

Airing Your Dirty Laundry: Vertical Integration, Reputational Capital and Social Networks*

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Abstract

This paper explores the relationship between an ethnic-based social network and vertical integration decisions in the laundry services industry. We find that stores in the social network are significantly less likely to vertically integrate than non-member stores. This has three primary implications. First, the social network may be lowering the costs of using the market more than facilitating in-house production. This implies better outsourcing opportunities in a social network and may therefore help explain a documented relationship between social networks and the economic performance of firms. Second, institutional details of our empirical example and the estimated relationship suggest a role for opportunism and reputation as determinants of the boundaries of the firm in a setting without asset specificity. Finally, while much of the existing social network literature has focused on the network's ability to increase access to credit in developing countries, our evidence suggests this is not a dominant factor in this developed country context.

Key words: vertical integration; reputation; social networks

*The authors would like to thank Latika Chaudhary, Ken Corts, Sara Ellison, Kathryn Shaw, seminar participants at UCLA, University of Washington, Seattle, IOFest, UCSB, Columbia, Harvard Business School, UCI and elsewhere. We would also like to acknowledge the research assistance of Nicole Ruch, Andrew Nigrinis, Hyo duk Shin, and Haein In Jeong. The usual disclaimer applies.

I. Introduction

The relationship between ethnic concentration and economic performance has become a well-documented fact.¹ One possible explanation for why ethnic membership may increase the performance of firms is the existence of gains from social networks operating within a specific ethnic group. We explore a potential mechanism by considering the relationship between membership in an ethnic-based social network and the make-or-buy decisions of firms. If a social network can decrease the costs of vertical integration or outsourcing, greater profits and survival rates should result.

Ethnic networks, and social networks more generally, are typically associated with characteristics such as enhanced communication, reputation or trust. Reputations have also been recognized as important determinants of the boundaries of the firm. We therefore outline a framework that considers how social networks can shift reputational capital and consequently affect make-or-buy decisions of firms. In this framework we explicitly analyze two channels through which social networks can affect vertical integration: one involves access to credit and the other solutions to agency problems. Both channels can either favor or discourage use of the market relative to in-house production, so we analyze the question empirically.

The context of our analysis is the laundry services industry because it is well suited for analyzing both vertical integration and social networks. Each store makes two make-or-buy decisions: one for drycleaning and another for laundry. These are the primary services offered by a store, and whether or not they are produced in-house can easily be revealed. Furthermore, the industry has long been associated with ethnic concentration,² such that in the southern California region where we focus our analysis, Koreans currently own more than 2,000 cleaners.

While there clearly is a social network of Koreans in the laundry services industry in southern California, our empirical strategy requires variation in network membership to identify the relationship

¹ Alesina and La Ferrara (2005) review the literature that links ethnicity and economic performance.

² Ong (1981) documents the concentration of Chinese workers and business owners in wash-houses in northern California in the late 1800s.

with make-or-buy decisions. However, the specific network relationships within the industry are unobservable, and would be difficult to account for econometrically even if they were observable, so we follow Bertrand, Luttmer and Mullainathan (2000) by using local demographics and cleaners' Korean speaking abilities to identify network membership. We define the network geographically to be a particular region in which the communication and trust within the network should be at its greatest: Koreatown. We define network membership to constitute Korean firms in Koreatown, while non-members may be Koreans elsewhere, or non-Koreans located in or out of Koreatown. This allows us to control for Korean specific factors that may affect make-or-buy decisions, and Koreatown specific factors that may affect make-or-buy decisions.

It is useful to reflect briefly on exactly how this defined social network may operate and affect vertical integration decisions. The greater concentration of Koreans in Koreatown and the communication between them suggests that "word-of-mouth" (or reputation effects) will spread faster within this area.³ An upstream cleaner supplying a Korean cleaner in Koreatown recognizes that their conduct can affect their reputation with their other Korean customers in Koreatown. Furthermore, if the upstream cleaner is also run by a Korean, its conduct also has the potential to affect their reputation within the Korean community more broadly. The fact that there are more Korean cultural institutions such as churches, restaurants or bars, in Koreatown should facilitate communication and enhance these reputation effects. Therefore, while a network of Korean cleaners outside Koreatown could yield some network effects, we expect these to be smaller. Our analysis therefore concentrates on the network effects of Koreatown relative to other small networks of Korean cleaners or the lack of networks.

Our estimates find that Korean stores located in Koreatown are between 35 to 50 percentage points more likely to outsource than Korean stores outside Koreatown or non-Koreans in or out of Koreatown. Of four potential relationships between vertical integration and social networks that our framework

³ While some within network outlets may compete with one another, there are still many local outlets that are unlikely to be direct competitors. For instance, we find as many as 18 other outlets within a half-mile of a cleaner. We therefore expect outlets to compete over very small geographic areas such that some of these outlets within a half mile may not be direct competitors. Furthermore, this density of outlets suggests there are many other slightly more distant outlets that may share the same supplier, but not directly compete.

outlines, this finding is consistent with the network either resolving an agency problem between laundry outlets and their suppliers, or social network members having inferior access to formal credit. These findings contribute to the existing literature in four ways.

First, the ability of a social network to help resolve an agency problem between firms may be one mechanism that can explain a positive relationship between social networks and the performance of firms.⁴ For example, Kalnins and Chung (2004) find that Gujarati immigrant-owned hotels have greater survival rates when located near a branded hotel owned by a member of their immigrant group. Their analysis cannot identify the exact sources of the social network advantage, so they rely on interviews suggesting factors such as access to credit and free or cheaper furniture. A finding of better outsourcing opportunities in social networks provides a potential mechanism that could easily transfer to the example of hotels which also face significant laundry costs.

Second, the mitigation of agency problems in social networks suggests a role for opportunism and reputation in make-or-buy decisions, even in the absence of firm-specific investments.⁵ The unique feature of laundry services is that assets are not specific and buyers typically do not have contracts with their suppliers. This suggests that ex-post bargaining problems should not be part of the rationale for vertical integration in our analysis. Our paper therefore also contributes to a growing empirical literature analyzing integration and contracting decisions in the absence of specific investments (e.g. Masten and LaFontaine (2002)).

Opportunism can also arise when firms do not have the correct incentives to deliver expected quality (Klein and Leffler (1981)). The dry cleaning industry ranks first in customer complaints about quality. Downstream stores cannot monitor the quality of every garment cleaned at a plant, so they must rely on

⁴ Robinson and Stuart (2005) find evidence similar to ours. They document how scientific networks in the biotechnology sector serve as a substitute for other governance mechanisms in inter-firm transactions.

⁵ The economics literature on the determinants of the boundaries of the firm is extensive. It first started with Coase (1937) and followed with Williamson (1975 and 1985) and Klein, Crawford and Alchian (1978) who tied vertical integration and opportunism by arguing that vertical integration could avoid the ex-post bargaining problems associated with asset specificity. Grossman and Hart (1986) developed the property rights theory of the firm, which also relies on contractual incompleteness and asset specificity. Some notable empirical tests of these theories include, among others, Monteverde and Teece (1982), Masten (1984), Joskow (1985 and 1987) and Baker and Hubbard (2003).

the reputation of their supplier. The ability of a social network to enhance communication and spread bad “word-of-mouth” may lead a social network member to be more willing to trust another member, and therefore buy the service rather than make it. While such a finding has not been estimated elsewhere, it is consistent with Greif (1993), which models and documents how a coalition of Maghribi traders used an ethnic information/communication channel to establish a reputation mechanism that helped prevent opportunistic behavior. Greif (1993) does not consider the make-or-buy decision margin, but the mechanism did facilitate contractual enforcement.

Third, the ability of a social network to build trust and enhance reputations of transacting agents also provides support for the sociology literature highlighting the importance of interpersonal relations in economic transactions (Granovetter, 1985). Our findings suggest that ignoring the social environment that Korean cleaners are embedded in would inaccurately characterize their incentives to make or buy laundry services. Furthermore, this evidence links our analysis to the work of Portes and Sensenbrenner (1993) and Light and Bonacich (1988) on the organization of business in immigrant communities.

Fourth, our findings have direct relevance for the literature suggesting that local ethnic networks help open access to credit. Most of the empirical work in this area has been conducted in the context of developing countries.⁶ Credit constraints clearly can be a problem in these examples. However, when we consider the case of a developed country, our findings suggest that the credit effects of the network may not be as important.

Our framework suggests that easier access to credit should favor vertical integration. However, we find the social network to be associated with less vertical integration. There may be a few explanations for this. The formal credit markets in the United States may be sufficient, such that ethnic/network ties are not necessary to gain access to credit. Alternatively, social networks may be facilitating access to credit, but these effects are less important relative to the networks ability to resolve an agency problem between a store and its suppliers.

⁶ See for example McMillan and Woodruff (1999), Fafchamps (2000) or Fisman (2003).

One interpretation of our results may be that the Koreans in Koreatown have less access to formal credit. This could imply that they are more credit constrained and less able to invest in the equipment that would allow them to integrate services in-house. We do not observe these factors to test for them. However, we place less weight on this credit based explanation because changes in borrowing rates only marginally affect the costs of integrating laundry and dry cleaning services.

