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

Ricard Gil[*]
University of California, Santa Cruz

Wesley R. Hartmann
Stanford University

This article 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 nonmember 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 explain a documented relationship between social networks and firm economic performance. Second, institutional details of our 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, although we provide evidence that better access to credit can increase the likelihood of vertical integration, we show that better outsourcing opportunities have a dominant effect of the social network in this particular setting.

1. 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.[2] 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 the 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 dry cleaning 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[3] such that in the southern California region where we focus our analysis, Koreans currently own more than 2000 cleaners.

Although 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 with make-or-buy decisions. However, the specific network relationships within the industry are unobservable and would be econometrically difficult to account for even if they were observable, so we follow Bertrand et al. (2000) by using local demographics and cleaners' Korean-speaking abilities to identify network membership. In the bulk of our analysis, we define the network geographically to be a particular region in which the communication and trust should be at its greatest within the network: Koreatown. We define network membership to constitute Korean firms in Koreatown, whereas nonmembers 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 suggest that "word of mouth" (or reputation effects) will spread faster within this area.[4]

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2. See Karlan et al. (2009) for a model of trust-based social networks.

3. Ong (1981) documents the concentration of Chinese workers and business owners in washhouses in northern California in the late 1800s.

4. Although 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.

An upstream cleaner supplying a Korean cleaner in Koreatown recognizes that their conduct can affect their reputation with their other Korean downstream 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. Our analysis here addresses this issue in two ways. First, it concentrates on the network effects of Koreatown relative to other small networks of Korean cleaners or the lack of networks. Second, we empirically disentangle the effect of networks of buyers from the effect of being surrounded by other Koreans more generally and show that it is mainly the concentration of outsourcing Korean dry cleaners that drives the make-or-buy decisions in this setting.

Our estimates find that Korean stores located in Koreatown are between 35 and 60 percentage points more likely to outsource than Korean stores outside Koreatown or non-Koreans in or out of Koreatown. Of all the potential relationships between vertical integration and social networks that we consider, this finding is consistent with the network resolving an agency problem between laundry outlets and their suppliers. 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.[5] 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.[6] 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

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5. 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.

6. 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, 1985) and Klein et al. (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, 1987) and Baker and Hubbard (2003).

of the rationale for vertical integration in our analysis. Our article 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 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. Although 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 the main benefit from local ethnic network membership is easier access to credit. Most of the empirical work in this area has been conducted in the context of developing countries.[7] Even though credit constraints clearly can be a problem in these examples, our findings suggest that the effect of better access to credit may not be as important as gains of better outsourcing opportunities when we consider the case of a developed country.

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.

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 are able to observe the credit score ratings for

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

most stores in our sample to test for the importance of these factors. However, we find no significant difference between the credit scores of Korean and non-Koreans in Koreatown. We do find that higher credit scores are associated with more vertical integration by Koreans, but the inclusion of these factors in our regression specification does not weaken our main result that social networks decrease the likelihood of vertical integration.

Another possible interpretation of our results is that stores owned by Koreans located in Koreatown are smaller than stores run by non-Koreans in Koreatown and elsewhere. Smaller stores may not have enough space for laundry or dry-cleaning machines and therefore may decide to outsource for reasons orthogonal to the presence of social networks. Once again, we find no significant difference in store size for Koreans relative to non-Koreans in Koreatown. In our specifications, we do find that smaller stores are associated with more outsourcing, but our main result is still robust to the inclusion of store size as explanatory variable.

The article 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 3 describes the data. Section 4 describes the empirical specification and the results, and Section 5 concludes.

2. Social Networks and Vertical Integration in Laundry Services

In this section, we analyze how membership in a social network may affect vertical integration decisions. Since social networks have the ability to affect vertical integration decisions through their enhancement of reputations, we consider four potential ways in which the relationship between social networks and vertical integration may be affected. Two of them involve the role of credit access in social networks and its implications for vertical integration decisions, whereas the other two 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." We describe these four potential driving forces of the make-or-buy decisions next.

2.1 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, through a lower rental rate of capital, and increase the likelihood of vertical integration. 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 which could lead to greater monthly interest payments on loans used to finance vertical integration. However, in Section 3, we document that credit ratings of both Koreans and non-Koreans in Koreatown are not significantly different.

Nevertheless, 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 2000 sq ft. 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 start-up capital. In terms of monthly payments, vertically integrating requires an additional $1433 per month. Although poor access to credit in this context would raise the monthly payments (by $342 if interest rate increased drastically according to calculations in Table 1), the fact that the store would have expected monthly revenue of $26,000 by the end of the first year of operation[8] suggests that overall effects implied for the social network on vertically integrating would be rather small.

