tend to emphasize the reduced costs associated with co-location. For example, employers and employees are able to reduce their search costs by being located in places dense with both. Thereby allowing employers ease of access to potential hires and also easing movement between jobs for employees (Ellison, et al 2010, Diamond and Simon 1990). Spatial mismatch theorists (Kain 1968, Ihlanfeldt and Sjoquist 1998) posit that occupational clustering along racial dimensions is the result of diminished minority access to job opportunities. On the other hand, network theories implicate the informational advantages realized with co-location (Sorenson and Audia 2000).

However, these explanations are partially relevant when we attempt to use them to explain why labor markets may pool despite the specific lack of geographic cost advantage. In particular, the phenomenon of outsourcing labor, which explicitly removes geographic distance as an advantage, has come to be concentrated in certain geographic regions, such as India or China. Additionally, extant theories of agglomeration tend to identify advantages to firms to be founded and to operate there – but do not examine demand for their services. For example, low labor costs could be one explanation as to why labor may migrate towards certain areas. However, given the abundance of less developed countries, where cheap labor abounds, the

concentration of occupations in certain geographic locals can only partially be explained by extant theories.

I advance a novel demand-side explanation to agglomeration which echoes work on hiring bias. Sociologists have been exceptionally productive in identifying mechanisms which stratify workers and produce unequal distributions of opportunity (Baron and Bielby 1984, Fernandez and Mors 2008). For example, they demonstrate how the processes of hiring and promotion may lead to gender and race disparities (Fernandez and Fernandez-Mateo 2006). And that even with the adoption of programs specifically aimed at eliminating these disparities, such as diversity programs (Kalev et al 2006) or merit-based pay practices (Castilla 2008) inequality in opportunity still exists. Given our interest in such matters, we should turn a sociological lens to how geographic space may alter opportunity structures in labor markets (Fernandez and Su 2004, Dahl and Sorenson 2011).

To address this lacuna in our understanding of mechanisms for occupational agglomeration, I propose a socio-cognitive account of labor pooling which focuses on demand-side decisions. I suggest that specific occupations or tasks may come to be associated with particular geographic regions. This follows from theories of "spatial signaling" (Fernandez and Su 2004, Newman 1999) which suggest that a job seeker's location acts to influence their desirability by employers. That is, being located in particular geographic space advantages some job seekers because external audiences, such as potential employers, see them as more appropriate. I propose that this stereotype may arise because particular industries or jobs become associated with specific geographic areas – creating a *job specific geographic identity*. This comes about through increasing observations by employers of employees at this intersection of geographic location and job tasks, thereby bolstering the chances that others job seekers situated

in a geographic area will be preferred. There is a *perceptual advantage* to being in a particular place and doing a particular type of work.

The mechanism is categorical stereotyping (Alport 1979). While literature has predominantly focused on the negative aspects of stereotypes as it may be manifested in discriminatory practices in hiring or employment (Kalev 2009, Petersen and Saporta 2004, Fernandez and Fernandez-Mateo 2006), stereotypes, more generally, can be any belief held by an external observer of a category member's characteristic, including skill or ability. Here, I suggest that employers can come to recognize an association between a particular job category and geographic location in a marketplace. In markets, categories serve to partition sellers or offerings into similar groups, so that buyers can search, compare, and choose among them (Zuckerman 1999, Hsu 2006, Hannan, Polos, and Carroll 2007). The strength of a category is its usefulness in coalescing multiple dimensions of an attributes into a single concept. Because of this, labor market participants seeking employment in a particular category of work are likely to be privileged if they are also from those geographic regions which have come to be associated with that type of work. Take the outsourcing of programming talent to India as a salient example. To the extent that individuals who work on a particular job category come to be identified with a particular geographic location – then buyers in that market should come to expect or stereotype sellers in that industry with that location. Others that co-locate should derive advantages because buyers will believe they are more appropriate than those from areas not associated with that job type.

I examine a virtual labor market for freelancing services, www.elance.com, an online cousin to the contract employment agency. Those wishing to hire skilled labor on a temporary basis post job listings on this website. Tasks include any service which can be completed

virtually, such as programming, design, or translation services. Freelancers worldwide bid on these jobs. Buyers then review the bids they receive and may choose to hire one of the freelancers to complete the task. A particularly salient advantage to this setting is that because of the virtual nature of the transaction, there should be little advantage to geographic propinquity. Employers and employees may be located anywhere worldwide as all work is conducted virtually. Despite this, I find evidence of geographic stratification, which I attribute to the mechanism described.

The investigation proceeds as follows. I first review the literature on how category stereotypes may develop and relate it to labor market outcomes. I then derive novel and refutable hypotheses as to how certain tasks may come to be associated with particular geographic regions – leading to structural outcomes in labor markets. I take care to distinguish my work from extant theories which may serve as alternative explanations for my observations. Following this, I describe the empirical setting after which I test these hypotheses. Discussion of the results and conclusions follow.