The paper is organized as follows. The following section lays out the framework for how social networks may affect vertical integration and describes the institutional details of the laundry services industry as well as the costs of integrating versus outsourcing decisions. Section III describes the data. Section IV describes the empirical specification and the results and section V concludes.

II. Social Networks and Vertical Integration in Laundry Services

In this section we outline a framework for analyzing how membership in a social network may affect vertical integration decisions. We approach the analysis from our empirical application of laundry service outlets, but the approach could be generalized to other outlets deciding between vertically integrating or outsourcing a good or service.

Social networks have the ability to affect vertical integration decisions through their enhancement of reputations. We therefore begin by expressing the vertical integration decision as a function of reputations. A laundry service outlet will choose to vertically integrate a service (e.g. dry cleaning) if the per-period profit of vertically integrating is greater than the per-period profit of outsourcing:

$$\begin{aligned} \pi\left(\left\{\left(p-c\left(vi,r^w,e,\eta^1\right)\right)q\left(p,z\left(vi,r^w,e\right),\xi\right)\right\}-f\left(vi,d\left(r^b,\kappa\right)\right)\mid vi=1\right) > \\ \pi\left(\left\{\left(p-c\left(vi,r^u,e,\eta^0\right)\right)q\left(p,z\left(vi,r^u,e\right),\xi\right)\right\}-f\left(vi,d\left(r^b,\kappa\right)\right)\mid vi=0\right) \end{aligned} \quad (1)$$

To avoid unnecessary complications of a dynamic decision, we treat the per-period profits to be a function of fixed costs, f , that include rental rates of capital equipment.⁷ f is therefore determined by

⁷ While it is possible that the decision to vertically integrate may actually be a decision of whether to buyout the business of an integrated or non-integrated cleaner, this should not alter the analysis. Specifically, the reputation

the vertical integration decision, which can increase rental costs of capital, and credit d which is determined by reputation with local financiers or bankers r^b and/or a credit worthiness, κ , unobservable to the econometrician. p is the price charged. q is demand, which is determined by the price, quality, z , and a vector of outlet-specific demand shocks, ξ . Quality is a function of the decision to vertically integrate, vi , because the integration decision affects the turnaround time. Quality is also a function of reputation r with either an upstream firm u or workers w , and e the effort of the owner or operator. The marginal costs of cleaning clothes, c , are a function of whether or not the firm is vertically integrated, the reputation and effort which determines quality, and a vector of firm specific marginal cost shocks that depend on whether the firm is vertically integrated, η .

Given the above specification, there are four potential findings about the relationship between social networks and vertical integration. Two potential findings involve the role of credit access in social networks and its implications for vertical integration decisions. The other two potential findings involve the social network affecting agency problems either between a cleaner and its supplier or between a cleaner and its employees. Agency problems may be particularly pervasive in the laundry services industry because quality is highly variable, which led the industry to be ranked first in the number of quality related complaints in a study by Saint Louis University's school of business titled "Customer Complaints: Closing the Gap."

A. The Role of Credit in Social Networks and Laundry Services

The study of social networks in economics has often focused on the ability of a network to facilitate access to credit. In the context of the vertical integration question we pose, superior access to credit conveyed by the social network should lower the costs of capital and increase the likelihood of vertical integration. The empirical framework in Equation (1) accounts for this because social network benefits

incentives we describe below will still affect the per-period profits of the firm and the rental costs of capital will still reflect the value of any cleaning equipment that may have already existed in the store.

could increase r^b , which would lower the rental rate of capital and increase the likelihood of integrating, all else equal. The empirical results we report later do not however find a positive relationship between vertical integration and social network membership.

The other possible role for credit is that members of ethnic social networks in developed countries may vertically integrate less due to inferior access to formal credit markets. In a developed country such as the United States, ethnic communities such as Koreatowns, Chinatowns, etc., may have residents that are more likely to be immigrants. Their relatively short tenures in the country could lead to a lack of an established credit history (i.e. a smaller value of κ) which could lead to greater monthly interest payments on loans used to finance vertical integration. Therefore, while the social network may enhance r^b , it may not be enough to offset the disadvantages network members face due to shorter credit histories.

To provide a benchmark for the plausibility of this credit based explanation, we explore the capital costs in the laundry services industry and the effect of variation in credit access. Table 1 summarizes the financial costs for a store ranging from 800 to 2,000 square feet. The table indicates that these businesses can be started quite cheaply (only a \$49,900 total investment for a drop-off location). Fully integrating into both laundry and dry-cleaning imposes an additional cost of approximately \$130,000. Down payments are 20%, so fully integrating only requires an additional \$26,000 of startup capital. In terms of monthly payments, vertically integrating requires an additional \$1,433 per month.

To assess whether social network members having worse access to formal credit can drive the empirical relationship between social networks and vertical integration, we consider the effect of a much higher interest rate (i.e. double the prime rate).⁸ Poor access to credit in this context would raise the cost of vertically integrating by \$342 per month. While this could affect some cleaners on the margin of vertically integrating, the fact that the store would have expected monthly revenue of \$26,000 by the end

⁸ Because we consider the margin between vertically integrating or not, as opposed to the entry decision, it is reasonable to assume owners with worse access to credit in fact do have access to credit, just at a higher rate.

of the first year of operation,⁹ suggests that overall effects implied for the social network on vertically integrating would be rather small.

B. Agency Problems and Social Networks in Laundry Services

Social networks also help build and enforce reputations which could mitigate agency problems either within the firm or across firms. There is a long literature in industrial organization explaining how the inability to perfectly monitor agents or the inability to measure agent-specific productivity can create instances where agents might shirk on the quality of their work. This can either reduce quality, or raise the costs of maintaining quality. In this subsection, we briefly introduce how a social network can affect agency problems within the context of our empirical framework outlined above, and then explore the potential magnitude of such affects by describing typical laundry outlet cost data in a similar way to how we discussed the plausibility of credit access effects above.

Agency problems within a firm arise if the owner or manager cannot monitor or measure the input or output of workers well enough to assure desired quality is always delivered. A social network can ease these problems by allowing the firm to impose a greater penalty on workers that violate the implicit or explicit understandings of their employment agreements. Specifically, by spreading bad word of mouth within the network, the employer can more greatly reduce the future employment prospects of the employee. This may be particularly strong in immigrant based ethnic social networks such as the Koreans in Koreatown which we consider. The social network therefore works to increase r^w , which can either increase the quality or lower the costs when vertically integrated. The prediction is therefore a positive relationship between social network membership and vertical integration, holding all else equal. While this network effect may be present, the empirical relationship we find in Section IV is not consistent with agency problems within the firm being a primary force behind the effect of social networks on vertical integration.

⁹ The \$26,000 per month is based on predictions by Americlean. However, in LA county, the average sales of a laundry service outlet are just over \$53,000 per month according to the 2002 Economic census.

The other potential effect of the social network on agency problems occurs when outlets that are members of social networks have a greater ability to affect the reputations of their upstream suppliers, which would provide them better quality or lower input prices than out-of-network outlets. While a repeat purchase mechanism is a primary determinant of an upstream supplier's reputational capital with an outlet, r'' , the presence of a social network also increases r'' by increasing the potential penalty against an upstream firm for undersupplying quality.

Klein and Leffler (1981) provide a framework for understanding how buyers can obtain desired quality through reputations. In their model a supplier provides quality to avoid losing rents derived from future sales. In the case of laundry services, the rents would be a premium a storefront pays when outsourcing. The greater the future rents an outlet can potentially withhold, the lower this premium needs to be. In our outline of the vertical integration decision in laundry services in Equation (1), this is captured by the reputation between the outlet and the upstream firm, r'' , on marginal costs, c , and/or quality, z .

The Klein and Leffler (1981) model makes the probably unrealistic assumption that a buyer can costlessly communicate with all other buyers. This allows a single buyer to aggregate all of the supplier's future rents to potentially withhold if it is cheated. Our implementation of their theory in the context of social networks recognizes that communication will be more concentrated within the network. In other words, buyers that are network members will have a greater ability to affect the upstream firm's reputation.

While we primarily focus on an outlet being able to spread bad word-of-mouth to other within-network buyers (both present outlets and potential entrants), another channel for the network to operate exists if an outlet can spread bad word-of-mouth to other members of the social network. If the supplier is a member of the social network, it is possible that it could be penalized up to the entire value of the social capital made available to it by network membership. This channel does not require that the outlet has any relationship with the supplier's other customers.

It is possible that both or just one of these two channels determines the reputational capital of the upstream firm. However, the common theme between these channels is that the social network increases the reputational capital at stake of the supplier by expanding the potential penalty for undersupplied quality beyond just the lost future sales of the affected outlet. In the first channel, the penalty includes lost future sales from other customers, while in the latter it includes social network benefits from many potential network members outside of the industry as well. Upstream suppliers with more reputational capital at stake in a relationship should provide better quality or lower prices, implying that social network members may have an outsourcing advantage relative to non-members whose suppliers have less reputational capital at stake. This suggests that, all else equal, social network membership should be negatively correlated with the decision to vertically integrate.