2.2 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 and then explore the potential magnitude of such affects by describing typical laundry outlet costs.

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 the delivery of desired quality. 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

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8. 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.

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 down payment (%)	20	20	20
Interest rate (prime +2.75%) (%)	11.00	11.00	11.00
Term (in years)	10	10	10
Approximate monthly loan payments	$550	$1982	$1433
Better access to credit			
Interest rate (prime) (%)	8.25	8.25	8.25
Approximate monthly loan payments	$490	$1765	$1276
Difference from typical outlet	−$60	−$217	−$157
Poor access to credit			
Interest rate (2 × prime) (%)	16.50	16.50	16.50
Approximate monthly loan payments	$681	$2456	$1775
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 (% of sales)	50	0	−50
Monthly marginal costs (total)	$13,000	$1300	−$11,700
Better relationship with upstream supplier			
Cost of operating supplies (% of sales)	0	5	5
Outsourcing expenses (% of sales)	45	0	−45
Monthly marginal costs (total)	$11,700	$1300	−$10,400
Difference from typical outlet	−$1300	0	$1300

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

strong in immigrant-based ethnic social networks such as the Koreans in Koreatown which we consider. This can work in favor of the owner or manager in that it can help 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. Although this network effect may be present, the empirical relationship we find in Section 4 is not consistent with agency problems within the firm being a primary force behind the effect of social networks on vertical integration.

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. Although a repeat purchase mechanism is a primary determinant of an upstream supplier's reputational capital with an outlet, the presence of a social network also increases 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.

The model in Klein and Leffler (1981) makes the probably unrealistic assumption that a buyer can costlessly communicate with all other buyers. This allows a single buyer to aggregate all 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.

Although 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, whereas 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 nonmembers 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% of sales. We therefore evaluate how much these costs would decrease if a social network helped an outlet obtain outsourcing costs of only 45% of sales. For instance, the average cleaner in the geographic location we study below, Los Angeles (LA) County, has monthly sales of $53,000, implying that a social network lowering outsourcing costs to 45% would lower monthly costs by $2650. This is potentially a much larger amount than the largest possible effect of a social network on access to credit as outlined above in the fixed cost analysis in Table 1.

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 dry cleaning than laundry. There are a couple of reasons for this. First, the clothes that are dry cleaned are typically more expensive and have fabrics that are much more prone to damage. Second, the dry-cleaning process is fairly complex, using chemicals that are extracted from fabrics, filtered, and then reused.[9] 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 dry cleaning than laundry.

3. 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 industry[10] 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 LA area because of its proximity and familiarity to the authors and a large concentrated community of Korean-speaking individuals, who operate roughly 2000 cleaners in southern California. We conducted a survey in a sample of dry-cleaning stores to find out their make-or-buy decisions with respect to laundry and dry cleaning, 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 A (Supplementary Material online). We also conducted follow-up interviews to learn further about some features of their upstream suppliers. We begin by defining the social network.

3.1 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 2, so we will be agnostic about the exact manner in which the social network functions in the empirical 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

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9. Fabrics are pretreated 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 dry cleaners. After going through the cleaning process, the fabric is then dried and pressed (EPA 1995).

10. Other papers documenting aspects of the dry-cleaning industry are Simester (1995) and Bracker and Pearson (1986).

past and future storefronts that provide or receive referrals, as well as other community members that communicate or care about bad word of mouth.[11] However, other network members such as end-customers or acquaintances could also facilitate this communication.

Although observing all 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 2000 Korean cleaners, suggesting that there may likely be a Korean network. The stores defined in this article to be in the social network are Korean owned or operated stores located in an area defined to be Koreatown (see Appendix B, Supplementary Material online, 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 more 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 first empirical implementation focuses on evaluating the incremental effect of being a Korean located in Koreatown.

In our second empirical implementation, we test for the presence of networks both in and out of Koreatown by using a proxy for the number of outsourcing Korean dry cleaners.[12] When doing this, we need to address the potentially endogenous formation of the network. Notice that in the first part of our empirical approach, we focus on the Koreatown network and therefore we can safely assume that the formation of Koreatown is exogenous to laundry services.

3.2 Downstream Survey Summary Statistics

Our survey consists of a total of 142 randomly selected laundry storefronts located throughout central and western LA County. For each cleaner, we

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11. One might ask why laundries would communicate if they presumably compete with one another. The dense geographic concentration of these firms suggests that 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 44 cleaners. It is very unlikely that each cleaner competes with all other 43 cleaners. The social ties can act as a substitute for the incentives of subsets of the firms to merge.

