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NETWORKS AND INTERMEDIARIES IN SEASONAL AGRICULTURAL LABOR MARKETS IN TURKEY

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Abstract

In casual labor markets, intermediaries are used in order to match employers and employees. This function is especially important when the market is imperfect and employers and employees have not formed solid networks. This paper investigates the network effects and the role of intermediaries in the seasonal agricultural labor market in the irrigated area of Adana, Turkey. The network of rural households is divided into one composed mainly of farmers and one composed mainly of seasonal agricultural workers. Our regression analyses show that the seasonal workers who do not have strong networks with farmers have difficulty finding jobs. Middlemen serve to mitigate the seasonal workers' lack of a network and play a key role in the area's seasonal agricultural labor market. At the same time, however, blood ties and territorial ties between middlemen and workers may cause middlemen to discriminate among seasonal workers based on their origins.
Keywords: *Middleman, migration, network, seasonal labor*

1. Introduction

It is often observed that labor markets, particularly in developing countries, have difficulty offering efficient ways of matching employers and job seekers (Munshi, 2011). In order to mitigate this difficulty, job seekers use their own networks to interact with employers and obtain jobs. A leading example is job referrals, which are widely observed in the urban labor markets of developing countries: employers are more likely to hire job seekers if they are referrals from employees (Kajisa, 2007; Munshi, 2011; Wahba & Zenou, 2005).

Intermediaries are an alternative system providing this matching function (Iversen & Torsvik, 2010; Roy, 2008). Intermediaries are specialized people and firms who introduce workers to client firms. At the request of client firms, the intermediaries select the necessary number of workers with the required skills from their own pool of job seekers to whom the intermediaries have access when needed. In some cases, the intermediaries hire workers directly to provide business support services to client firms (Abraham & Taylor, 1996). In a casual labor market such as the seasonal agricultural labor market, a system of intermediaries may be more effective than a system of job referrals. Casual labor markets are characterized by short-term, often one-time, contracts and high turnover of employees. Skills required in

these markets are generally low but diverse. In such circumstances, a referrals system may entail high transaction costs compared with its benefits, which include the mitigation of information asymmetry.

Although the network effect and the role of job referrals in the labor market have been widely discussed in the empirical literature, there is little empirical evidence pertaining to the system of intermediaries except a few cases such as Iversen and Torsvik (2010), especially in the context of rural labor markets. If the system of intermediaries works well in the labor market, a network composed of workers and employers will have no effect on the outcome of labor contracts. This is to the question we investigate empirically in this paper.

The site we surveyed for the purposes of this paper is the irrigated area of Adana province in Turkey. This area is one of the regions in Turkey that, since the 1950s, has experienced a large inflow of seasonal agricultural workers from other regions of the country. In recent years, the poverty of these seasonal workers has emerged as a social problem (Duruiz, 2013a, 2013b; Gülçubuk, Karabıyık, & Tanır, 2003). The differences in cultural, geographic, and ethnic backgrounds have made difficult the creation of a solid direct network composed of farmers and seasonal workers (Çetinkaya, 2008). In order to fill this gap, middlemen (in Turkish, *elçi*) have matched farmers and seasonal workers (Çetinkaya, 2008; Keyder, 1989). This study site will provide good opportunities for us to investigate the network effect and the role of intermediaries in the seasonal agricultural labor market.

The remainder of this paper is organized as follows. In section 2, we describe the brief history of Adana's seasonal agricultural labor market. The household survey is explained in section 3, which also describes Adana's agricultural labor market in by using the information obtained from the household survey. In Section 4, we discuss the network of rural households and estimate indices to quantify the network. In Section 5, the network effect and the role of middlemen in Adana's seasonal agricultural labor market are investigated by regression analyses on the seasonal workers' working days. Section 6 summarizes the conclusions of this paper.

2. A Brief History of Adana's Seasonal Agricultural Labor Market

Adana province is located in the Mediterranean Region of Turkey, which produces 24% of the gross value of Turkey's crop production. Notably, the Çukurova Plain, located in the southern portion of Adana province, is a major agricultural center of the region, thanks to the large-scale irrigation system that draws water from the Seyhan and Ceyhan rivers (see Figure 1).

The irrigation system has been gradually installed in the Çukurova Plain since the 1950s, mainly to enhance the productivity of cotton farming. At the time, cotton was picked by hand; therefore, increasing production required hiring additional seasonal laborers. The increased demand for such labor and the improved transportation attracted rural people from the Southeastern Anatolia Region, whose development had been delayed. Farmers in the Çukurova Plain who were able to take advantage of these changes accumulated land and became large-scale farmers, managing farms of greater than 100 ha (Hiltner, 1960).