As we did with the access to credit effects, we benchmark the potential magnitude of the social network effect on agency problems. In Table 1, outsourcing costs for the typical outlet are expected to be 50 percent of sales. We therefore evaluate how much these costs would decrease if a social network helped an outlet obtain outsourcing costs of only 45 percent of sales. We see that monthly costs drop by \$1,300 from \$13,000 to \$11,700 for an outlet with monthly revenue of \$26,000. This is nearly four times greater than the largest potential effect of a social network on access to credit as outlined in the fixed cost analysis in Table 1. Furthermore, because the social network effect on outsourcing costs is a marginal effect, the sales volume of the outlet could increase this substantially. For instance, the average cleaner in the geographic location we study below, Los Angeles County, has monthly sales of \$53,000, implying that a social network lowering outsourcing costs to 45 percent would lower monthly costs by \$2,650.

We have considered both access to credit and quality effects for a firm fully-integrating into both dry-cleaning and laundry, but it is important to note that the quality concerns leading to potential agency problems are more severe for drycleaning than laundry. There are a couple of reasons for this. First, the clothes that are drycleaned are typically more expensive and have fabrics that are much more prone to damage. Second, the drycleaning process is fairly complex, using chemicals that are extracted from

fabrics, filtered, and then reused.¹⁰ Inappropriate chemicals or poorly filtered chemicals are obvious potential sources of quality concerns. In addition, if garments are removed from the dryer prematurely, the garments can retain a scent of the chemicals. We therefore expect that options for resolving agency problems may be more important for drycleaning than laundry.

III. Data

Our empirical approach involves relating the propensity to integrate services on premises to membership in a language-based social network. We chose the laundry services industry¹¹ because of the variation in make-or-buy decisions with respect to their two primary services and the important role of quality provision, which reputations within a social network could help assure. We chose the Los Angeles area because of its proximity and familiarity to the authors and a large concentrated community of Korean speaking individuals, who operate roughly 2,000 cleaners in southern California. We conducted a survey in a sample of drycleaning stores to find out their make-or-buy decisions with respect to laundry and drycleaning, the languages spoken, the prices and turnaround times for each service, and other services offered by the firm. A copy of the survey and description of the collection process and details are included in Appendix 1. We also conducted some follow-up interviews to learn further about some features of their upstream suppliers. We begin by defining the social network.

A. The Definition of the Social Network

We now turn to how we define the social network for the purposes of our empirical analysis. It is important to note that we cannot observe the exact social network relationships outlined in section II, so we will be agnostic about the exact manner in which the social network functions in the empirical

¹⁰ Fabrics are pre-treated for stains and then put through a machine which uses liquid solvents. These solvents do not completely saturate the fibers of the garment, reducing the swelling and shrinking which can be harmful to some fabrics when cleaned with water. The most common solvents are perchloroethylene (PCE) and petroleum-based solvents. PCE is more commonly used by commercial drycleaners. After going through the cleaning process, the fabric is then dried and pressed (EPA 1995).

¹¹ Other papers documenting aspects of the drycleaning industry are Simester (1995) and Bracker and Pearson (1986).

specification. In the case of access to credit, the social network likely involves laundry service stores and financiers within the social network. In the case of resolving the agency problem, the network involves current storefronts and past and future storefronts that provide or receive referrals, as well as other community members that communicate or care about bad word of mouth.¹² However, other network members such as end-customers or acquaintances could also facilitate this communication.

While observing all of the potential relationships described above is unmanageable, we rely on an indicator for whether or not a firm is more likely to have these valuable social ties. In southern California, there are more than 2,000 Korean cleaners, suggesting there may likely be a Korean network. The stores defined in this paper to be in the social network are Korean owned or operated stores located in an area defined to be Koreatown (see Appendix 2 for our definition of Koreatown). Koreatown itself defines a language and ethnic based social network. It is therefore reasonable to assume that Koreans in Koreatown would be most likely to receive benefits of Korean social ties. This is not to say that Korean networks do not exist outside Koreatown. Other Korean networks could exist and also help to provide access to credit or reduce a quality related agency problem, but in Koreatown, these networks should be stronger. To the extent that these networks exist, our empirical approach is to evaluate the incremental effect of being a Korean located in Koreatown.

Testing for the presence of networks outside Koreatown is beyond the scope of this paper due to a data and a modeling issue. First, we would need to observe all of the laundry service stores (or at least a much greater sample) to identify networks elsewhere. Second, we would have to deal with the endogenous formation of the network. By focusing on the Koreatown network in this paper, we can safely assume the formation of Koreatown is exogenous to laundry services.

¹² One might ask why laundries would communicate if they presumably compete with one another. The dense geographic concentration of these firms suggests there are local convenience aspects, such that a given cleaner may only compete with those cleaners located very close. For instance, in Koreatown, we have sampled 38 cleaners. It is very unlikely that each cleaner competes with all 37 other cleaners. The social ties can act as a substitute for the incentives of subsets of the firms to merge.

B. Downstream Survey Summary Statistics

Our survey consists of a total of 138 randomly selected laundry storefronts located throughout central and western Los Angeles County. For each cleaner, we observe whether laundry and/or dry cleaning services are performed in house, or are outsourced. For each service, we know the price and turnaround time for a typical item. We also observe whether or not the cleaner is part of chain, as these stores may be less likely to perform services on the premises. To identify the social network membership, we know whether or not the owner or manager speaks Korean and we know the exact address to determine whether or not it is located within the region defined to be Koreatown. This store level data is then merged with a variety of census tract characteristics which we describe below.

Table 2 summarizes the variables used in our statistical analysis below. We have divided the variables into those describing the drycleaning decisions of the stores, the laundering decisions of the stores, the store characteristics, and census tract characteristics where the stores are located.

Integration (as opposed to outsourcing) refers to whether or not laundry and drycleaning are done on the premises. Laundry and drycleaning each have an integration dummy equal to one if the process is done on-site. As we can see from the summary statistics table, 54% of the stores launder on their premises and 70% of them dryclean on their premises.

The variable titled Korean Speaking is an indicator for whether or not the store is Korean-speaking. 43 percent of the cleaners are Korean speaking. These cleaners located within the boundaries of Koreatown as described above are considered to be in the social network. The percent of stores in the Koreatown social network boundaries are 28 percent of our sample. The census tracts in our data set had an average of 9 percent Korean speakers, with a maximum of 41.8 percent in a tract in Koreatown.

We also asked the stores whether or not they were part of a chain. This allows us to account for the fact that some store-fronts may be owned by their suppliers. Just over 15 percent of stores in our sample were classified as chains.

The number of stores within a half mile of the address of each outlet ranges from 1 to 19. The minimum is 1 because we include the store itself so that we can take the log of this variable in estimation.

On average there are 7 stores within this small area. This suggests competition is intense, but it also suggests that geographic location may be critical. In other words, customers highly value the convenience of an outlet's location. This can also help explain why network stores might communicate with one another. An outlet might not compete with all the others in this small area and if we expand beyond a half mile there are potentially many more outlets that it may share suppliers with, but not compete directly with.

In our empirical analysis below, we use a few variables to account for local market characteristics. One is the number of local competitors. We also include the median income of the census tract to account for those tracts that may have a greater taste for quality. Similarly, we also use some imputed measures for the apparel and textile expenditures per capita. These were obtained from the University of Wisconsin, Milwaukee Purchasing Power Profiles. They combine Consumer Expenditure Survey information by income group and geography with income groups in the census tract to obtain the estimates.¹³

We also included employment levels of the census tracts to control for demand differences. The overall employment and the female employment levels are used to account for differences between laundry and drycleaning, in that laundry services are used predominantly by men and drycleaning services predominantly by women. We also entered the employment numbers according to whether or not the cleaner was Korean-speaking. Specifically, for Korean-owned stores we used the number of employed Asians, while for non-Korean-owned stores we used the number of employed non-Asians. The purpose of this is to account for the fact that network members may have faced demand characteristics specific to their ethnic group. Employment in a census tract is about 1,264 on average, while female employment is 584 on average.¹⁴

¹³ Visit <http://www.uwm.edu/Dept/ETI/PurchasingPower/ETImethodology.htm> for a more detailed description of these variables.

¹⁴ Instances of zero employment correspond to a Korean speaking store located in area the Census reports having no employed male or female Asians.

To document prices for laundry and drycleaning, the survey asks for the prices of two standard items: a long-sleeved, collared, button-down shirt (laundry) and a full-length dress (drycleaning). The average prices charged for laundering and drycleaning are \$1.78 and \$7.21 respectively.¹⁵ Similarly, the minimum turnaround time for laundering a shirt and drycleaning a dress are 1 day and 0.95 days respectively. When we evaluate how these prices differ by whether or not a cleaner is integrated, we find that integrated cleaners provide both laundry and drycleaning in less than a day, while non-integrated cleaners take more than a day on average. Prices for integrated cleaners are higher, which may reflect the value of offering faster service.