12. We determine the number of outsourcing Korean dry cleaners within a given distance of a store as follows. First, we identify all Korean cleaners within the distance (e.g., 5 miles), using geocoded distances and by identifying cleaners whose owners' last names are on a list of common Korean last names. Second, we identify the subset that outsources as those Korean cleaners not on the list of cleaners that are members of the Korean Drycleaners-Laundry Association (KDLA). The KDLA includes only integrated dry cleaners, of which there are more than 825 listed members in southern California. This is admittedly an imperfect measure of Korean outsourcers because some integrated Koreans might not be KDLA members and some Korean last names may also be non-Korean. On the other hand, we instrument for this below such that we only identify the effect from variation due to underlying drivers of the number of outsourcing Koreans (e.g., local Korean population and credit scores).

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. These store-level data are then merged with a variety of census tract characteristics and store-level information from Reference USA which we describe below.

Table 2 summarizes the variables used in our statistical analysis below. We have divided the variables into those describing the dry-cleaning 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 dry cleaning are done on the premises. Laundry and dry cleaning each has an integration dummy equal to one if the process is done on-site. As we can see from the summary statistics table, 53% of the stores launder on their premises and 68% of them dry clean on their premises.

The variable titled Korean speaking is an indicator for whether or not the store is Korean speaking. Forty-two 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 31% of our sample. The census tracts in our data set had an average of 9% Korean speakers, with a maximum of 41.8% 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 storefronts may be owned by their suppliers. Just over 15% 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 26. 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 nine stores within half mile of each store. This suggests not only that competition is intense but also 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. For example, as part of our empirical approach we will use the number of outsourcing Korean dry cleaners located within 5 miles to account for the possible formation of Korean stores networks in and out of Koreatown.

In our 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

Table 2. Summary Statistics

	Mean	Standard deviation	Count	Min	Max
Dry cleaning					
Integration	0.68	0.47	142	0	1
Price	7.28	5.78	126	2	50
Turnaround time	0.95	0.88	113	0	3
Laundering					
Integration	0.53	0.50	142	0	1
Price	1.78	0.98	125	1	10
Turnaround time	1.00	0.92	113	0	4
Store characteristics					
Korean speaking	0.42	0.50	142	0	1
Located in Koreatown	0.31	0.46	142	0	1
Chain	0.15	0.36	142	0	1
Stores within half mile	9.29	4.64	142	1	26
Census tract characteristics by store					
% Korean speakers	0.09	0.12	142	0	0.42
Median income	38630.10	17832.13	142	8125	96691.00
Apparel expenditure per capita	575.01	204.99	142	136	1031.07
Textile expenditures per capita	38.61	18.26	142	6	139.34
Employment by ethnic firm	1286.16	978.29	142	11	3921.00
Female employment by ethnic firm	593.29	472.62	142	2	1801.00
Credit score	87.79	8.57	128	31	100.00
Less than 2500 sq ft	0.68	0.47	128	0	1.00
Employees	3.48	5.28	112	1	35.00

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

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 dry cleaning in that laundry services are used predominantly by men and dry-cleaning 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, whereas 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 1286 on average, whereas female employment is 593 on average.[14]

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13. See 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 the area the Census reports having no employed male or female Asians.

To document prices for laundry and dry cleaning, the survey asks for the prices of two standard items: a long-sleeved, collared, button-down shirt (laundry) and a full-length dress (dry cleaning). The average prices charged for laundering and dry cleaning are \$1.78 and \$7.28, respectively.[15] Similarly, the minimum turnaround time for laundering a shirt and dry cleaning a dress are 1 day and 0.95 days, respectively. When we evaluate how these differ by whether or not a cleaner is integrated, we find that integrated cleaners provide both laundry and dry cleaning in less than a day, whereas nonintegrated cleaners take more than a day on average. Prices for integrated cleaners are higher, which may reflect the value of offering faster service.

We also match our stores with information available in the Reference USA data set. Even though, not all stores appear in Reference USA, this allows us to get information for 128 of the 142 stores on credit score ratings, store size (whether the store is smaller than 2500 sq ft), and the number of employees (for 112 stores only). It turns out that 68% of the stores are smaller than 2500 sq ft and on average the stores have 88 credit score rating (measured between 1 and 100) and between three and four employees.