Keyder (1989) argued that the mechanization that took place during the 1960s and 1980s enabled the consolidation of independent family farms and, thus, decreased the advantages of sharecropping arrangements. The development of Turkey's urban economy induced landlords to migrate to urban areas. Modern land-lease market with fixed rent payments emerged, because most of the landlords who migrated to urban areas retained their landholdings. The emergence of the modern land-lease market has contributed to the equalization of land distribution. However, Keyder (1989) also pointed out that independent large-scale farmers have survived in the Çukurova Plain. In addition, strong ties between landlords and sharecroppers in Southeastern Anatolia interrupted the development of the modern land-lease

market.

Since the 1980s, several development projects, including Southeastern Anatolia Project (in Turkish, *Güneydoğu Anadolu Projesi*, or GAP) have started in the Southeastern Anatolia Region. The irrigation system introduced by those projects enabled the large-scale cultivation of cash crops such as cotton and tomatoes. These projects and Turkey's economic growth elevated wage levels in this region and then increased wages for seasonal workers in the Mediterranean Region, because most of them came from Southeastern Anatolia (Çetinkaya, 2008).
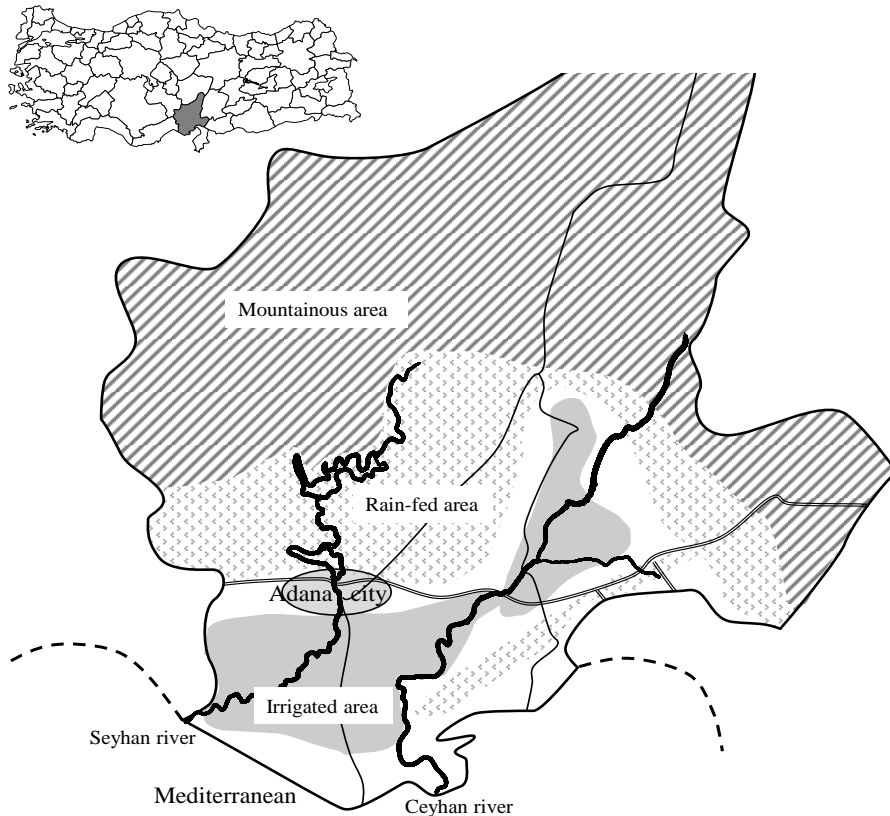

Figure 1. Map of Adana Province in Turkey

Recently, labor-saving crops, such as maize and soybeans, are extensively cultivated in the irrigated area of Adana. Farmers there also cultivate a wide variety of labor-intensive cash crops, such as citrus fruits, cotton, watermelon, and vegetables. Most of these labor-intensive operations, which are generally done by hand, include pruning, mulching, weeding, spraying of pesticide, and harvesting. The demand for seasonal agricultural labor is still high, and a large portion of that demand is filled by workers from Southeastern Anatolia.

Keyder (1989) argued that the seasonal agricultural workers who engaged in cotton harvesting during the 1960s and 1980s maintained their access to farmland and livestock in their areas of origin. In contrast, Gurel (2011) claimed that many of these seasonal migrants who came from Southeastern Anatolia were former sharecroppers and landless peasants who had lost any income source in their areas of origin. Harris (2008) suggested that the improved irrigation provided by GAP brought a large benefit on farmers but not on these

landless people. None of the seasonal migrant households interviewed as part of our household survey had engaged in any job in their areas of origin. It seems that people who left behind by development projects and economic growth in their areas of origin continue to engage in seasonal agricultural work in the Mediterranean Region.

3. Characterizing Adana's Agricultural Labor Market by Use of a Household Survey

3.1. Household Survey

We conducted a household survey of the irrigated villages of the Çukurova Plain in Adana province in September 2013 and September 2014. In total, we interviewed 129 households in 18 villages; 78 of these households were farm households. Another 18 households were classified as permanent-worker households, because they each had at least one member who engaged in agricultural work under a permanent contract arrangement. The remaining 33 households were classified as seasonal-worker households, because each of them had no members who were permanent agricultural workers but at least one member who engaged in agricultural work under a seasonal or daily contract arrangement.