C. Upstream Information

While our primary focus and later empirical analysis concentrates on the outsourcing decisions of downstream cleaners, we also tried to gain as much information as possible about the upstream. We excluded such questions from the initial survey because we wanted to assure a high response rate and recognized that respondents will be less compliant with more specific questions, so we asked questions about the upstream in a follow-up telephone survey. As expected, response rates were poor and too selective to include in our data analysis¹⁶, but we provide some of the information here to at least document some of the data points in the support of the distribution of upstream characteristics

We found that most of the responding non-integrated Korean cleaners in Koreatown outsource to other Koreans. This suggests that outlets may be able to leverage connections outside the industry to help influencing the quality that their supplier delivers. However, there are also some non-Korean upstream cleaners that do reportedly supply Korean cleaners in Koreatown. For reputation effects of the network to influence decisions for these cleaners, there needs to be some communication between buyers. To assess whether such communication exists, we asked outsourcing Korean cleaners in Koreatown whether they

¹⁵ The cleaner charging \$50 for dry-cleaning is a “French Laundry” in the Santa Monica area. As assurance that such an outlier does not affect our results, it was one of 17 stores in the Santa Monica and Century City areas that were excluded in a robustness check requiring that each store have an overlapping support in the probability of being located in Koreatown. See section IV.B for more details.

¹⁶ Of the 75 stores in our sample that we had a Korean speaking research assistant contact, only 39 of them provided any information about the upstream and most stopped answering questions at some point.

knew any other customers of their suppliers. Most responding cleaners knew other outlets using their supplier, and most identified the other customers as Koreans.

We also asked the cleaners in our sample if they supplied other cleaners and if so, how many. The limited responses indicated that many of the integrated cleaners in our data set were also suppliers to other cleaners. Most supplied just two or three downstream cleaners, but one indicated a larger number, though she was not specific. Furthermore, those upstream cleaners located in Koreatown seemed to be predominantly supplying other Koreatown cleaners.

D. Analysis of Vertical Integration Using Differences in Means

In Table 3, we report summary statistics of integration decisions by service (laundry or drycleaning) and by location (in Koreatown versus outside Koreatown). Outside Koreatown, Koreans and non-Koreans are not significantly different in their incidence of vertical integration. They integrate both services at about the same rate (just over 70% for drycleaning and between 50 and 60 percent for laundry). However, in Koreatown, Koreans are much less likely to integrate than non-Koreans. In drycleaning, Koreans are 34 percentage points less likely to integrate and in laundry, Koreans are almost 50 percentage points less likely to integrate. Both of these differences are statistically significant, as are the differences in differences from comparing stores in and out of Koreatown as reported in the table. This is the primary empirical finding of our paper which we will explore with regression analysis in the next section.

Another relevant fact revealed in Table 3 that we also evaluate in our regressions is that stores tend to integrate drycleaning more than laundering. There is an 11 to 20 percentage point difference for all of the store language combinations except non-Korean in Koreatown. The fact that drycleaning is more likely to be integrated is consistent with the notion that quality concerns may be an important feature for the make-or-buy decision in this industry.

IV. Results

In this section we show results from investigating the relationship between the social network and make-or-buy decisions controlling for neighborhood fixed effects, and other local demand characteristics.

Our empirical approach follows the specification of Equation (1). However, we are unable to observe the relationships and reputational capital between agents, r , and therefore we cannot evaluate directly the impact of the social network on vertical integration decisions. Bertrand, Luttmer and Mullainathan (2000) face this same problem when they investigate the effect of social networks on welfare use. They argue that even if the network itself was observed and somehow measured, the analysis would still suffer from severe measurement and omitted variable problems. They address this issue by interacting ethnicity membership and network availability by neighborhood.

For the same reason, we follow a similar indirect approach. Group membership is defined by whether an outlet has a defining characteristic, $K \in \{0,1\}$ (i.e. is it owned and/or operated by a Korean), and whether or not workers, suppliers, or financiers in the outlet's geographic proximity are very likely to have that characteristic, $KT \in \{0,1\}$ (i.e. is the outlet located in Koreatown).¹⁷

Given this specification for our social network analysis, the relationship between a social network and vertical integration is described by the correlation between vi and the interaction of K and KT , $K \times KT$. The relationship between vi and K will pick up factors common to Korean speaking outlets located in either Koreatown or elsewhere. The relationship between vi and KT will pick up factors common to outlets in Koreatown, whether operated by a Korean or non-Korean. The relationship between vi and $K \times KT$ will therefore explain all systematic differences of Korean speaking outlets in Koreatown relative to non-Koreans located anywhere and Koreans located outside Koreatown. This will specifically estimate the social network effect if none of the other variables in Equation (1) are correlated

¹⁷ An alternative specification would be to use the distance to the center of Koreatown to measure the strength of the social network. We cannot however do this because there is not a well-defined center of Koreatown. For instance, in Figure 1 in the appendix, there is large Korean share on some census tracts on the border of Koreatown and also a small share of Koreans in some census tracts on the interior of Koreatown. We therefore do not expect the Korean network to be more accessible in the geographic center of the region we have defined to be Koreatown.

with $K \times KT$. Marginal cost determinants, η , will not likely differ for Koreans and non-Koreans in Koreatown, but it is possible some demand characteristics, ξ , will. We therefore extend our empirical specifications to include an extensive set of demand characteristics, Z . Our estimating equation is therefore a difference-in-differences as follows:

$$vi = \alpha K \times KT + \delta_K K + \delta_{KT} KT + \beta X + \gamma Z + \varepsilon \quad (2)$$

The variable X includes other explanatory variables such as fixed effects, whether or not the service of interest is dry cleaning or laundry as well as its interaction with K and KT . We begin our analysis with linear regression, but then estimate probit specifications, where vi in Equation (2) can be interpreted as a latent value of vertically integrating.

If we make the common difference-in-differences assumption of selection on observables (also referred to as unconfoundedness),¹⁸ $E[\varepsilon \times (K \times KT) | K, KT, X, Z] = 0$, estimates of α will measure the average treatment effect of a Korean speaking store being in Koreatown. There are two reasons why we may want to relax this assumption, but either case still allows α to inform us about the way social networks affect vertical integration. First, as we suggested previously, it is possible that Korean speakers in Koreatown may have less access to formal credit, which would imply the unobservable κ is in ε and is correlated with $K \times KT$. Such cases provide support for the fact that social network members do not get enough extra access to informal credit to offset their inherent disadvantages in acquiring formal credit.

Second, we may want to relax the assumption of selection on observables if not all Korean speakers have the same ability to take advantage of social network benefits. Our social network measure of $K \times KT$ only proxies for relationships, r , being stronger. If r varies within Korean speakers, those operating stores in Koreatown may select into Koreatown, such that $E[r | K = 1, KT = 1] > E[r | K = 1, KT = 0]$.¹⁹ In such cases, selection on unobservable differences in

¹⁸ See Imbens (2003) for a useful discussion of these assumptions.

¹⁹ Along these lines, one possibility is that Koreans select whether to locate in Koreatown based on whether or not they plan to integrate or not. While a network effect favoring outsourcing over integration would certainly create

r will prevent α from measuring the average effect of shifting a Korean speaking cleaner into Koreatown. However, if selection on unobservables only includes selection on unobservable differences in r , the sign of α will still identify the sign of the relationship between the social network and vertical integration decisions.

A. OLS Regressions

We begin by running simple OLS regressions to estimate a linear probability model. While these models can certainly predict outside the desirable range, they are useful for establishing the sign of the effects and relating the estimation to the difference in differences reported in Table 3. Table 4 shows results from OLS regressions of combining observations from both laundry and drycleaning services. The coefficient on **Korean*Koreatown** shows a negative relationship between vertical integration and social network membership. We run these regressions with and without chain stores included (controlling for them when included) and fixed effects at the neighborhood level. The fixed effects tend to make the results stronger.²⁰

Of the four potential effects of a social network discussed in section II, this provides support for one of two potential effects: either a social network helps resolve a quality related agency problem between an outlet and its supplier or social network members have inferior access to formal credit. This relationship will hold through the rest of our specifications. As we control for more factors through fixed effects, demand characteristics, and correlations in unobservables across services, the estimates tend to provide greater support for the agency effects.

In addition, the results reported in Table 4 show that stores are less likely to integrate laundering services than drycleaning services. This finding is consistent with our prediction that the service more sensitive to quality (drycleaning) should be the service also with a higher propensity to experience

such an incentive, it is not clear why a Korean with access to the Koreatown social network would not want to locate an integrated store in Koreatown. A customer with network benefits specifically for outsourcing laundry will likely have other network benefits as well.

²⁰ It is not reasonable to include finer geographic fixed effects such as zip-codes, because if the fixed effect is at a smaller level than the size of Koreatown, identification will focus only on zip-codes that have census tracts both in and out of Koreatown.

integration and be provided in-house. As expected, stores that belong to chains are also less likely to conduct services on their premises.

Table 5 shows results from OLS regressions that are very similar to those reported in Table 4. In this table, we include controls for census tract specific measures of median income, per capita expenditures on apparels and textiles, and the size of the labor force inside the network (Asian and non-Asian employment and female Asian and non-Asian employment). We also control for local competition by including the log of the number of stores within a half mile of the store's address. The previous results are robust to these new variables: cleaners in Koreatown are more likely to integrate than if located elsewhere, Korean cleaners in Koreatown are less likely to integrate than non-Korean in Koreatown and Korean elsewhere and drycleaning services are always more likely to take place on the store premises than laundering services.