JOB SPECIFIC GEOGRAPHIC IDENTITY

In his seminal work on the subject of prejudice, Gordon Alport (1979: p. 191) states, "whether favorable or unfavorable, a stereotype is an exaggerated belief associated with a category". In this sense, a stereotype is a belief held by observers of members of a particular category group. I differentiate this from the concept of discrimination, which scholars of labor markets have assiduously worked to identify the detriment faced by participants in labor markets who are associated with an identifiable category. For example, there has been overwhelming evidence that cues which suggest a job seeker is a member of the African American racial group is detrimental to their opportunity for employment (Bertrand and Mullainathan, 2004). Or that

particular types of occupations are more or less appropriate for a certain gender (Bielby and Baron 1984). More recently, scholars find that being identified with the category of criminal – that is, any indication of being incarcerated in the past, drastically reduces an individual's ability to be employed (Pager, 2003). And through processes of hiring and promotion, women and racial minorities are often relegated to lower quality jobs (Petersen and Saporta 2004; Fernandez and Fernandez-Mateo 2006).

Work by sociologists of labor who examine the intersection of space and hiring demonstrate how attitudes can be formed of an individual's suitability for employment due to their geographic provenance, referred to as "spatial signaling" (Fernandez and Su 2004; Moss and Tilly 2003; Newman 1999; Kirschenman and Neckerman 1991). Because labor market decisions are fraught with uncertainty, participants strive to make decisions based on potential cues to a job candidate's suitability and may fall back onto stereotypes as a cognitive shortcut. For example, Newman (1999) reported how certain fast food franchisees were less likely to hire applicants from their immediate neighborhood believing that those youths who live in the area are "irresponsible workers." Because local applicants were often as poor as those that were eventually hired, Newman (1999: 239) concluded that the "ghetto you don't know, the one that is far away…is more attractive to employers." Further evidence of this "spatial signaling" is reflected by Japanese auto firms avoiding locating factories in areas with large concentration of blacks (Cole and Deskin 1988) or the "place discrimination" described by Kasinitz and Rosenberg (1996) whereby local employers in the Red Hook area of Brooklyn were loath to hire from their immediate (poverty-stricken) surroundings. I propose that spatial signaling can come to be realized as an association between a specific job category and a particular geographic region and acts as a stereotype.

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Gordon Allport (1979, p:20) linked stereotypes with categories by writing, "The human mind must think with the aid of categories....Once formed, categories are the basis for normal prejudgment. We cannot possibly avoid this process. Orderly living depends upon it." Here, he suggested that grouping like-items together is a natural tendency. Because social objects can vary infinitely, humans attempt to cognitively group them into like-clusters. These clusters of like-items are referred to as a category. Sociologists interested in markets have studied categories as cognitive structures held by market participants that affects how firms and individuals are compared, evaluated, or chosen (Rao, et al 2005; Hsu 2006; Hannan, et al 2007; Fleischer 2009; Smith 2011). The categories I am interested in are clusters of similar jobs in a labor market. In labor markets, as in many other markets, social items (in this instance, jobs and tasks) are grouped together into clusters which represent similar types of work (Zuckerman, et al 2003; Leung 2012). Categories are socially recognized groupings of like-objects, and serve to circumscribe similar items and exclude dissimilar ones (Rosch 1973; Hannan et al. 2007). This parallels our universal inclination to partition an assortment of complex items or objects into manageable and socially understood classificatory clusters (Douglas 1966; Fiske and Taylor 1991; Zerubavel 1997). In essence, sociologists that study market behavior have expanded on previously identified race or gender categories to include other socially consequential distinctions among social actors. For example, the labor market for sociologists could be partitioned into quantitative versus qualitative job positions. Categories ease comprehensibility for employers because jobs and people labeled in one category are understood by market participants to be similar to each other and dissimilar to those in another.

Understandings as to what a category entails results from repeated observations of those category members (Murphy, 2004). In particular, attributes come to be associated with category

members the more often they are observed with such features (Rao, et al 2003; Hannan, et al 2007). This suggests that the more often a particular task or job is associated with a feature (in this case a geographic location) the more likely audiences will recognize this combination as appropriate. So we come to expect that movies produced in the United States are likely to come from the Los Angeles area and "grunge" music likely comes from bands located in the Northwestern United States merely because we have seen these associations before.