Finally, Table 3 provides summary statistics for the same variables for stores located in Koreatown distinguishing them on whether they are Korean or non-Korean stores. This table shows that non-Korean stores within Koreatown are located in census tracts that contain less Korean speakers and with higher median income. This arises because there is a greater share of Korean stores in tracts with more Koreans. The summary statistics presented in this table also show that Korean and non-Korean stores have comparable credit score ratings and sizes.

3.3 Upstream Information

Although our primary focus and later empirical analysis concentrate 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 analysis,[16] 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.

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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 has an overlapping support in the probability of being located in Koreatown.

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.

Table 3. Summary Statistics of Koreatown Stores by Korean or Not

	Korean			Non-Korean		
	Mean	Standard deviation	Count	Mean	Standard deviation	Count
Dry cleaning						
Integration	0.48	0.51	27	0.71	0.47	17
Price	5.62	1.39	24	5.92	1.60	11
Turnaround time	1.27	0.80	15	0.56	0.73	9
Laundering						
Integration	0.33	0.48	27	0.71	0.47	17
Price	1.66	0.35	23	1.95	0.67	11
Turnaround time	1.40	0.74	15	0.78	0.67	9
Store characteristics						
Korean speaking	1.00	0.00	27	0.00	0.00	17
Located in Koreatown	1.00	0.00	27	1.00	0.00	17
Chain	0.11	0.32	27	0.06	0.24	17
Stores within half mile	12.22	6.70	27	9.71	3.51	17
Census tract characteristics by store						
% Korean speakers	0.26	0.10	27	0.16	0.11	17
Median income	24893	7713	27	36910	30794	17
Apparel expenditure per capita	407.00	81.22	27	527.14	175.37	17
Textile expenditures per capita	24.45	6.75	27	35.03	15.16	17
Employment by ethnic firm	782.70	537.84	27	1281.77	893.78	17
Female employment by ethnic firm	360.00	258.34	27	507.94	473.29	17
Credit score	87.28	6.69	25	85.41	15.25	17
Less than 2500 sq ft	0.88	0.33	25	0.88	0.33	17
Employees	1.53	0.70	19	1.87	1.30	15

This table presents summary statistics of the variables used in our statistical analysis for dry-cleaning stores located in Koreatown within our sample.

We found that most of the responding nonintegrated 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 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

Table 4. Integration Statistics by Social Network Status

	Dry cleaning	Laundering
Koreatown		
Korean	0.4815 (0.0980) 27	0.3333 (0.0925) 27
Non-Korean	0.7059 (0.1139) 17	0.7059 (0.1139) 17
Elsewhere		
Korean	0.7576 (0.0758) 33	0.6061 (0.0864) 33
Non-Korean	0.7231 (0.0559) 65	0.5231 (0.0624) 65
Difference in differences	−0.2589 (0.1773)	−0.4555 (0.1813)

The table describes average integration incidence by service (dry cleaning or laundering), location (Koreatown or elsewhere), and language (Korean or non-Korean). Standard errors are in parentheses.

she was not specific. Furthermore, those upstream cleaners located in Koreatown seemed to be predominantly supplying other Koreatown cleaners.

3.4 Analysis of Vertical Integration Using Differences in Means

In Table 4, we report summary statistics of integration decisions by service (laundry or dry cleaning) 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 dry cleaning and between 50% and 60% for laundry). However, in Koreatown, Koreans are much less likely to integrate than non-Koreans. In dry cleaning, Koreans are 22 percentage points less likely to integrate, and in laundry, Koreans are almost 37 percentage points less likely to integrate. The difference in differences is −0.26 and −0.46 for dry cleaning and laundry, respectively. When we include the above controls in our regression analysis to account for some systematic differences, we find that both effects are significant. This is the primary empirical finding of our article which we will explore further in Section 4.

Another relevant fact revealed in Table 4 that we also evaluate in our regressions is that stores tend to integrate dry cleaning more than laundering. There is a 15 to 20 percentage point difference for all the store language combinations except non-Korean in Koreatown. The fact that dry cleaning 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.

4. Results

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

In our empirical approach, we are unable to observe the relationships and reputational capital between agents and therefore we cannot evaluate directly the impact of the social network on vertical integration decisions. Bertrand et al. (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 with $K \times KT$. Marginal cost determinants will not likely differ for Koreans and non-Koreans in Koreatown, but it is possible some demand characteristics will. We therefore extend our empirical specifications to include an extensive set of demand- and store-specific characteristics. Our estimating equation is therefore a difference in differences as follows:

$$vi = \alpha K \times KT + \delta_K K + \delta_{KT} KT + \beta X + \varepsilon. \tag{1}$$

The variable X includes the demand and store characteristics as well as 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, respectively. We begin our analysis with linear regression but then estimate logit specifications, where vi in equation (1) can be interpreted as a latent value of vertically integrating.