B. Probit and BiProbit Specifications

Table 6 reports estimates demonstrating robustness to a probit specification. Most of the results reported in this table are coefficients of these regressions, while marginal effects are reported for the three top variables only. We see that by constraining the model to predict a probability between 0 and 1, the marginal effect of being in the social network is still very strong, but now in the more reasonable range of 35 to 46 percentage points.

We also find drycleaning services are always 22 to 24 percentage points more likely to take place on the premises of the store than elsewhere and we find a similar effect (around 20 percentage points) of chain membership on the probability to undertake services within the premises of the store.

Finally, Table 7 shows results from using a biprobit specification. This allows us to examine both outsourcing decisions (drycleaning and laundering services) independently at each store while controlling for unobservable factors (to the econometrician) that may drive both decisions simultaneously. We find a strong positive correlation in the unobservable errors (87% to 94%). In addition, we again find that Korean cleaners are less likely to dryclean and launder on their premises when located in Koreatown than non-Korean stores are anywhere or Korean stores located outside of Koreatown. Similar to results

reported in previous tables, stores belonging to chains are also less likely to integrate services on their premises. Results are robust when dropping observations of stores belonging to chains and the inclusion of neighborhood fixed effects.

The correlations in the unobservable factors between vertically integrating dry-cleaning and laundry yield a very interesting feature of the social network effect. In all previous specifications, the variable **Korean*KoreaTown*DryCleaning** measuring the difference between the social network effect on dry cleaning and laundry, indicated that the network had a greater effect for laundry services. However, the effect on dry cleaning becomes greater once we control for the fact that there are likely unobservable complementarities between these services. For instance in Table 5, the social network effect was 13 to 17 percentage points weaker for dry cleaning, though never statistically significant. However, in Table 7, the social network effect is as much as 22 percentage points for dry cleaning. The dry cleaning effect is still not significantly different from the laundry effect, but we see that only the dry cleaning effect is significant in specification (4). The estimates in Table 7 and their contrast to estimates in previous tables indicate that unobservables in the dry cleaning vertical integration decisions are spilling over to laundry. There is certainly a spillover effect into laundry, but in some cases it appears that the social network still has a direct effect on laundry as it is strong and significant in specifications (1) and (2). Because dry cleaning is the more quality-sensitive service, this finding, together with the finding that dry cleaning is always more likely to be vertically integrated, provides strong support for the social network helping to assure that upstream firms deliver expected quality.

Though not reported here, we have also run these analyses excluding observations that do not have overlapping support with the two variables determining treatment: Korean and Koreatown. This is useful because, for instance, there are some systematic differences in the explanatory variables between Koreans and non-Koreans in Koreatown. While these explanatory variables are accounted for on the right-hand side of the regressions, the overlapping support check allows these variables to enter the analysis in a more flexible and less parametric fashion. We find that there are 17 stores outside of Koreatown that are dropped because they are systematically different from stores in Koreatown and there are 4 Korean stores

in Koreatown that are dropped because they are systematically different from non-Korean stores in Koreatown. Our results are robust to these specifications.

To summarize the results from Table 4 to Table 7, we find a strong robust negative relationship between social network membership and providing services in-house. We also find that drycleaning services are always more likely to take place within the store premises than laundering services. We also find that much of the social network effect on laundry services is attributable to spillovers from the social network's effect on dry cleaning. As described above, this is mostly because drycleaning services are more sensitive to quality consideration than laundering services (more delicate fabrics and different type of clothing). Finally, consistent with common sense, we find robust evidence that chain stores are less likely to clean on premises. When we exclude chain stores from the analysis, all results hold.

It is useful to consider our empirical findings in the context of the institutional details of the laundry services industry and the existing literature. We find that there is a negative relationship between integration and membership in an ethnic based social network. This suggests that either the network reduces the costs of using the market or the social network effects on access to credit do not offset network members' inferior access to formal credit. Our analysis in section II.A above demonstrated that very poor access to credit would only cost outlets an additional \$342 per month. For outlets in LA County that average over \$50,000 in revenue per month, it is unlikely that this could explain the social network reducing vertical integration by 35 to 50 percentage points.

This leads us to believe that significant factors explaining this relationship are more likely to involve reputations affecting marginal costs. An obvious marginal factor for an outsourced cleaner is whether or not the supplier delivers expected quality and how much must be paid for this. In section II.B we documented the role of quality in this industry. There is an existing literature suggesting that reputation affects the delivery of difficult-to-measure quality and/or the price that must be paid to receive it (e.g. Klein and Leffler (1981)). Furthermore, Greif (1993) has linked the role of reputation in using the market to communication and information within a coalition of buyers. Our paper therefore provides empirical

evidence consistent with the suggestions of Greif (1993) and consequently links the literature on the effects of social networks and ethnic membership to the economic literature on the boundaries of the firm.

V. Conclusions

This paper documents the relationship between an ethnic-based social network and make or buy decisions. We find that stores which are members of a social network in the laundry services industry are significantly less likely to integrate than non-members. This suggests that one channel through which ethnic-based social networks affect firm performance may be by lowering the costs of using the market. Furthermore, the common association between social networks and attributes such as enhanced communication and reputation provide support for these factors in determining the boundaries of the firm.

Social networks shift reputational capital and hence the relational contracting regime faced by firms. In our empirical setting, social networks do this by expanding the upstream firm's reputation that is at stake in any bilateral transaction to include two other types of agents: the firm's other customers that are in the network and network members that are external to the industry that may provide social benefits to the upstream firm. Our evidence suggests that these social network members that are external to a given transaction are effective in deterring upstream firms from renegeing on the implicit agreement between a cleaner and its supplier. This evidence is consistent with the fact that relational contracting may be used as a substitute for organizational form. Evidence that buying laundry services is more common than in drycleaning also supports the idea that services that are more quality sensitive are also more difficult to purchase in the market, hence opportunism is likely a factor in the make-or-buy decisions. The unique feature of our empirical example is that, while opportunism appears to be an important factor, there are not specific assets locking a buyer to a seller. This suggests that theories of the firm based on ex-post bargaining rationales, such as the asset specificity theories of Williamson (1975, 1985) and Klein, Crawford and Alchian (1978), and the property rights approach following Grossman and Hart (1986), cannot explain vertical integration in this industry. In future work, we plan to use this feature of this industry to explore other determinants of the boundaries of the firm that may not be affected by the presence of a social network.

References

- Alesina, A., La Ferrara, E. 2005. Ethnic Diversity and Economic Performance. *Journal of Economic Literature* **43** 721-61.
- Baker, G.P., Hubbard, T. 2003. Make v. Buy in Trucking: Asset Ownership, Job Design and Information. *American Economic Review* **93**(3).
- Bertrand, M., Erzo, Luttmer, E.F.P., Mullainathan, S. 2000. Network Effects and Welfare Cultures. *The Quarterly Journal of Economics* **115**(3) 1019-1055.
- Bracker, J., Pearson, J. 1986. Planning and Financial Performance of Small, Mature Firms. *Strategic Management Journal* **7** 503-522.
- U.S. Government Census. 2002. 2002 Economic Census:
www.census.gov/econ/census02/data/us/US000_81.HTM#N812.
- Coase, R. 1937. The Nature of the Firm. *Economica*, New Series **4**(16) 386-405.
- Environmental Protection Agency. 1995.
- Fafchamps, M. 2000. Ethnicity and Credit in African Manufacturing. *Journal of Development Economics* **61** 205-235.
- Fisman, R. 2003. Ethnic Ties and the Provision of Credit: Relationship-Level Evidence from African Firms. *Advances in Economic Analysis and Policy* **3**(1).
- Granovetter, M. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *The American Journal of Sociology* **91**(3) 481-510.
- Greif, A. 1993. Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition. *American Economic Review* **83**(3) 525-548.
- Grossman, S., Hart, O. 1986. The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy* **94**(4) 691-719.
- Hubbard, T. 2004. Affiliation, Integration, and Information: Ownership Incentives and Industry Structure. *Journal of Industrial Economics* **52**(2) 201-227.

- Imbens, G. 2003. Semiparametric Estimation of Average Treatment Effects under Exogeneity: A Review. Working paper.
- International Fabricare Institute. 2002. Association for Professional Drycleaners. Laurel, MD. <http://www.ifi.org/consumer/whatis-drycleaning.html>.
- Joskow, P.L. 1985. Vertical Integration and Long-Term Contracts: The Case of Coal-Burning Electric Generating Plants. *Journal of Law, Economics, & Organization* **1**(1) 33-80.
- Joskow, P.L. 1987. Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets. *American Economic Review* **77**(1) 168-185.
- Kalnins, A., Chung, W. 2004. Social Capital, Geography, and Survival: Gujarati Immigrant Entrepreneurs in the U.S. Lodging Industry. *Management Science*, forthcoming.
- Kim, Y.M. 1994. The Korean American Community in Southern California. In, *Community in Crisis: The Korean American Community After the Los Angeles Civil Unrest of April 1992*. G.O. Totten III and H.E. Schockman, ed. pp. 3-20. Los Angeles: Center for Multiethnic and Transnational Studies, University of Southern California.
- Klein, B., Crawford, R., Alchian, A. 1978. Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. *Journal of Law and Economics* **23**(2) 297-326.
- Klein, B., Lefler, K.B. 1981. The Role of Market Forces in Assuring Contractual Performance. *Journal of Political Economy* **89**(4) 615-641.
- Light, I., Bonacich, E. 1988. *Immigrant Entrepreneurs: Koreans in Los Angeles 1965-1982*. University of California Press, Berkeley.
- Masten, S. 1984. The Organization of Production: Evidence from the Aerospace Industry. *Journal of Law and Economics* **27**(2) 403-17.
- Masten, S., Lafontaine, F. 2002. Contracting in the Absence of Specific Investments and Moral Hazard: Understanding Carrier-Driver Relations in U.S. Trucking. *Michigan Law and Economics Research Paper* No. 02-002.