I define the extent that a job or task is associated with individuals from a particular geographic region as *job specific geographic identity*. I propose that associations between a particular job or task and a geographic area can be strong enough to manifest as a categorical stereotype – thereby influencing decision to hire. This association is developed through repeated observations of individuals from a particular geography with specific jobs. The stronger this job specific geographic identity, the greater expectations an external audience will have of any individual from that same geographic region, they will be perceived as more appropriate. More formally:

> *Hypothesis 1: The stronger a job specific geographic identity, the greater the*
> *appeal of any individual from that geographic region will be for that job.*

This positive effect of job specific geographic identity should be strongest for employees with little other signals or cues of their underlying ability. Because a job specific identity is hypothesized to act as a stereotype, then more formalized symbols of competence or skill should nullify the use of such a cognitive shortcut. To the extent that job specific identity occurs as an initial screen for potential ability, then job seekers with other signals of competence should be less likely to be evaluated by such a metric. On the other hand, with little other information to

evaluate a potential hire, audiences may be forced to rely on cues to a new candidate's suitability. Therefore,

Hypothesis 2: This effect will be strengthened for those individuals with no previous relevant job experiences.

Stereotypes, as with other beliefs we hold, can be altered or dismissed. Contact theory suggest that the sharing of common goals and cooperation necessitated by working together should serve to eliminate any lingering stereotypes an employer may hold (Allport 1954; Pettigrew 1998). In particular, if an employer had a poor working experience with a freelancer from a particular geographic region, then they are likely to update their beliefs of other employees from that region for that particular type of work.

Hypothesis 3: This effect will be weakened for those buyers with poor past experiences of individuals at a specific job and geographic intersection.

ALTERNATIVE EXPLANATIONS

Spatial mismatch theorists (Kain 1968, Ihlanfeldt and Sjoquist 1998) posit that occupational clustering along racial dimensions is the result of diminished minority access to job opportunities. To the extent that employers decide to move outside of inner-city locations, then they would be more likely to draw from a suburban labor pool. This leaves those potential applicants who reside in the inner-city at a disadvantage to those in suburban settings for two reasons. First, they may be less likely to be aware of opportunities distant from their residence and second, the costs of commuting may be prohibitive. Similar predictions are made by the more economically derived theories which implicate the reduced cost of employee or employer

search as a reason why people with particular skills tend to co-locate. That is, to the extent an employer requires a particular type of skill, then those individuals with that ability will want to live nearby. As industries tend to agglomerate, then employment opportunities will increase for those with particular skill, making the area more attractive as job switching is easier as well. In short, propinquity to certain employers increases access.

A second theoretical stream implicates the benefits of tightly knit local networks (Granovetter 1995, Sorenson and Audia 2000) which suggest that being located near others is beneficial because of privileged access to information. For example, Sorenson and Audia (2000) suggests that to the extent that entrepreneurial ventures are founded based on prior experience, because people tend to prefer to remain where they live, then the most likely founders of certain organizations are from previous employees of similar organizations. More generally, there are positive knowledge spillovers in locales with a density of similar organizations, thereby improving the likelihood of future similar organizations to be founded.

Below I attempt to control for these alternative explanations empirically. Additionally, confirmation of my second and third hypotheses should serve to distinguish my theory from these alternative explanations. Variation in experience of the job applicant should not vary the strength of the relationship if the mechanism was access, as suggested by the first alternative explanation. Therefore, confirmation of my second hypothesis should serve to cast doubt that mere access is the reason agglomeration is observed. Similarly, if actual ability is improved due to geographic propinquity to other similar job seekers, then there should be no effect of previous experience, as predicted by the third hypothesis.

OCCUPATIONAL AGGLOMERATION IN AN ONLINE LABOR MARKET

Elance.com is the largest, oldest, and most established virtual marketplace where buyers of a broad range of business services find and hire independent professionals on a contract basis to work remotely. Freelancers (bidders) bid on projects that employers post to the website. There are currently over 65,000 jobs posted each month and over 1.3 Million providers of service located worldwide. Since founding in 1999, there have been over $500 Million in cumulative transactions on the website with an average job value of over $650 in 2004. As a necessity, given the volume of transactions, Elance.com job listings are organized into job categories that represent conventionally recognized divisions of tasks. Examples include Web Programming, Logo Design, and Business Plan Writing. (See Appendix A for a full list.) Elance identified these job categories by partitioning them according to the skills needed to perform the jobs listing within.

As a virtual external labor market, Elance attracts a very broad and international labor force. A recent check showed they had slightly less than 500,000 individual freelancers on their website representing 154 countries. Figure 1 depicts a worldwide cartogram whereby the size of the country represents their population with internet access. Of note is the large number of internet users (relative to their population) concentrated in North America and Western Europe. The population of each country with internet access is our relevant risk set in this case, as Elance operates a virtual marketplace so all transactions are internet based. Therefore, only those individuals with internet access are at risk to be in this labor force. Figure 2 below is the world map redrawn whereby size is now a proxy for bidding activity in 2005 on Elance. As depicted, there is a very large shift in concentration to countries such as the US, India, and Eastern Europe

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which is suggestive evidence that work on Elance is unevenly distributed. The following analysis more rigorously investigates this phenomenon.