Table 1 is a summary of household characteristics by household type. For the purposes of this paper, a migrant household is defined as a household in which the household head or the household head's father migrated to the surveyed village from another province. Seasonal-worker households that continue seasonal migration between the surveyed village and their area of origin are also classified as migrant households. According to this definition, 34% of farm households were migrant households. In contrast, approximately 80% of permanent-worker households and seasonal-worker households were migrant households. In addition, 18 of the 33 seasonal-worker households were seasonal migrants. The majority of these seasonal migrants came from Southeastern Anatolia.

Approximately 30% of the heads of farm households attended high school. However, only 3% of the heads of seasonal-worker households attended high school. Nearly all seasonal-worker household heads stopped their education in primary school. The situation of permanent-worker households was slightly better than that of seasonal-worker households.

Although more than half of the members of seasonal-worker households engage in economic activity, only approximately one-third of the members of farm households and permanent-worker households do so. Such a difference in the labor force participation is more apparent when we examine the participation of women and young people in these types of households. The labor force participation rate is less than 10% for women in farm households but 36% for women in seasonal-worker households. The low participation rate of women in farm households may reflect the social customs that define the roles of men and women, as well as the recent preference of rural households that a woman being a full-time homemaker is a more rational choice for their lifestyles (World Bank and Turkish State Planning Organization, 2009). The labor force participation rate of young people, those aged 6–17 years, for seasonal-worker households is higher than that for farm households and permanent-worker households. Furthermore, children aged 6–14 years only work if they are members of seasonal-worker households. Child labor is still a serious issue for seasonal-worker households (Gülçubuk et al., 2003).

The average annual income of a farm household is approximately 63,150 TL. This income level is higher than the average income of a household at the 80th percentile of income in the Mediterranean Region as of 2012 (Turkish Statistical Institute, 2014). The average permanent-worker household in the sample earns as the same income as the average household in the Mediterranean Region. The average annual income of a seasonal-worker household is 14,201 TL, which is less than the average in Southeastern Anatolia (17,346 TL) but close to the median in Southeastern Anatolia (13,903 TL). On average, seasonal migrants

may be able to maintain the minimum standard of living of their areas of origin.[i]

Table 1. Summary of Average Household Characteristics by Household Type

	Farmer households	Permanent-worker households	Seasonal-worker households
Number of observations	78	18	33
Migrant households*	0.34	0.78	0.82
Age of household head	48.11	46.50	42.76
Educational attainment of household head			
None or dropped out of primary school*	0.03	0.06	0.33
Completed primary school*	0.54	0.78	0.64
Attended high school or beyond*	0.29	0.11	0.03
Number of household members			
Total	4.76	5.00	4.76
Male	2.54	2.61	2.48
Female	2.22	2.39	2.27
Number of working members			
Total	1.63	1.83	2.45
Male	1.44	1.39	1.64
Female	0.19	0.44	0.82
Number of members aged 6–17 years			
Total	1.19	1.67	1.67
Working members	0.05	0.22	0.52
Number of members aged 6–14 years			
Total	0.78	1.39	1.21
Working members	0.00	0.00	0.15
Annual income (TL)	63,150	23,391	14,201

Source: Author-conducted household survey in 2013 and 2014
Note: The variables with asterisk are dummy variables. 1 TL = 0.53 USD (average of 2013).
The income of households surveyed in 2014 is adjusted to the price of 2013 using CPI.

3.2. Agricultural Labor Market in Adana

Of the 78 farm households surveyed, 18 employed permanent agricultural workers and 57 employed seasonal agricultural workers. Due to the labor-intensive technologies used in producing cash crops, 87% of cash-crop growers hired seasonal workers to satisfy peak-season labor demand.

Table 2 is a summary of the contract types of the agricultural workers surveyed. All of the permanent workers surveyed contracted directly with their employers, but less than 20% of seasonal workers did so. Rather, the majority of seasonal workers contracted with middlemen

and, thus, did not have direct relationships with their employers. A farmer who wants to hire seasonal workers for a specific job contacts a middleman about the job (e.g., weeding or harvesting), date, wage, number of workers needed, middleman's commission, and any additional details. If the job specifications are agreed upon, the middleman generally takes full responsibility, from start to finish, for the contracted work. The middleman finds and organizes the workers, provides the workers with transportation to the farm, manages the workers while they are at the farm, and pays the workers after the job has been completed. Thus, by contracting with a middleman, the farmer greatly reduces the transaction costs and management costs associated with hiring seasonal workers.