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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 A1 in the Appendix B (Supplementary Material online), 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.

If we make the common difference-in-differences assumption of selection on observables (also referred to as unconfoundedness),[18] $E[\varepsilon \times (K \times \mathrm{KT})|K, \mathrm{KT}, X, Z] = 0$, 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. First, as we suggested previously, it is possible that Korean speakers in Koreatown are systematically different. The fact that credit scores and store sizes are similar between Koreans and non-Koreans in Koreatown does suggest that other unobservable factors might not be different.

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 $K \times \mathrm{KT}$ only proxies for relationships being stronger in Koreatown than elsewhere. If the gains of the social network vary within Korean speakers, those operating stores in Koreatown may select into Koreatown.[19] In such cases, selection on unobservable differences in the gains from the social network 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 these gains, the sign of α will still identify the sign of the relationship between the social network and vertical integration decisions, while leaving the magnitude biased (i.e., if the effect were truly zero, this selection would not exist).

We end the regression analysis by changing the network definition. First, we redesign how we control for the potential presence of a social network by breaking the formerly used Koreatown dummy variable into the percentage of Korean speakers in the store's census tract (correlated with the existence of Korean institutions such as churches, restaurants, schools, and others) and the number of outsourcing Korean stores located within 5 miles. This will allow us to answer the question of whether the reputation mechanism is enforced through the relation with other dry-cleaning stores or through other institutions that may allow word of mouth travel as fast. Second, we instrument the number of stores within 5 miles with the number of Korean speakers within 5 miles. This instrument is correlated with the entry decision of other Korean dry cleaners in their census tracts but yet uncorrelated with the entry decision of each store in its particular census tract.

4.1 OLS and Logit Regressions

We begin by running simple ordinary least squares (OLS) regressions to estimate a linear probability model. Although these models can certainly predict

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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. Although a network effect favoring outsourcing over integration would certainly create 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.

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 4. Table 5 shows results from OLS regressions of combining observations from both laundry and dry-cleaning services. In these regressions (and others hereafter), we adjust standard errors for possible spatial correlation.[20] The coefficient on Korean × Koreatown shows a negative relationship between vertical integration and social network membership. Column (1) shows results from the simplest specification where we do not control for local demand differences or store characteristics. We add complexity to the original specification by adding local demand characteristics and neighborhood fixed effects in specifications (2) and (3), respectively. Finally, in column (4) we add store characteristics such as credit score ratings and an indicator for whether the store is smaller than 2500 sq ft, and in column (5) we add local demand characteristics interacted with Korean and Koreatown. The result that there exists a negative correlation between vertical integration and ethnic membership is robust to all these different specifications.[21]

Of the four potential effects of a social network discussed in Section 2, 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. Notice that we control for credit score ratings and we include interactions of the credit score ratings with the Korean and Koreatown indicator variables allowing the effect of better credit ratings vary for Korean dry cleaners and stores located in Koreatown. Since our result is robust to the inclusion of these variables, it seems plausible to disregard the latter potential explanation as the one driving the result that Korean stores located in Koreatown are less likely to vertically integrate. This relationship will hold through the rest of our specifications. As we control for more factors through fixed effects and demand characteristics and its respective interactions with Korean and Koreatown dummy variables, the estimates tend to provide greater support for the agency effects.

In addition, the results reported in Table 5 show that stores are less likely to integrate laundering services than dry-cleaning services. This finding is consistent with our prediction that the service that is more sensitive to quality (dry cleaning) should be the service also with a higher propensity to experience integration and be provided in-house. Table 5 also provides some evidence that stores that belong to chains are also less likely to conduct services on their premises as we expected. Other reassuring results in this table are the fact that Koreans with higher credit score ratings are also more likely to vertically

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20. In particular, we use the statistical software available in Tim Conley's Web site to account for spatial correlation where spatial distances are based on geocoded latitude and longitudes of cleaners' addresses (http://faculty.chicagobooth.edu/timothy.conley/research/gmmcode/statacode.html).

21. 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.