[insert Figures 1 and 2 about here]

I measure the concentration of freelancers in each high-level job domain across countries by using the spatial Hirschman-Herfindahl Index (HHI), formally defined as:

$$g_j = \sum_{i=1}^{n} \left(s_i - x_i \right)^2$$

Where 'j' signifies the high level job domain, 'i' represents the country the freelancers are from with 'n' number of countries in our marketplace. 's_i' is the share of job domain 'j's' jobs in country 'i' and 'x_i' is the total share of jobs in country 'i.' The spatial HHI has a value of zero if the country distribution of job domain 'j's' employment is identical in distribution of total jobs on elance. Indexes greater than zero indicate a spatial concentration of industry activity. Results are depicted in Figure 4 below. As we can see, there is clearly evidence of concentration of jobs in countries across all domains, with particular concentration in the Web & Programming and Legal domains of work. Detailed results of the analyses, not reported for brevity, show a concentration in countries such as the US, Great Britain, Canada, and India. Not surprisingly, the majority of the freelancers have clients based in the US (~83%), so it may not be surprising that jobs are concentrated in predominantly English speaking countries. I account for this below.

[insert Figure 3 about here]

Potential buyers of a freelancing service post job listings on the website. These job listings, and the bids which accompany them, are free for all users to browse. See Figure 4 for an example listing. Job postings on the website are organized into the job categories, thereby

assisting both buyers and sellers of services to search, order, and bid on work. These job categories represent distinct partitions of the work into tasks which require similar skills. For example, job categories include Web Programming, Website Design, or Label and Package Design.

[insert Figure 4 about here]

Once a job is listed, freelancers can bid on it. See Figure 5 for a sample listing of bids. Of note is the prominence of the country of the freelancer. In this particular example, the first two bidders are from India, and the other two from Pakistan and Bolivia. Bids include the stated price a freelancer is willing to complete the job for, but the lowest bidder is not automatically chosen. A buyer can choose to hire whomever they wish. In making a decision, buyers have access to the freelancer's online profile. This includes their complete history of all their past jobs, the types of jobs these were, the buyer they worked for, and any feedback that they received for these completed jobs. Most important for our purposes is the fact that for each freelancer, their geographic location is prominent on their background page. The bidding concludes within a timeframe established by the buyer, generally within a week, whereupon a buyer may decide to choose a winning bidder to perform the task.

[Insert Figure 5 about here]

DATA

I was provided detailed data regarding all transactions that occurred on the website from its inception in 1999 through April of 2008. This resulted in data on 5,065,995 bids made by 50,678 freelancers for 527,513 listed jobs. Unfortunately, the website did not require freelancer's

to list their locations until recently. Therefore, of the 50,678 freelancers in my dataset, I have country location data for 33,216 of them, ~66% of them.

My dependent variable of interest was whether a freelancer was ultimately picked for a job they bid on. Every bid was coded a 1 if it was eventually picked by the buyer and 0 otherwise. Of the 5,065,995 bids, 360,255 were picked as winners, ~7%.

My independent variable of interest was the strength of association between a particular job category and a geographic location. Because most freelancers were identified with a geographic region, I calculated the number of times each buyer observed a bidder from a particular country for a particular job. This was updated each time a buyer posted a job listing that was bid on by freelancers. The association between Job Category 'j' and Country 'c' for each Buyer 'i' at job posting 'n', where 'n' is the number of posting the buyer has done, is the sum of all previous job posting where job category 'j' was bid on by a freelancer from country 'c'.

I attempt to control for several other explanations. First, as mentioned above, if advantageous input costs were the reason freelancers agglomerate, then the price they charge for performing the service would be a factor. I control for the amount of the freelancer's bid. If agglomeration affects the knowledge spillover effects, these bidders from dense areas will also be more experienced and also receive better feedback ratings. I control for their past experiences in terms of the number of previous jobs they completed overall and within the particular job category as well as the average feedback they received on their past jobs. As mentioned above, most buyers on Elance are English speaking (and indeed the website operates only in English), in order to control for the likelihood of a buyer/freelancer language effect, I include an indicator variable which identifies whether the buyer and seller are from the same country. Previous experience by a buyer with a seller from a particular country may bias them in a different way, as

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they may prefer to work with freelancers from that country again, so I include an indicator as to whether the buyer has employed a freelancer form the same country before. The density of freelancers from each country is also included to capture competition effects. Spillover effects of previous jobs by freelancers from the same country in a particular category may benefit all other bidders from that country, so I include a measure of the number of wins by other freelancers from the same country.

MODELS AND RESULTS

Because my dependent variable is dichotomous in nature, I model this with a logistic regression predicting the likelihood of a bid by a particular freelancer being chosen. A Hausman (1978) test resulted in my having to reject the null hypothesis that a random-effects model was sufficient. I therefore modeled this using a fixed-effect specification, grouping the observations within each Job listing. Summary statistics and correlations are presented in Tables 1 and 2 below.