- McMillan, J., Woodruff, C. 1999. Interfirm Relationships and Informal Credit in Vietnam. *Quarterly Journal of Economics* **114** 1285-1320.
- Monteverde, K., Teece, D. 1982. Supplier Switching Costs and Vertical Integration in the Automobile Industry. *Bell Journal of Economics* **13**(1) 206-13.
- Ong, P. 1981. An Ethnic Trade: The Chinese Laundries in Early California. *Journal of Ethnic Studies* **4**(2) 95-113.
- Portes, A., Sensenbrenner, J. 1993. Embeddedness and Immigration: Notes on the Social Determinants of Economic Action. *The American Journal of Sociology* **98**(6) 1320-1350.
- Robinson, D., Stuart, T. 2005. Network Effects in the Governance of Biotech Strategic Alliances. Mimeo, Fuqua Business School.
- Shaw, R.W. 1973. Investment and Competition from Boom to Recession: A Case Study in the Processes of Competition – The Drycleaning Industry. *Journal of Industrial Economics* **21**(3) 308-324.
- Simester, D. 1995. Signaling Price Image Using Advertised Prices. *Marketing Science* **14**(2) 166-188.
- William Bowen California Geographical Survey. 1996.
- Williamson, O. 1975. *Markets and Hierarchies*. New York: Free Press.
- Williamson, O. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.

APPENDIX 1:

During the weeks of March 21st- 25th and April 25th-30th 2005, we collected survey data from cleaners in four roughly defined areas of Los Angeles: Koreatown, Chinatown/Downtown, Century City, and Santa Monica. It is important to note that stores sampled in the Koreatown region may be either within or outside the Koreatown boundaries used to define the social network. Thirty surveys were completed in each area for a total sample of 120. A copy of the eight-question survey can be found in Appendix 1.

Two days were needed to collect data from each area. The drycleaners were randomly selected from 80 online yellow-page listings per area. A research assistant drove to each of the randomly selected locations and administered the survey in person. In the Koreatown area, 43 drycleaners were visited and 30 successful surveys were collected. The research assistant believes that the refusal to fill out the survey was related to the English speaking ability. We therefore conducted a follow-up telephone survey to account for these non-responses and increase our overall sampling in the Koreatown area. For this survey we had a Korean-speaking research assistant ask an additional 18 cleaners whether they were outsourcing each service, which price they charged, whether or not they spoke Korean and whether or not they were a chain. Our response rate for this telephone survey was 100 percent.²¹ While this paragraph has discussed a broad area including and surrounding Koreatown, all future references to Koreatown will refer specifically to the census tracts used to define the social network.

We also administered surveys in the vicinity of Chinatown. None of the randomly selected cleaners were located in Chinatown proper and, when driving through it, our research assistant was unable to locate any.²² Many of the cleaners in this area were in predominantly Hispanic neighborhoods or in downtown Los Angeles. In this area, 35 cleaners were visited with 30 surveys successfully completed. The primary reason for incomplete surveys in this area was a drycleaner that was closed or no longer existed.

²¹ One number dialed was no longer a laundry service firm.

²² There may be a Chinese network in the Monterrey Park area of Los Angeles county, but we have focused on the Korean network because of the dominance of Koreans in laundry services in southern California.

We surveyed the areas of Century City and Santa Monica to locate Korean cleaners operating outside the social network defined by Koreatown and to locate controls to identify Koreatown specific effects. 77 cleaners were visited with a success rate of 60. The primary reason for incomplete surveys in these areas seemed to be that they were either busy or felt the survey was not worth their time.

In general the survey was well received, though some people became defensive and/or refused to answer certain questions. Such behavior was rarely experienced before the fifth question, which asks for price information. When it came to this question, many people would suddenly want to know more information about why we were doing this survey, and why we wanted to know their prices.

Survey:

Name of Cleaners:

Address of Cleaners:

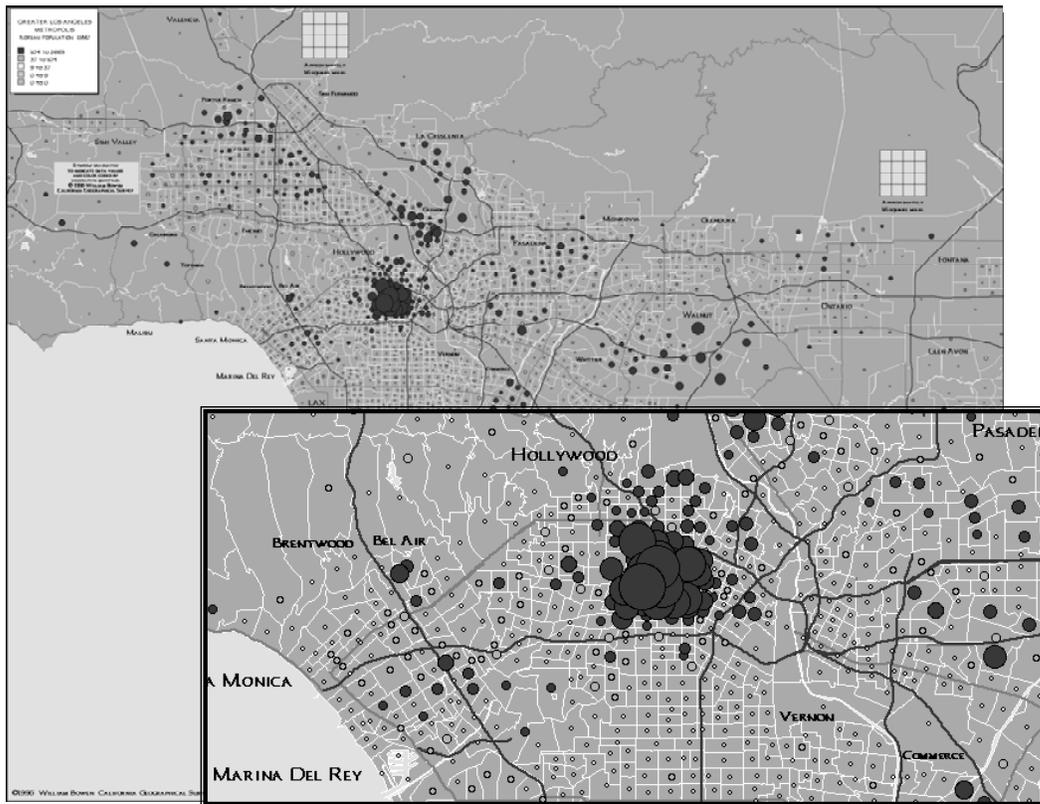
I'm doing a study analyzing how family businesses operate relative to non-family businesses. This is a project conducted by Professors Wesley Hartmann from Stanford University and Ricard Gil from University of California at Santa Cruz. I would really appreciate it if you could take five minutes to answer some questions.

1. Do you launder the clothes here? Yes No
2. Do you dryclean the clothes here? Yes No
3. Do you have any family in the business? Yes No
 - a. Do they provide either of those services?
 - i. Laundry Yes No
 - ii. Drycleaning Yes No
4. Are you part of a chain or not? Yes No
5. Prices
 - a. Laundered Shirt? _____
 - b. Drycleaned dress _____
6. Turnaround times?
 - a. Laundry _____
 - b. Drycleaning _____
7. What languages do you speak?
8. Other services displayed
 - a. Tailoring
 - b. Wash and Fold laundry
 - c. Other _____