Table 2. Labor Contract Types of Agricultural Workers

	Obser-vations	Sex		Average age	Contract		Average wage	Average working days
		Male	Female		Direct	Indirect		
Permanent workers	24	22	2	39.8	24	0	1,154 TL/month	287
Seasonal workers	90	63	27	30.8	19	71	38.2 TL/day	112

Source: Author-conducted household survey in 2013 and 2014

The jobs that farmers offer to middlemen vary in magnitude, type, required skills, and so on. In order to deal with these varied requests, a middleman must maintain a pool of available seasonal workers from which to draw. Similarly, a middleman must have sufficient connections with farmers to guarantee work that can support his or her pool of seasonal workers.

As stated in section 2 of this paper, historically, a large proportion of Adana's seasonal workers have been seasonal migrants from Southeastern Anatolia. These seasonal migrants formed groups based on blood and territorial relationships. Because their cultural background differed from that of the residents of the Mediterranean Region and some of them could not speak Turkish, they had difficulty negotiating with farmers and solving problems at work and in daily life.[ii] Traditionally, influential members of these migrant groups have served as middlemen. Therefore, the relationships between middlemen and seasonal workers were not equal, but rather the middlemen held the power. Çetinkaya (2008) reports that in recent years "professional" or "modernized" middlemen, who have no blood or territorial ties with seasonal workers, have emerged in the irrigated area of Adana. The reasons for this emergence of a new type of middleman may be that some seasonal migrants have stopped seasonal migration and have settled in Adana and that some residents of the urban area of Adana have started to seek seasonal agricultural work because of the difficulty of finding jobs in the urban area. Despite these changes, most middlemen who work with seasonal migrants are connected with them by blood or territorial relationships.

A seasonal worker's average wage and average number of working days are 38.2 TL/day and 112 days/year, respectively. Thus, the average annual income of seasonal workers is about 4,300 TL, which is less than a permanent worker's average wage for 4 months of work. Except for a few specialized tasks (e.g., setting irrigation tubes and picking cotton by hand), the wage level for seasonal workers is generally kept at the minimum wage set by the local government. The demand for seasonal labor is concentrated in the dry season (April through October), when most of the cash crops, such as watermelon, cotton, and peanuts, are grown. The income of a seasonal-worker household depends on how many household members work and how many days they are hired to work during the dry season. The tasks for which

seasonal workers are hired may last only a few days. A seasonal worker generally works at multiple farms during a season. It would be difficult for a seasonal worker who does not have sufficient connections with farmers to find enough work to support the household without help from a middleman.

Table 3. Distribution of Acquaintances by Household Type

	Number of acquaintances				
Type of household	0	1–2	3–5	5–9	>10
A. Acquaintances who are farmers (*p*-value of Fisher's exact test = 0.00)					
Farm households	0	4	13	7	54
	0.0%	5.1%	16.7%	9.0%	69.2%
Permanent-worker households	2	3	0	4	9
	11.1%	16.7%	0.0%	22.2%	50.0%
Seasonal-worker households	4	7	5	2	15
	12.1%	21.2%	15.2%	6.1%	45.5%
B. Acquaintances who are agricultural workers (*p*-value of Fisher's exact test = 0.04)					
Farm households	6	6	20	7	39
	7.7%	7.7%	25.6%	9.0%	50.0%
Permanent-worker households	2	1	2	0	13
	11.1%	5.6%	11.1%	0.0%	72.2%
Seasonal-worker households	1	1	1	3	27
	3.0%	3.0%	3.0%	9.1%	81.8%
C. Acquaintances who are middlemen (*p*-value of Fisher's exact test = 0.02)					
Farm households	14	56	7	0	1
	17.9%	71.8%	9.0%	0.0%	1.3%
Permanent-worker households	7	6	3	0	1
	41.2%	35.3%	17.6%	0.0%	5.9%
Seasonal-worker households	4	27	1	1	0
	12.1%	81.8%	3.0%	3.0%	0.0%
D. Acquaintances who are village heads (*p*-value of Fisher's exact test = 0.10)					
Farm households	6	70	1	0	0
	7.8%	90.9%	1.3%	0.0%	0.0%
Permanent-worker households	3	15	0	0	0
	16.7%	83.3%	0.0%	0.0%	0.0%
Seasonal-worker households	8	25	0	0	0
	24.2%	75.8%	0.0%	0.0%	0.0%

Source: Author-conducted household survey in 2013 and 2014
Note: The figures in percentage show the rate of acquaintances of the given type for each household type (row). Summation of the rate by each row may not total 100%, due to rounding.

4. Networks in Adana

In order to obtain information about the structure of rural households' networks, we asked the households to report their number of acquaintances by type: farmers, agricultural workers, middlemen, and village heads. In addition, we asked what specific topics they discuss with each type of acquaintance.

Table 3 shows the distribution of acquaintances. Each Panel A through D of Table 3 focuses on one type of acquaintance. For example, Panel A shows the distribution of acquaintances who are farmers. Within Panel A, the rows show the distribution of those acquaintances for each type of household: farm households, permanent-worker households, and seasonal-worker households.