[Insert Table 1 and 2 about here]

Results of the regressions are presented in Table 3 below. Model 1 includes only the control variables, which generally behave as expected. The greater the amount of a freelancer's bid, the less likely they are to win the bid. The better average feedback score that the freelancer has received in the past, the better chance they will win the bid. Previously working with a buyer, having a greater number of jobs in the focal category, being from the same country as the buyer, and a buyer having experience with a freelancer from the same country before – all improved a freelancer's changes of being hired. However, having more overall wins is negatively associated with winning again – perhaps because I am already controlling for category specific experience, any other experience may make the freelancer seem unfocused. Measures of competition and

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knowledge spillovers (as indicated by previous wins and density) are not significant. Interestingly, I also find that the greater number of bidders from the same country as the focal freelancer; the better the freelancer's chances of winning their bid.

[Insert Table 3 about here]

In Model 2 includes the measure of job geographic identity. As predicted, there is a positive and significant effect of this variable on the likelihood that the bidder will win the bid (β=0.09, χ^2=45.4 (1), p<0.000). Thereby suggesting that the stronger the association between a particular job task and a particular country – the greater likelihood that a buyer will prefer to hire a freelancer from that country. Notice that the effect of number of bidders for this job from the same country has diminished in effect size. A glance at the correlation table demonstrates that this variable, not surprisingly, is somewhat correlated with the measure of country and job category association. This seems reasonable, as if there really is a strong association between a particular task and freelancers from a particular country – then we should also expect them to dominate in bidding as well.

Model 3 test the second hypothesis by including an indicator variable if the bidder has never won a job in the category. The interaction of this variable and the measure of job geographic identity is positive and significant, supporting my contention that this geographic identity effect is stronger for those freelancers with less experience. (β=0.12, χ^2=44.7 (1), p<0.000) With additional experience in the job category, buyers will have less use for potential signals of appropriateness.

Model 4 includes an indicator variable as to whether a buyer had a negative experience with a freelancer from that country before. Buyers can rate their past experiences with

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freelancers in the form of a feedback measure, which are star ratings from 1 to 5. I identified all instances where a buyer rated a freelancer the lowest score of 1, and used this to indicate a buyer had a bad experience at that country and job category intersection. The interaction of this indicator of a bad experience and job geographic identity is negative and significant as predicted ((β=-1.15, χ^2=303.4 (1), p<0.000).

Further Analyses

The descriptive analyses above identified how there was a tremendously large concentration of freelancers from India. Indeed, a Lexus-Nexus search on articles which mentioned outsourcing and programming show that a large portion of these articles also mention India, see Figure 6 below. In order to ensure the effect I am observing is not merely a result of dominance in the outsourcing arena by Indian freelancers, I included an indicator variable designating whether the freelancer was from India. Results reported in Model 5 show that there is actually a negative effect of being a freelancer from India and winning a bid. More importantly, all previous hypotheses continue to be supported.

[insert Figure 6 about here]

DISCUSSION AND CONCLUSION

I set out to demonstrate an alternative explanation as to why occupations seem to exhibit geographic concentration. I proposed that geographic areas can come to be associated with particular tasks. This manifests itself as a categorical stereotype, which serves to make buyers perceive social actors from specific locations to be more skilled or better exchange partners. I observe this in the preferential hiring of freelancers from specific countries which have become more associated with a particular job category – net of other observable measures of ability or

price. I also demonstrate that this effect is strengthened when freelancers have no previous relevant experience and that it is weakened for those buyers who have had a bad experience with job seekers for a particular job from the same country.

My analyses also seem to suggest that my results hold net of previous explanations for occupational agglomeration. In particular, I have controlled for underlying experience as well as competence (as measured by feedback scores). Propinquity to employers is less of an issue in a virtual setting, however, my analyses control for the fact that the employer and bidder reside in the same country. The context at hand – an online market for freelancing services is likely less subject to the effects of other theories of geographic agglomeration. For example, some economic based explanations implicate advantages to inputs. For example, being located near raw materials reduces transportation costs or being co-located stimulates technological investments – the fruit of which can be shared among many firms. These explanations do not seem to apply to a labor market – as there is little direct input costs, besides the labor itself.

This paper contributes to the literature on occupational agglomeration by suggesting a novel theoretical mechanisms for why those with certain skills tend to co-locate. Previous explanations generally implicate a supply-side mechanism. However, I suggest that those with particular skills are preferred merely because they reside in particular locations as well. Interestingly, there is a circular dynamic at play here, as the market needs to recognize some activity of job seekers for particular tasks from a particular country before those individuals can be advantaged. This advantage will then likely lead to additional entrants, bolstering the nascent job specific geographic identity and contributing to additional density. This echoes ideas of population ecologists who have studied spatial legitimation (Hannan et al 1995, Lomi 1995, Greve 2002) and who identify how prior fundings of organizations of a particular type lead to

increased foundings. The contribution this paper presents to this line of work is to demonstrate the manifestation of actual perceptual preference for such organizations.