Table 5. OLS Regressions with Conley Standard Errors

	Dependent variable: integrate or not				
	(1)	(2)	(3)	(4)	(5)
Korean × Koreatown	−0.6436 (0.1224)***	−0.3635 (0.1935)*	−0.4223 (0.1748)**	−0.5647 (0.1695)***	−0.4955 (0.2332)**
DryCleaning	0.6683 (0.0600)***	0.1778 (0.0448)***	0.1785 (0.0448)***	0.1693 (0.0488)***	0.1692 (0.0490)***
Chain?	0.0663 (0.0950)	−0.1452 (0.0828)*	−0.0971 (0.0819)	−0.0654 (0.1037)	−0.0934 (0.1050)
Korean	0.5202 (0.0780)***	0.0563 (0.1332)	0.1333 (0.1279)	−0.8256 (0.6939)	−10.0459 (7.7230)
Koreatown	0.5470 (0.0794)***	0.2254 (0.1576)	0.4000 (0.1354)***	0.6038 (0.6258)	10.9819 (6.9539)
Korean × DryCleaning	−0.3570 (0.1068)***	0.0154 (0.0794)	0.0153 (0.0797)	−0.0304 (0.0919)	−0.0410 (0.0929)
Koreatown × DryCleaning	−0.3583 (0.1122)***	−0.0968 (0.0862)	−0.0965 (0.0859)	−0.0555 (0.0948)	−0.0554 (0.0960)
AppSpendingpp		−0.4304 (0.1505)***	−0.5352 (0.1209)***	−0.3775 (0.1196)***	−0.4877 (0.1353)***
TextileSpendingpp		0.3252 (0.0912)***	0.3084 (0.0533)***	0.2248 (0.0586)***	0.2476 (0.0618)***
Log(Income)		0.1945 (0.0783)**	0.1712 (0.0775)**	0.1926 (0.0746)***	0.3712 (0.1599)**
Log(Comp)		0.0185 (0.0537)	−0.0187 (0.0597)	−0.0783 (0.0781)	0.0228 (0.1329)
NetworkEmp		−0.0002 (0.0002)	−0.00004 (0.0002)	−0.0001 (0.0002)	−0.0004 (0.0003)
NetworkFemEmp		0.0005 (0.0004)	0.0001 (0.0004)	0.0002 (0.0005)	0.0007 (0.0007)
Credit score				−0.0044 (0.0064)	−0.0071 (0.0059)
Korean × credit score				0.0118 (0.0078)	0.0254 (0.0078)***
Koreatown × credit score				−0.0011 (0.0068)	0.0002 (0.0078)
Less than 2500 sq ft				−0.2851 (0.0978)***	−0.2861 (0.0986)***
Korean × less than 2500 sq ft				0.0979 (0.1384)	0.1736 (0.1451)
Koreatown × less than 2500 sq ft				−0.0711 (0.1723)	−0.1507 (0.1916)
Local demand interactions	No	No	No	No	Yes
Neighborhood fixed effects	No	No	Yes	Yes	Yes
Observations	284	284	284	256	256

Robust Conley standard errors in parentheses.

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

integrate and also that smaller stores are less likely to clean clothes in their premises.

On the other hand, Table 6 reports estimates demonstrating robustness to a logit specification while still adjusting standard errors for spatial dependence. The results reported in this table are coefficients of these regressions and may not be interpreted as marginal effects.

Results in this table are consistent with those in Table 5. We find as well that the presence of a social network is negatively correlated with vertical integration after controlling for local demand characteristics, neighborhood fixed effects, credit score rating, store size, and its respective interactions with Korean and Koreatown indicators. Similar to previous results, dry-cleaning services are always more likely to take place on the premises of the store than elsewhere and we find some evidence that chain membership lowers the probability to undertake services within the premises of the store. We also find here that smaller stores are less likely to clean clothes on their premises and that Koreans with higher credit score ratings are more likely to vertically integrate.

4.2 Disentangling the Social Network Effect and Instrumental Variable Specifications

In Table 7, we depart from the definition of Koreatown that we use in Tables 5 and 6. Instead of such variable, we use now both the percentage of Korean speakers per census tract and the number of outsourcing Korean dry cleaners within 5 miles of a store in our sample to proxy for the presence of a Korean network. With this new specification, we are able to address the question of how does the social network enforce the informal contract. Is it through the network of other close-by Korean dry cleaners or is it through other Korean institutions such as churches, restaurants, or schools? The former variable is intended to proxy for other Korean institutions, and the number of Korean dry cleaners within 5 miles is measuring the thickness of the network of Korean dry cleaners for any given store within our sample.