APPENDIX 2: Definition of Koreatown

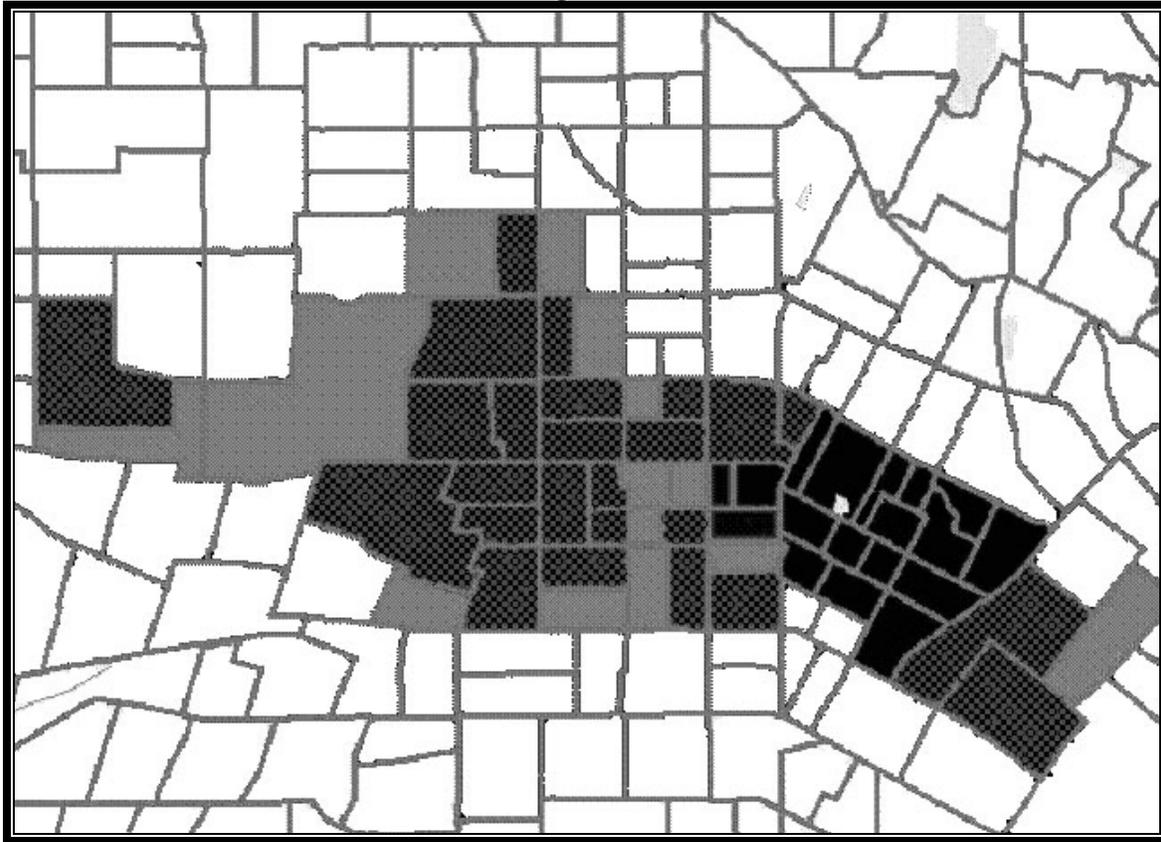
Koreatown is a small area within southern California which can be recognized by the large cluster of dots in Map 1 (William Bowen California Geographical Survey, 1996). There are not however, clear borders defining Koreatown and there is debate even within the community about the actual boundaries as they have been changing over time (Kim, 1994). We therefore analyze 2000 Census tract data on the population of Korean speakers to define a region that can reasonably be regarded as Koreatown. We also construct alternate definitions of Koreatown, which we used to verify the robustness of our main results.

Map 1



To define Koreatown, we therefore include all census tracts near this area with at least fifteen percent Korean speakers. These tracts are checked in Figure 1. One obvious feature is that there are holes, apparently within the center of Koreatown with fewer Korean speakers. Some of these tracts have less than five percent Korean speakers. It is also important to note that some of the tracts with over thirty percent Korean speakers are divided by as many as five other census tracts. We address these gaps as follows.

Figure 1



Our first definition of Koreatown seeks to unite all these tracts with fifteen percent or more Korean speakers. We therefore add all tracts which are bordered by a checkered tract on at least two sides. These result in the tracts shaded in gray. Then, to connect the two divided regions of Koreatown we include the tracts shaded in black. We use two alternate definitions of Koreatown as robustness checks on this latter assumption. The first excludes the tracts in black from Koreatown and the second restricts Koreatown to only the checkered tracts. The definition used throughout the paper uses the checkered, gray and black tracts, but the results have been validated for these other definitions.

Table 1

Approximate Investments and Expenses by Type of Laundry Service Firm

	Drop-off Location	Fully Integrated	Difference
Fixed Costs Analysis			
Typical Outlet			
Total Investment	\$49,900	\$179,900	\$130,000
Required Downpayment	20%	20%	20%
Interest Rate (Prime +2.75%)	11.00%	11.00%	11.00%
Term (in years)	10	10	10
Appx. Monthly Loan Payments	\$550	\$1,982	\$1,433
Better Access to Credit			
Interest Rate (Prime)	8.25%	8.25%	8.25%
Appx. Monthly Loan Payments	\$490	\$1,765	\$1,276
Difference from Typical Outlet	-\$60	-\$217	-\$157
Poor Access to Credit			
Interest Rate (2 x Prime)	16.50%	16.50%	16.50%
Appx. Monthly Loan Payments	\$681	\$2,456	\$1,775
Difference from Typical Outlet	\$131	\$473	\$342
Marginal Costs Analysis			
Typical Outlet			
Monthly Sales	\$26,000	\$26,000	\$0
Cost of Operating Supplies (% of Sales)	0%	5%	5%
Outsourcing Expenses (Percent of Sales)	50%	0%	-50%
Monthly Marginal Costs (Total)	\$13,000	\$1,300	-\$11,700
Better Relationship with Upstream Supplier			
Cost of Operating Supplies (% of Sales)	0%	5%	5%
Outsourcing Expenses (Percent of Sales)	45%	0%	-45%
Monthly Marginal Costs (Total)	\$11,700	\$1,300	-\$10,400
Difference from Typical Outlet	-\$1,300	0	\$1,300

The above reported estimates come from business package descriptions reported at <http://www.americleancorp.com/business.cfm> on October 9, 2006

Table 2. Summary Statistics

	Mean	Std. Dev.	Count	Min	Max
Dry Cleaning					
Integration	0.70	0.46	138	0	1
Price	7.21	5.68	131	1.99	50
Turnaround Time	0.95	0.88	113	0	3
Laundering					
Integration	0.54	0.50	138	0	1
Price	1.78	0.97	130	0.99	10
Turnaround Time	1.00	0.92	113	0	4
Store Characteristics					
Korean Speaking	0.43	0.50	138	0	1
Located in Koreatown	0.28	0.45	138	0	1
Chain	0.15	0.36	138	0	1
Stores within 1/2 mile	6.99	4.01	138	1	19
Census Tract Characteristics by Store					
% Korean Speakers	0.09	0.12	138	0	0.42
Median Income	38768	17162	138	8125	96691
Apparel Expenditure per Capita	572	206	138	136	1031
Textile Expenditures per Capita	38	18	138	6	139
Emp. By Ethn Firm	1264	953	138	0	3921
Fem Emp by Ethn Firm	584	459	138	0	1801

This table presents summary statistics of the variables used in our statistical analysis.

Table 3. Integration Statistics by Social Network Status

	Dry Cleaning	Laundering
Korea Town		
<i>Korean</i>	0.5000 (0.1000)	0.3846 (0.0973)
<i>Non Korean</i>	0.8462 (0.1042)	0.8462 (0.1042)
Elsewhere		
<i>Korean</i>	0.7353 (0.0768)	0.5882 (0.0857)
<i>Non Korean</i>	0.7231 (0.0559)	0.5231 (0.0624)
Difference in Differences	-0.3584 (0.1728)	-0.5267 (0.1776)

The table describes average integration incidence by service (dry cleaning or laundering), location (korea town or elsewhere) and language (korean or non-korean). Standard Errors are in parenthesis.

Table 4. OLS regressions with and without fixed effects

Dependent Variable: Integrate or Not				
	(1)	(2)	(3)	(4)
Korean*Korea Town	-0.5063 (0.1774)***	-0.5806 (0.1809)***	-0.5010 (0.1888)***	-0.5637 (0.1928)***
Dry Cleaning	0.2000 (0.0505)***	0.2000 (0.0508)***	0.2157 (0.0587)***	0.2157 (0.0591)***
Chain?	-0.2083 (0.1072)*	-0.1608 (0.1026)		
Korean	0.0448 (0.1055)	0.1130 (0.1061)	0.0843 (0.1144)	0.1446 (0.1133)
Korea Town	0.2942 (0.1233)**	0.5113 (0.1352)***	0.2843 (0.1307)**	0.4838 (0.1447)***
Korean*Korea Town*Dry Cleaning	0.1683 (0.1965)	0.1683 (0.1976)	0.1324 (0.2123)	0.1324 (0.2137)
Korean*Dry Cleaning	-0.0529 (0.0999)	-0.0529 (0.1004)	-0.0490 (0.1135)	-0.0490 (0.1143)
Korea Town*Dry Cleaning	-0.2000 (0.1646)	-0.2000 (0.1656)	-0.2157 (0.1798)	-0.2157 (0.1810)
Constant	0.5680 (0.0661)***	0.4837 (0.0676)***	0.5490 (0.0711)***	0.4727 (0.0718)***
Fixed Effects	No	Neighborhood	No	Neighborhood
Observations	276	276	234	234
R-squared	0.1	0.17	0.09	0.14

Columns 3 and 4 drop all stores that belong to chains.

Robust standard errors, clustered at the store level, in parentheses.