I also attempt to further the concept of "spatial signaling" (Kirschenman and Neckerman 1991, Newman 1999, Fernandez and Su 2004) which scholars at the intersection of space and labor markets have proposed as a mechanism leading to discriminatory practices of employers. Previous research along this vein has identified how employers tend to screen out candidates from disadvantaged neighborhoods because their perception of them as poor workers. What this paper attempts is to present a more generalized theoretical extension of this concept by demonstrating that any job specific task can come to be associated with particular geographic locations.

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Figure 1
Worldwide Cartogram
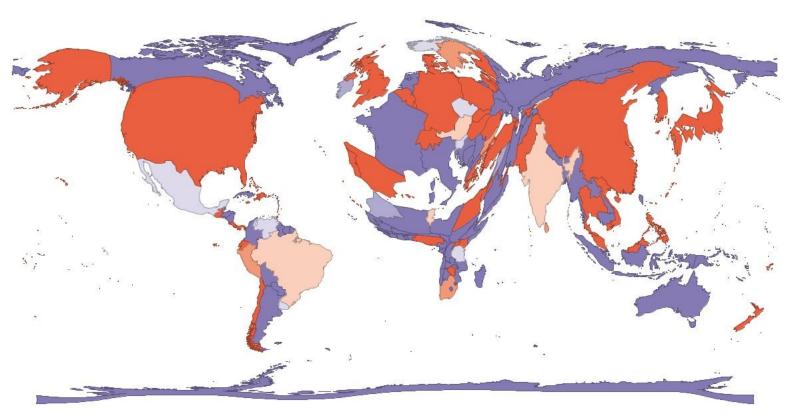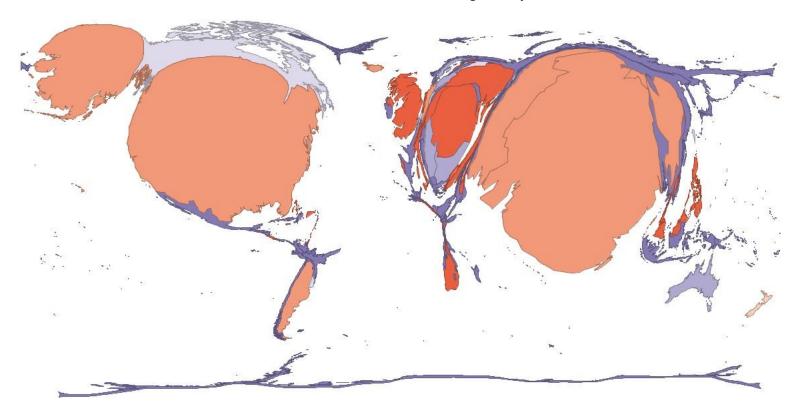Size Denotes 2005 Internet Population

Figure 2
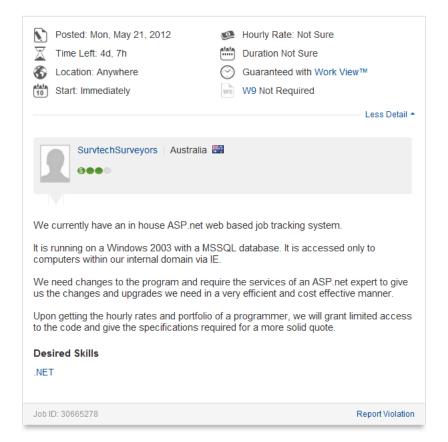Worldwide Cartogram
Size Denotes 2005 Elance Bidding Activity

Figure 3
Spatial Hirschman-Herfindahl Index
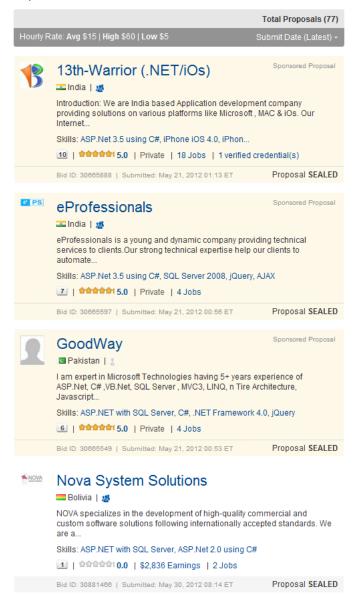By High Level Job Category