Table 4. Rate of Households Who Talk Each Topic with Acquaintances by Household Type

Type of household	Topics of conversation				
	Agricultural production	Product market	Labor market	Family issues	Village issues and politics
A. Acquaintances who are farmers					
Farm households	94.9%	87.2%	59.0%	20.5%	55.1%
Permanent-worker households	77.8%	61.1%[a]	38.9%	11.1%	22.2%[a]
Seasonal-worker households	63.6%[a]	42.4%[a]	33.3%[a]	9.1%	27.3%[a]
B. Acquaintances who are agricultural workers					
Farm households	69.2%	46.2%	60.3%	5.1%	16.7%
Permanent-worker households	66.7%	44.4%	38.9%	11.1%	27.8%
Seasonal-worker households	48.5%[a]	39.4%	66.7%	33.3%[ab]	33.3%
C. Acquaintances who are middlemen					
Farm households	32.1%	20.5%	60.3%	2.6%	10.3%
Permanent-worker households	27.8%	16.7%	38.9%	5.6%	0.0%
Seasonal-worker households	33.3%	18.2%	75.8%[b]	21.2%[ab]	15.2%
D. Acquaintances who are village heads					
Farm households	69.2%	57.7%	46.2%	33.3%	75.6%
Permanent-worker households	38.9%[a]	38.9%	33.3%	16.7%	55.6%
Seasonal-worker households	18.2%[a]	18.2%[a]	30.3%	21.2%	51.5%[a]

Source: Author-conducted household survey in 2013 and 2014
Note: Each rate designated [a] is statistically different (5% significance level) from the corresponding rate for farm households. Similarly, each rate designated [b] is statistically different (5% significance level) from the corresponding rate for permanent agricultural worker households.

Nearly 70% of the farm households surveyed have more than 10 acquaintances who are also farmers. The percentages of permanent-worker households and seasonal-worker households having more than 10 acquaintances who are farmers are 50% and 40%, respectively. Approximately one-third of seasonal-worker households know fewer than 2 farmers. Fisher's exact test suggests that these differences across household types are statistically significant. The connections of permanent and seasonal worker households to farmers may be fewer than that the connections of farm households to farmers.

The following also can be observed from Table 3. Seasonal-worker households and permanent-worker households tend to have more acquaintances who are agricultural workers than do farmer households. These differences are statistically significant at the 5% level. Most farm households and seasonal-worker households know one or two middlemen. In contrast, approximately 40% of permanent-worker households have no connection with middlemen. This may reflect the fact that most permanent workers contract directly with farmers. The proportion of households who know village heads can be ranked in descending order as farm households, permanent-worker households, and seasonal-worker households, but these differences are not statistically significant.

Table 4 summarizes the respondents' answers to the question about their topics of conversation with their acquaintances. For example, the first row of Panel A shows the rate at which farm households discuss each topic listed at the top of the table with farmers they know.

The rate at which households discuss agricultural issues (agricultural production, the product market, and the labor market) and village and political issues with farmers can be ranked in descending order as farm households, permanent-worker households, and seasonal-worker households (see Panel A). We observe a similar pattern for households' topics of conversation with village heads (Panel D). Agricultural-worker households, especially seasonal-worker households, may not discuss various issues with farmers and village heads.

The observed patterns in topics of conversation with agricultural workers and middlemen (Panels B and C) are similar to each other. Higher percentages of seasonal-worker households discuss family issues with both middlemen and agricultural workers than those of farm households and permanent-worker households. As described in section 3.2, most middlemen have blood or territorial relationships with their pool of seasonal migrants. The relationships between middlemen and seasonal-worker households are not always limited to business but rather sometimes extend to their daily lives.

These data may capture the quantitative and qualitative aspects of the network of respondents; however, the raw data are not quantitative and they have too many dimensions. In order to reduce the number of dimensions and extract quantitative indices that represent the size of the network, measuring both its quantitative aspects and qualitative aspects, we conducted a principal component analysis (PCA). PCA is sometimes utilized in development economics to quantify households' asset holdings in the absence of information about the value or price of each asset (Ferreira and Gignoux, 2010; Filmer and Pritchett, 2001).

The number of acquaintances, by type, and the topics for conversation with each type of acquaintance are used as variables in the PCA. Although the number of acquaintances is given by a 5-value scale (see Table 3), some of the values include only a few cases, depending on the type of acquaintance. We convert each variable to a dummy variable, which takes only two values. For acquaintances who are farmer and agricultural-worker, the threshold is set to 10. For example, if the household knows more than 10 farmers, its value for the corresponding dummy variable is set equal to 1, otherwise it is set equal to 0. For acquaintances who are middleman and village-head, the threshold is set to 1. In other words, if the household knows any middleman or village head, its value for the corresponding dummy variable is set equal to 1, otherwise it is set equal to 0. In addition, we add dummy

variables that are set equal to 1 if the respondents visit places where villagers gather and exchange information (cafeteria, mosque, and village office) at least once per week.