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

Table 5. OLS regressions controlling for local demand characteristics

Dependent Variable: Integrate or Not				
	(1)	(2)	(3)	(4)
Korean*Korea Town	-0.5822 (0.2189)***	-0.5763 (0.2142)***	-0.4762 (0.2339)**	-0.5139 (0.2299)**
Dry Cleaning	0.2000 (0.0511)***	0.2000 (0.0514)***	0.2157 (0.0595)***	0.2157 (0.0599)***
Chain?	-0.2034 (0.1022)**	-0.1437 (0.1101)		
Korean	0.0538 (0.1452)	0.1135 (0.1366)	0.0306 (0.1543)	0.0996 (0.1459)
Korea Town	0.4824 (0.1619)***	0.5874 (0.1535)***	0.4034 (0.1684)**	0.5486 (0.1669)***
Korean*Korea Town*Dry Cleaning	0.1683 (0.1987)	0.1683 (0.1999)	0.1324 (0.2152)	0.1324 (0.2167)
Korean*Dry Cleaning	-0.0529 (0.1010)	-0.0529 (0.1016)	-0.0490 (0.1150)	-0.0490 (0.1158)
Korea Town*Dry Cleaning	-0.2000 (0.1665)	-0.2000 (0.1675)	-0.2157 (0.1823)	-0.2157 (0.1835)
Log Apparel Expenditures per capita	-0.3433 (0.1217)***	-0.4816 (0.1016)***	-0.3425 (0.1235)***	-0.5105 (0.1079)***
Log Textile Expenditures per capita	0.2912 (0.0556)***	0.3065 (0.0526)***	0.2723 (0.0577)***	0.2974 (0.0579)***
Log Median Income	0.2028 (0.1098)*	0.1759 (0.1035)*	0.2341 (0.1086)**	0.2021 (0.1025)**
Log Local Competition	-0.0028 (0.0644)	-0.0494 (0.0728)	0.0012 (0.0689)	-0.0496 (0.0812)
Emp. By Firm Ethnicity	-0.0004 (0.0002)	-0.0002 (0.0003)	-0.0003 (0.0003)	-0.0002 (0.0003)
Fem. Emp. By Firm Ethnicity	0.0008 (0.0005)	0.0005 (0.0005)	0.0005 (0.0006)	0.0004 (0.0006)
Constant	-0.4609 (0.8934)	0.6535 (1.0353)	-0.6804 (0.9303)	0.6350 (1.1127)
Fixed Effects	No	Neighborhood	No	Neighborhood
Observations	276	276	234	234
R-squared	0.17	0.2	0.14	0.18

Columns 3 and 4 drop observations from all stores that belong to chains.

Robust standard errors, clustered at the store level, in parentheses.

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

Table 6. Probit Regressions

Dependent Variable: Integrate or Not				
	(1)	(2)	(3)	(4)
Korean*Korea Town	-1.8016	-1.7126	-1.4347	-1.5137
<i>Marginal Effect</i>	<i>-0.4552</i>	<i>-0.4236</i>	<i>-0.3633</i>	<i>-0.3540</i>
	(0.1859)**	(0.1865)**	(0.2019)*	(0.1975)*
Dry Cleaning	0.6033	0.6356	0.6389	0.6799
<i>Marginal Effect</i>	<i>0.2203</i>	<i>0.2321</i>	<i>0.2235</i>	<i>0.237</i>
	(0.0538)***	(0.0564)***	(0.0597)***	(0.0623)***
Chain?	-0.6012	-0.4562		
<i>Marginal Effect</i>	<i>-0.2326</i>	<i>-0.1759</i>		
	(0.1102)**	(0.1235)		
Korean	0.1301	0.327	0.047	0.261
	(0.3948)	(0.3983)	(0.4178)	(0.4259)
Korea Town	1.6057	1.7511	1.2924	1.6226
	(0.7627)**	(0.6458)***	(0.7478)*	(0.6578)**
Korean*Korea Town*Dry Cleaning	0.1885	0.3057	0.0792	0.1765
	(0.8424)	(0.7825)	(0.8774)	(0.8294)
Korean*Dry Cleaning	-0.1689	-0.1869	-0.1214	-0.1335
	(0.2915)	(0.3042)	(0.3438)	(0.3638)
Korea Town*Dry Cleaning	-0.3173	-0.4485	-0.3786	-0.5043
	(0.7878)	(0.7191)	(0.8123)	(0.7530)
Log Apparel Expenditures per capita	-2.4421	-3.1807	-3.1053	-3.6992
	(3.3811)	(3.8242)	(4.3483)	(4.4599)
Log Textile Expenditures per capita	1.9501	2.2906	2.4397	2.5651
	(2.7268)	(3.1110)	(3.4781)	(3.5971)
Log Median Income	0.7260	0.5851	0.7641	0.6416
	(0.3964)*	(0.3692)	(0.3966)*	(0.3712)*
Log Local Competition	0.0062	-0.1100	0.0412	-0.0880
	(0.1865)	(0.2160)	(0.2071)	(0.2469)
Emp. By Firm Ethn.	-0.0013	-0.0008	-0.0009	-0.0007
	(0.0007)*	(0.0008)	(0.0008)	(0.0009)
Fem. Emp. By Firm Ethn.	0.0027	0.0016	0.0017	0.0012
	(0.0015)*	(0.0017)	(0.0017)	(0.0019)
Constant	0.9334	6.2873	3.0836	8.1771
	(12.2094)	(14.2459)	(15.6883)	(16.7425)
Fixed Effects	No	Neighborhood	No	Neighborhood
Observations	276	276	234	234

Columns 3 and 4 drop observations from stores that belong to chains. Marginal effects reported in *italics* for variables of interest. Robust standard errors, clustered at the store level, in parentheses.

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

Table 7. Biprobit regressions

	(1)		(2)		(3)		(4)	
	Dry Clean In	Laundry In						
Korean*Korea Town	-1.9113	-1.4054	-2.1802	-1.259	-1.953	-1.0162	-2.4836	-0.9572
<i>Marginal Effect</i>	<i>-0.3773</i>	<i>-0.4420</i>	<i>-0.4060</i>	<i>-0.3624</i>	<i>-0.4156</i>	<i>-0.3094</i>	<i>-0.4687</i>	<i>-0.2404</i>
	(0.1865)**	(0.1975)**	(0.1723)**	(0.2043)*	(0.1895)**	0.2176	(0.1869)**	0.2211
Difference Between Marginal Effects	<i>0.0647</i>		<i>-0.0436</i>		<i>-0.1062</i>		<i>-0.2283</i>	
	(0.1630)		(0.1413)		(0.1665)		(0.1629)	
Chain	-0.6393	-0.5467	-0.5148	-0.4				
	(0.3474)*	(0.3174)*	(0.3819)	(0.3504)				
Korean	0.0228	-0.1277	0.3327	0.0096	0.0758	-0.2962	0.4626	-0.1443
	(0.4649)	(0.4192)	(0.4359)	(0.4039)	(0.5130)	(0.4455)	(0.4598)	(0.4353)
Korea Town	1.6499	1.1897	1.9968	1.4633	1.381	0.9471	1.9368	1.3779
	(0.5688)***	(0.6213)*	(0.5897)***	(0.5319)***	(0.6195)**	(0.6093)	(0.6358)***	(0.5337)***
Log Apparel Expenditures per capita	-2.3872	-2.4954	-4.378	-2.2723	-4.4872	-2.0038	-7.4043	-1.9932
	(1.3649)*	(3.3588)	(4.5328)	(3.8202)	(4.8819)	(4.5779)	(4.7550)	(2.4350)
Log Textile Expenditures per capita	1.3475	2.3377	2.5855	1.8085	2.6597	1.9728	4.3747	1.5449
	(1.0336)	(2.7131)	(3.5505)	(3.1097)	(3.9155)	(3.6625)	(3.7254)	(1.9740)
Log Median Income	1.2485	0.3124	1.2198	0.3135	1.3527	0.3632	1.3293	0.4062
	(0.4603)***	(0.4457)	(0.5205)**	(0.4023)	(0.4789)***	(0.4601)	(0.5178)**	(0.4115)
Log Local Competition	0.0225	0.0042	-0.1523	-0.1174	0.1426	0.0099	-0.0459	-0.1141
	(0.2252)	(0.2071)	(0.2707)	(0.2272)	(0.2551)	(0.2262)	(0.2941)	(0.2473)
Emp. By Ethn. Firm	-0.0017	-0.0013	-0.0007	-0.0011	-0.0014	-0.001	-0.0007	-0.0012
	(0.0009)*	(0.0008)	(0.0012)	(0.0009)	(0.0011)	(0.0009)	(0.0014)	(0.0009)
Fem. Emp. By Ethn. Firm	0.0039	0.0023	0.002	0.0019	0.0033	0.0015	0.0019	0.0017
	(0.0020)**	(0.0016)	(0.0025)	(0.0018)	(0.0024)	(0.0018)	(0.0029)	(0.0020)
Constant	-2.4079	4.5688	6.3417	5.5701	4.952	2.4944	17.8731	4.0536
	(5.6480)	(11.9670)	(15.7246)	(14.4345)	(17.8204)	(16.5268)	(16.6510)	(9.6516)
Correlation	0.8904		0.9256		0.8761		0.9382	
	(0.0511)		(0.0461)		(0.0592)		(0.0742)	
Fixed Effects	No	No	Neighborhood	Neighborhood	No	No	Neighborhood	Neighborhood
Observations	138	138	138	138	117	117	117	117

Groups 3 and 4 drop observations of stores that belong to chains.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Specifications were also estimated dropping 17 additional stores that did not have overlapping support in the propensity to be in Koreatown. Results were substantively unchanged.