The specification in column (1) of Table 7 shows that it is indeed the network of Korean dry cleaners that lowers the likelihood of vertical integration, whereas the presence of Korean institutions (through the percentage of Korean population in that store's census tract) does not seem to have a statistically significant effect (even though the coefficient sign is pointing in the expected direction). Here we report Conley standard errors that correct for spatial dependence.[22] Similarly, in column (3) we run a logit specification with the same controls as in column (1). Results are qualitatively the same and robust to the use of Conley standard errors. Similar to results in Tables 5 and 6, dry cleaning appears to be more likely to take place within premises of the stores, and the evidence that stores belonging to chains are less likely to vertically integrate is rather weak.

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22. We report Conley standard errors in specifications (1) and (3) and regular standard errors in columns (2) and (4) in Table 7 because software that implements IV estimation while correcting for spatial dependence is not available.

Table 6. Logit Regressions with Conley Standard Errors

	Dependent variable: integrate or not				
	(1)	(2)	(3)	(4)	(5)
Korean × Koreatown	−1.5841 (0.5645)***	−1.6557 (0.9996)*	−1.8989 (0.8205)**	−2.9168 (0.9537)***	−2.4476 (1.4668)*
DryCleaning	1.0327 (0.2624)***	0.8581 (0.2182)***	0.9498 (0.2291)***	1.0320 (0.2776)***	1.0795 (0.2956)***
Chain?	−0.5685 (0.3808)	−0.6734 (0.3778)*	−0.4383 (0.3933)	−0.3151 (0.5716)	−0.4930 (0.7582)
Korean	0.3837 (0.3110)	0.2241 (0.6276)	0.7288 (0.6439)	−3.1542 (3.9097)	−79.0011 (52.5817)
Koreatown	0.6950 (0.3484)**	1.1836 (0.8737)	1.7240 (0.6564)***	3.1752 (3.7787)	45.6086 (61.2877)
Korean × DryCleaning	−0.0820 (0.4362)	0.0607 (0.4188)	0.0555 (0.4226)	−0.1010 (0.5804)	−0.1346 (0.6429)
Koreatown × DryCleaning	−0.5773 (0.4181)	−0.4690 (0.4395)	−0.5665 (0.4372)	−0.4533 (0.5771)	−0.4378 (0.6190)
AppSpendingpp		−3.4683 (1.2549)***	−9.6279 (5.2822)*	−7.2145 (5.3687)	−8.3850 (11.6996)
TextileSpendingpp		2.6933 (0.9384)***	7.1719 (4.1990)*	5.4560 (4.3542)	5.2123 (9.7447)
Log(Income)		1.1579 (0.5041)**	0.7045 (0.4504)	0.8030 (0.4636)*	2.3709 (1.4169)*
Log(Comp)		0.1294 (0.2541)	−0.0341 (0.2931)	−0.4527 (0.4774)	0.1636 (0.9860)
NetworkEmp		−0.0008 (0.0009)	0.00002 (0.0010)	−0.0001 (0.0016)	−0.0021 (0.0022)
NetworkFemEmp		0.0016 (0.0020)	0.0002 (0.0021)	0.0002 (0.0032)	0.0039 (0.0048)
Credit score				−0.0173 (0.0364)	−0.0358 (0.0348)
Korean × credit score				0.0601 (0.0448)	0.1597 (0.0484)***
Koreatown × credit score				−0.0137 (0.0400)	0.0098 (0.0463)
Less than 2500 sq ft				−1.6315 (0.5900)***	−1.6829 (0.5849)***
Korean × less than 2500 sq ft				−0.2861 (1.4831)	0.2020 (1.8982)
Koreatown × less than 2500 sq ft				0.3569 (1.4587)	−0.0213 (1.7519)
Local demand interactions	No	No	No	No	Yes
Neighborhood fixed effects	No	No	Yes	Yes	Yes
Observations	284	284	284	256	256