Table 5. Results of the Principal Component Analysis (PCA) Used to Estimate Network Indices

	First component	Second component
A. Proportion of variance explained by each component		
	0.180	0.132
B. Eigenvector		
Number of acquaintances		
Farmers	0.237***	0.001
Agricultural workers	-0.031	0.162**
Middlemen	0.054	0.215***
Village heads	0.196***	-0.196**
Topics of conversation with acquaintances who are farmers		
Agricultural production	0.174***	-0.104
Product market	0.268***	-0.110
Labor market	0.288***	0.070
Family issues	0.184***	0.144*
Village and policy issues	0.242***	0.033
Topics of conversation with acquaintances who are agricultural workers		
Agricultural production	0.118*	0.113
Product market	0.170**	0.183**
Labor market	0.123*	0.184**
Family issues	-0.060	0.334***
Village and policy issues	0.024	0.342***
Topics of conversation with acquaintances who are middlemen		
Agricultural production	0.035	0.285***
Product market	0.095	0.324***
Labor market	0.080	0.180*
Family issues	-0.029	0.352***
Village and policy issues	0.089	0.365***
Topics of conversation with acquaintances who are village heads		
Agricultural production	0.310***	-0.124
Product market	0.330***	-0.063
Labor market	0.327***	0.023
Family issues	0.264***	0.026
Village and policy issues	0.207***	-0.133
Visiting places		
Cafeteria	0.229***	-0.025
Mosque	0.126**	-0.047
Village office	0.208***	-0.113
C. Mean value of the components by household type		
Farmer	0.371	-0.193
Permanent agricultural worker	-0.393[a]	-0.179
Seasonal agricultural worker	-0.661[a]	0.554[ab]

Note: The analysis is based on 129 observations. In Panel B, each coefficient designated ***, **, or * is significant at the 1%, 5%, or 10% level, respectively. In Panel C, each mean designated [a] is statistically different (5% significance level) from the corresponding mean for farm households at 5% significance level. Similarly, each mean designated [b] is statistically different (5% significance level) from the corresponding mean for permanent agricultural worker households.

The results of the PCA are summarized in Table 5. The first and second principal components explain 18% and 13%, respectively, of the total variances of the variables. From the eigenvector of the first component (see Panel B), we observe that all of the coefficients of variables representing the relationships of households with farmers and village heads are positive and statistically significant. However, the eigenvector of the second component exhibits the opposite pattern: most of the coefficients of variables representing the relationships of households with agricultural workers and middlemen are positive and statistically significant. Therefore, it is reasonable to use the first component as an index of households' networks with the communities of farmers and village heads and to use the second component as an index of households' networks with the communities of agricultural workers and middlemen.
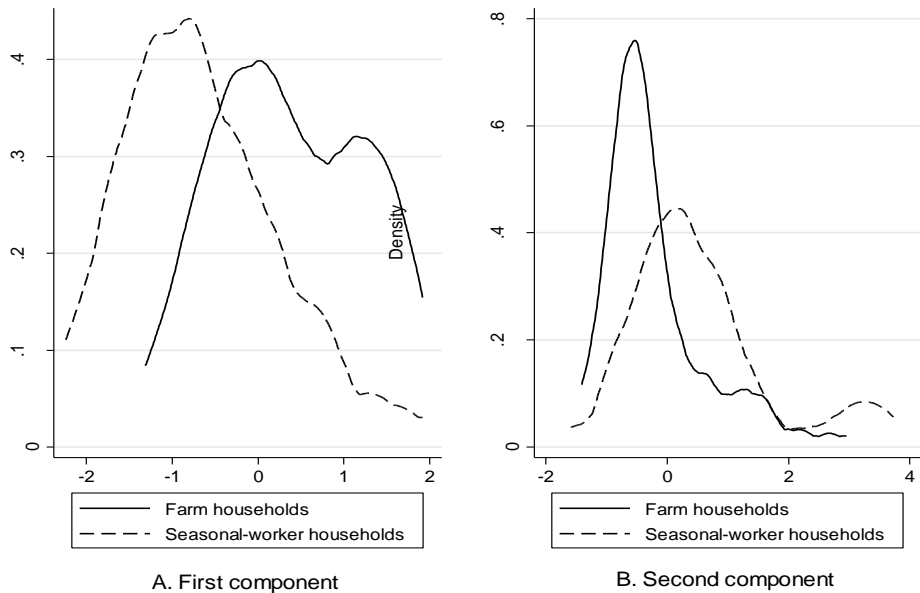

Figure 2. Distributions of the First and Second Components of the Principal Component Analysis (PCA) by Household Type

In order to use the first and second components as network indices, each component is normalized such that its mean and variance are 0 and 1, respectively. Panel C of Table 5 compares the means of normalized components by household type. The mean of the first component for seasonal-worker households is the lowest of all household types, as expected. In contrast, seasonal-worker households have the highest mean for the second component.