Figure 4
Job Listing

Figure 5
Bids for Job

Figure 6
Lexis Nexus Search on Outsourcing Articles

Table 1
Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Winning Bid...	2547817	0.0757	0.2645	0	1
Bid Amount...	2547817	899.4968	5595.84	0	5e+06
Average Feedback....................................	2184774	4.2855	0.5565	1	5
Worked With Buyer.................................	2547817	0.0201	0.1406	0	1
Number Previous Jobs (logged)...............	2547817	2.9585	1.8030	0	7.2334
Number Jobs Focal Category (logged).…	2547817	1.4664	1.5569	0	6.5161
From Same Country as Buyer..................	929316	0.3005	0.4584	0	1
Density Category Country Bidders..........	2547817	5.1434	1.7009	0	7.9810
Previous Jobs in Category Country.........	2547817	5.1064	1.7747	0	7.9807
Bought from this Category Country........	2547817	0.2547	0.4356	0	1
Number of Same Country Bidders...........	2458876	4.3093	4.0637	1	52
Job Geographic Identity...........................	2547817	0.9463	0.9990	0	8.2957
New Bidder...	2547817	0.4024	0.4903	0	1
Bad Experience with Category Country. .	2547817	0.0085	0.0919	0	1
Indian Bidder..	2547817	0.3664	0.4818	0	1

Table 2

Correlations

	Variable	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Winning Bid	1							
(2)	Bid Amount	-0.0155	1						
(3)	Average Feedback	0.0783	0.0146						
(4)	Worked With Buyer	0.4519	-0.0100	1					
(5)	Num. Previous Jobs (logged)	-0.0256	0.0208	0.0559	1				
(6)	Num. Jobs Focal Category (logged)	0.0462	0.0040	0.0893	0.6979	1			
(7)	From Same Country as Buyer	0.0919	-0.0155	0.0369	-0.1415	-0.0838	1		
(8)	Density Category Country Bidders	-0.1005	0.0158	-0.0373	-0.0424	0.0364	0.3929	1	
(9)	Previous Jobs in Category Country	-0.1009	0.0156	-0.0375	-0.0389	0.0379	0.3878	0.9990	1
(10)	Bought from Category Country	0.4018	-0.0155	0.2472	-0.0406	-0.0073	0.2070	0.1172	0.1173
(11)	Number Same Country Bidders	-0.1678	0.0262	-0.0552	-0.0232	0.0036	0.1443	0.4377	0.4341
(12)	Job Geographic Identity	-0.0321	0.0097	0.1673	-0.0060	0.0639	0.1399	0.4267	0.4242
(13)	New Bidder	-0.0779	-0.0062	-0.0844	-0.4810	-0.7299	0.0619	-0.0346	-0.0355
(14)	Bad Experience with Category Country	0.1134	-0.0010	0.0699	-0.0085	0.0151	0.0411	0.0405	0.0399
(15)	Indian Bidder	-0.1087	0.0312	-0.0497	0.1351	0.0455	-0.4588	0.1865	0.1915

		(10)	(11)	(13)	(14)
(10)	Bought from Category Country	1			
(11)	Number Same Country Bidders	0.0277	1		
(12)	Job Geographic Identity	0.2523	0.5672		
(13)	New Bidder	-0.0118	-0.0033	1	
(14)	Bad Experience with Category Country	0.1256	0.0005	-0.0075	1
(15)	Indian Bidder	0.0030	0.2552	-0.0320	-0.0007

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Table 3
Likelihood of Winning a Job
(Fixed Effects Grouped by Job)

	Model 1	Model 2	Model 3	Model 4	Model 5
Bid Amount..	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Average Feedback....................................	0.1472***	0.1478***	0.1579***	0.2229***	0.2185***
	(0.0152)	(0.0152)	(0.0155)	(0.0160)	(0.0160)
Worked With Buyer.................................	2.7538***	2.7461***	2.7742***	2.8004***	2.7921***
	(0.0613)	(0.0613)	(0.0620)	(0.0625)	(0.0626)
Number Previous Jobs (logged)...............	-0.3118***	-0.3108***	-0.3027***	-0.3065***	-0.2984***
	(0.0088)	(0.0088)	(0.0089)	(0.0089)	(0.0090)
Number Jobs Focal Category (logged)….	0.4327***	0.4326***	0.2901***	0.2926***	0.2860***
	(0.0092)	(0.0092)	(0.0104)	(0.0105)	(0.0105)
From Same Country as Buyer.................	0.2840***	0.2962***	0.2869***	0.2832***	-0.0099
	(0.0262)	(0.0263)	(0.0265)	(0.0268)	(0.0344)
Density Cat. Country Bidders (logged)…	-0.0026	-0.0623	-0.0491	-0.0643	-0.0130
	(0.1222)	(0.1226)	(0.1239)	(0.1256)	(0.1260)
Prev. Jobs in Cat. Country (logged).........	-0.1726	-0.1291	-0.1404	-0.1251	-0.1314
	(0.1155)	(0.1157)	(0.1170)	(0.1186)	(0.1190)
Bought from this Category Country........	2.9426***	2.9403***	2.9457***	2.9213***	2.9314***
	(0.0287)	(0.0287)	(0.0289)	(0.0291)	(0.0291)
Number of Same Country Bidders...........	0.0505***	0.0375***	0.0378***	0.0394***	0.0511***
	(0.0046)	(0.0049)	(0.0050)	(0.0050)	(0.0052)
Job Geographic Identity...........................		0.0926***	0.0653***	0.0599***	0.0819***
		(0.0137)	(0.0144)	(0.0146)	(0.0148)
New Bidder..			-0.8509***	-0.8645***	-0.8566***
			(0.0314)	(0.0317)	(0.0318)
New Bidder X Job Geographic Identity...			0.1162***	0.1236***	0.1176***
			(0.0174)	(0.0175)	(0.0175)
Bad Experience with Category Country. .				4.5954***	4.6037***
				(0.1829)	(0.1835)
Bad Exp. X Job Geographic Identity.......				-1.1519***	-1.1646***
				(0.0661)	(0.0663)
Indian Bidder..					-0.3756***
					(0.0276)
Number Observations..............................	198,995	198,995	198,995	198,995	198,995
Number Clusters.......................................	29,706	29,706	29,706	29,706	29,706
Min	2	2	2	2	2
Mean	6.7	6.7	6.7	6.7	6.7
Max	50	50	50	50	50
Log-Likelihood.......................................	-39142.55	-39119.66	-38662.13	-38102.29	-38008.82
Chi^2..	26396.74	26442.52	27357.59	28477.28	28664.22