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

Table 7. Decomposing the Impact of Networks and Applying IV

	Dependent variable: integrate or not			
	OLS	IV-OLS	Logit	IV-Probit
Korean × Pctg Kor Population	−1.4567 (0.9496)	−1.5016 (0.8617)*	−5.3101 (6.9138)	−2.4942 (3.2253)
Korean × Out Kor Stores w/in 5 m.	−0.2543 (0.0695)***	−0.4367 (0.2006)**	−2.2177 (0.5339)***	−2.0346 (0.8530)**
DryCleaning	0.1573 (0.0535)***	0.1578 (0.0710)**	0.9790 (0.3342)***	0.5843 (0.2665)**
Chain?	−0.01136 (0.1066)	−0.1154 (0.0889)	−0.7228 (0.6272)	−0.3950 (0.3235)
Korean	−0.7862 (6.3246)	−1.1548 (5.7325)	−85.6505 (61.4854)	−49.3545 (32.6944)
Percentage Kor Population	0.7221 (0.8362)	0.8568 (0.6254)	1.2252 (4.1936)	1.6774 (2.2653)
Outsourcing Kor Stores w/in 5 m.	0.0468 (0.0591)	0.2633 (0.2010)	0.3587 (0.3814)	0.9697 (0.8127)
Korean × DryCleaning	−0.0405 (0.0941)	−0.0420 (0.1173)	0.0521 (0.6900)	0.0681 (0.4744)
Korean × Pctg Kor Population	−0.0112 (0.3669)	−0.0188 (0.4800)	−1.0229 (2.3849)	−0.6583 (1.8104)
AppSpendingpp	−0.3350 (0.1464)***	−0.3416 (0.2008)*	−13.9869 (8.7887)	−8.0232 (4.9449)
TextileSpendingpp	0.2364 (0.0586)***	0.3779 (0.1863)**	11.2252 (7.0523)	6.9582 (4.0087)*
Log(Income)	0.1786 (0.0831)**	0.0728 (0.1323)	0.5599 (0.6023)	−0.0560 (0.5387)
Log(Comp)	0.0849 (0.1365)	0.1093 (0.1025)	0.7184 (0.8428)	0.5994 (0.4109)
NetworkEmp	0.0001 (0.0002)	0.0002 (0.0003)	−0.0002 (0.0014)	0.0004 (0.0010)
NetworkFemEmp	−0.0004 (0.0005)	−0.0006 (0.0005)	−0.0003 (0.0030)	−0.0014 (0.0021)
Credit score	−0.0055 (0.0043)	−0.0062 (0.0041)	−0.0256 (0.0244)	−0.0186 (0.0153)
Korean × credit score	0.0193 (0.0087)**	0.0205 (0.0091)**	0.1241 (0.0718)	0.0686 (0.0361)*
Less than 2500 sq ft	−0.3234 (0.1013)***	−0.3960 (0.1030)***	−1.9087 (0.6785)***	−1.4134 (0.4324)***
Korean × less than 2500 sq ft	0.2596 (0.1649)	0.3429 (0.1969)*	−0.0394 (1.7963)	0.6810 (0.8639)
Constant	0.2885 (0.8946)	0.4577 (1.1300)	44.3906 (28.7608)	25.8417 (18.6167)

Robust standard errors in parentheses. All specifications contain neighborhood fixed effects and interactions of Korean dummy variable with local demand characteristics. Specifications (1) and (3) report Conley standard errors, whereas specification (2) and (4) report regular standard errors. We instrument the number of outsourcing Korean stores within 5 miles with the amount of Korean population within 5 miles of each Korean store in out data set. All specifications contain 256 observations.
*Significant at 10%; **significant at 5%; ***significant at 1%.

Columns (2) and (4) use instrumental variables for OLS and Probit, respectively. In these specifications, we instrument the number of outsourcing Korean dry cleaners within 5 miles distance with the average local Korean population for stores within 5 miles. The Korean population within 5 miles increases the likelihood of entry of Korean dry cleaners within 5 miles, but it is uncorrelated with the entry decision of the particular store in its own census tract.[23] Results after instrumenting for endogeneity in both specifications (2) and (4) are still robust and qualitatively similar to those in earlier specifications and Tables 5 and 6. Dry-cleaning services are still more likely to take place within the premises of the store.

To summarize the results from Tables 5–7, we find a strong robust negative relationship between social network membership and providing services in-house in the dry-cleaning service industry in LA. We also find that dry-cleaning 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 dry-cleaning 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 some evidence that chain stores are less likely to clean on premises.

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 2.1 indicated that very poor access to credit would only increase moderately the costs of vertical integration. Moreover, 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 35–60 percentage points. In addition to this, our regression specifications now account for differences in credit score ratings across stores and allow this effect to vary for Korean stores as well for stores located in Koreatown.

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 2.2, 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 article therefore provides

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23. To help assure that the Korean population for surrounding stores is an excluded variable for the focal store, we exclude the Korean population numbers for the closest store in the north, south, east, and west directions, if such a store exists.

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.

5. Conclusions

This article 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 nonmembers. 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 reneging 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 dry cleaning 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, although opportunism appears to be an important factor, there are no 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 et al. (1978) and the property rights approach following Grossman and Hart (1986), cannot explain vertical integration in this industry.

Supplementary Material

Supplementary material is available at *Journal of law, Economics & Organization online*.

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