Figure 2 illustrates the distribution of each of the two components, as estimated by a kernel method. The mean of the first component for farm households is 0.37. Although seasonal-worker households, on average, have weak networks with farmers, Panel A of Figure 2 suggests that some seasonal-worker households have strong networks with farmers. The distribution of the second component for seasonal-worker households has a longer tails than does the distribution of the second component for farm households (Panel B). Seasonal workers' networks with the community of agricultural workers are not homogeneous.

5. Seasonal Workers' Network Effects and Working Days

5.1. Effects of Network Indices and Contracts with Middleman on Working Days

As discussed in section 3.2, seasonal workers' income is highly dependent on how many days they are hired to work during the peak season. However, seasonal workers generally do not have strong networks with farmers. In such circumstances, the workers may face difficulty in finding enough work on their own. However, if middlemen function well in the labor market, seasonal workers' weak networks with farmers may not affect their number of working days.

To test this hypothesis, the working days of individual seasonal workers are regressed on the network indices estimated in section 4, the dummy variable for labor contract type, which is set equal to 1 if the worker contracts with middlemen, interaction terms for the network indices and the labor contract type, and other control variables. The sample includes seasonal workers who are members of farm households or permanent-worker households as well as seasonal workers who belong to seasonal-worker households. The control variables consist of individual characteristics and household characteristics. The individual characteristics of workers include sex, age, squared age, a dummy variable indicating whether the worker completed primary school, and a dummy variable indicating whether the worker is the head of the household. The household characteristics include the number of members aged 14 years or less, the number of members aged 15–60 years, dummy variables indicating whether the worker is a member of a farm household or permanent-worker household, dummy variables indicating whether the worker is a member of a migrant household or seasonal-migrant household, and a dummy variable indicating whether the household was surveyed in 2014.

Table 6 reports the estimation results. To conserve space, only the coefficients of variables related to the network indices and the labor contract type are shown. The first column reports the results of the model with the control variables and the network indices (model 1). The second column reports the results of the model which also includes the labor contract type and the interaction terms for the network indices and labor contract types (model 2). Finally, the third column reports the results of the model 1 specification but based on only those workers who contracted with middlemen (model 3). All of these models are estimated by ordinary least squares (OLS) estimator.

Before evaluating the results, we discuss the selection of estimation method. Whether the worker asks a middleman to help him or her find jobs or not is a choice by the worker or the worker's household. In other words, the variable for labor contract type may not be an exogenous variable. The network indices capture the current size of the worker's network. The workers who obtain more jobs may have better chances of growing their networks with farmers and other agricultural workers. Thus, the OLS estimates may suffer from endogeneity problems.

In order to consider these issues, we apply the instrumental variable methods to models 1 and 2. In model 1, the network indices are treated as endogenous variables. In model 2, the labor contract type and the interaction terms for the network indices and labor contract types are also treated as endogenous variables. The instrumental variables in both models are the years after the migration (if the worker is not a member of a migrant household, this variable is set equal to 0), a dummy variable indicating whether the household head was born in this area, a dummy variable indicating whether the father of the household head was a seasonal worker, and the literacy status of the father and mother of the household head. In both models, the test of endogeneity does not reject the null hypothesis of exogeneity at any conventional statistical significance level. Therefore, we report the results of OLS estimates

for models 1 and 2.

Table 6. Summary of Regression Results for Seasonal Workers' Working Days, Including Network Indices as Determinants

	Entire sample		Subsample: workers who contract with middlemen
	Model 1	**Model 2**	**Model 3**
Network index: first component	3.981 (12.726)	61.584** (28.479)	6.582 (13.701)
Network index: second component	3.365 (7.242)	58.173 (34.616)	1.594 (8.059)
Contracts with a middleman		-52.754 (32.410)	
Interaction term: first component and contracts with a middleman		-62.022* (30.999)	
Interaction term: second component and contracts with a middleman		-52.754 (35.308)	
Other control variables	Yes	Yes	Yes
Number of observations	90	90	71
R^2	0.301	0.330	0.297

Note: The figures in parentheses are household-level cluster-robust standard errors. Each coefficient designated ***, **, or * is significant at the 1%, 5%, or 10% level, respectively.

Because model 3 uses the subsample of seasonal workers who contracted with middlemen, the OLS estimates may suffer from selection bias. We apply the Heckman two-step approach to correcting the potential selection bias. The variables used in the first-step probit estimates of the selection model are the same ones used in the instrumental variable method described above. In the second-step estimates of working days, the coefficient on the inverse Mills-ratio, computed from the first-step estimates, is not statistically significant. Selection bias may not be a serious problem in this case.