Note: Standard errors in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001

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Appendix A

ADMIN SUPPORT
Bulk Mailing
Customer Response
Data Entry
Event Planning
Fact Checking
Mailing List Development
Office Management
Other - Administrative Support
Presentation Formatting
Research
Transcription
Travel Planning
Virtual Assistant
Word Processing

DESIGN AND MULTIMEDIA
3D Graphics
Animation
Banner Ads
Brochures
Card Design
Cartoons and Comics
Catalogs
CD and DVD Covers
Commercials
Corporate Identity Kit
Digital Image Editing
Direct Mail
Displays and Signage
Emails and Newsletters
Embedded Video/Audio
Graphic Design
Illustration
Label and Package Design
Logos
Menu Design
Music
Other - Design
Other - Multimedia Services
Page and Book Design
Photography and Editing
Podcasts
Presentation Design
Print Ads
Radio Ads and Jingles
Report Design
Sketch Art
Stationery Design
Videography and Editing
Viral Videos
Voice Talent

ENGINEERING AND MANUFACTURING
Architecture
CAD
Civil and Structural
Contract Manufacturing
Electrical
Industrial Design

Interior Design
Mechanical
Other - Architecture and Engineering

FINANCE AND MANAGEMENT
Accounting and Bookkeeping
Billing and Collections
Budgeting and Forecasting
Cost Analysis and Reduction
Financial Planning
Financial Reporting
HR Policies and Plans
Management Consulting
Other - Management and Finance
Outsourcing Consulting
Process Improvement
Stock Option Plans
Supply Chain Management
Tax

LEGAL
Bankruptcy
Business and Corporate
Contracts
Criminal
Family
Immigration
Incorporation
Landlord and Tenant
Litigation
Negligence
Other - Legal
Patent, Copyright and Trademarks
Personal Injury
Real Estate
Tax Law
Wills, Trusts and Estates

SALES AND MARKETING
Advertising
Branding
Business Plans
Business Skills
Business Software
Competitive Analysis
Corporate Training
Diversity Training
Email and Direct Marketing
Grassroots Marketing
Lead Generation
Management Training
Market Research and Surveys
Marketing and Sales Consulting
Marketing Collateral
Marketing Plans
Media Buying and Planning
Media Training
Other - Sales and Marketing
Other - Training and Development
Policies and Manuals
Pricing
Product Research
Programming Languages
Project Management

Promotions
Public Relations
Retailing
Sales Presentations
Sales Training
Search and Online Marketing
Technical Training
Telemarketing
Tradeshows and Events

WEB AND PROGRAMMING
Application Development
Blogs
Database Development
Ecommerce Website
Enterprise Systems
Flash Animation
Handhelds and PDAs
HTML Emails
Network Administration
Online Forms
Other - Programming
Other - Website Development
Project Management
Quality Assurance
Scripts and Utilities
Security
SEO and SEM
Simple Website
System Administration
Technical Support
Usability Design
Web Design
Web Programming
Website QA
Wireless

WRITING AND TRANSLATION
Test Writing
Academic Writing
Article Writing
Children's Writing
Copywriting
Creative Writing
E-books and Blogs
Editing and Proofreading
Ghost Writing
Grant Writing
Newsletters
Other - Writing Services
Press Releases
Report Writing
Resumes and Cover Letters
Sales Writing
Speeches
Technical Writing
Translation
User Guides and Manuals
Web Content