We turn to the results of OLS estimates shown in Table 6. In the results for model 1, none of the coefficients on network indices is statistically significant. However, when the labor contract type and the interaction terms are added (model 2), some of the results change. The coefficient on the first component is positive and statistically significant. In other words, seasonal workers who contract directly with farmers may obtain more jobs if they have stronger networks with farmers. At the same time, the coefficient on the interaction term for labor contract type and the first component is negative and statistically significant. The positive network effect on working days may be mitigated if the seasonal workers contract with middlemen. The signs and magnitudes of the coefficients on the second component and the interaction term are similar to those of the coefficient on the first component but are not

statistically significant. The effects of a network with the community of agricultural workers are ambiguous. When the model 1 specification is regressed for the subsample of workers who contract with middlemen (model 3), the coefficient on the first component is not statistically significant. Their networks with farmers may have low importance for seasonal workers who contract with middlemen.

These regression results emphasize the role of middlemen in the seasonal labor market in the surveyed area. Seasonal workers may be able to find jobs regardless of the weakness of their connections to farmers if they ask middlemen for assistance in finding jobs. This middleman system is also preferable for farmers, because most farmers do not have sufficient connections to seasonal workers to be able to gather the necessary number of seasonal workers on their own.

5.2. Effects of Workers' Origins and Contracts with Middleman on Working Days

Recent literature on network effects in the urban labor market has focuses on the origins of migrants (Munshi, 2011). If migrants use their territorial and blood connections to find jobs, their origins can proxy for their network in the destination. This also may be true for the seasonal labor market in the surveyed area, because seasonal workers and middlemen traditionally have been tied by blood or territorial relationships.

Of the 90 seasonal workers we surveyed, 81 were members of migrant households. Of those 81, 58 were from Şanlıurfa province and 23 were from other provinces. Şanlıurfa is one of the provinces in Southeastern Anatolia. Other notable areas of origin for the migrant workers are the other provinces in Southeastern Anatolia, such as Diyarbakır and Siirt. Migrants from Şanlıurfa constitute the majority of seasonal agricultural workers in the surveyed area.

We create dummy variable indicating whether each migrant workers is from Şanlıurfa. Working days are then analyzed based on this origins variable rather than the network indices used in section 5.1.

Table 7 summaries the OLS regression results.[iii] To conserve space, only the coefficients of variables related to workers' areas of origin and labor contract type are shown. In model 1, in which the labor contract type and the interaction terms are not included, the coefficient on the origin dummy variable is positive and statistically significant. However, the coefficient loses the significance when the labor contract type and the interactions are added to the model (model 2). Instead, the labor contract type and the interaction terms for origin and labor contract type have negative and positive signs, respectively, and are statistically significant. The positive effect of worker origin in model 1 may arise from the fact that seasonal workers from Şanlıurfa can find more jobs by contracting with middlemen than can migrant workers from other provinces or non-migrant workers. At the same time, among workers from provinces other than Şanlıurfa, workers who contract with middlemen may work fewer days than do workers who contract directly with farmers. When restricting the sample to seasonal workers who contract with middlemen (model 3), the coefficient on worker origin is larger in magnitude than the corresponding coefficient in model 1. In this way, the results of model 3 support the results of model 2.

These results suggest that, if a seasonal worker asks a middleman for assistance in finding jobs, the origin of the worker is important. Seasonal workers from provinces other than Şanlıurfa may be distinguished from seasonal workers from Şanlıurfa if we consider working days as the outcome of the seasonal labor market. As background, two causal factors should be considered.[iv] First, migrants from Şanlıurfa comprise the majority of seasonal workers. Middlemen who have blood or territorial relationships to migrants from Şanlıurfa may have access to a larger pool of seasonal workers than do middlemen who do not have such relationships. Şanlıurfa-related middlemen may be able to provide more jobs

for their workers, because they can handle the varied requests from farmers, as discussed in section 3.2. Second, the abilities of middlemen to attract jobs from farmers may not vary by their areas of origin. However, the majority of middlemen and workers come from Şanlıurfa and, thus, are connected by blood or territorial relationships. Şanlıurfa-related middlemen prefer to call upon seasonal workers from Şanlıurfa than workers from other areas.

Table 7. Summary of Regression Results for Seasonal Workers' Working Days, Including Worker Origin as Determinants

	Entire sample		Subsample: workers who contract with
	Model 1	**Model 2**	**Model 3**
Migrant from Şanlıurfa	42.963** (19.946)	-21.507 (31.770)	78.331*** (21.185)
Contracts with a middleman		-46.658* (23.721)	
Interaction term: migrant from Şanlıurfa and contracts with a middleman		85.868** (37.613)	
Other control variables	Yes	Yes	Yes
Number of observations	90	90	71
R^2	0.353	0.399	0.465

Note: The figures in parentheses are household-level cluster-robust standard errors. Each coefficient designated ***, **, or * is significant at the 1%, 5%, or 10% level, respectively.

If the second factor is the main cause of the effect of worker origin on the number of working days, the emergence of modernized middlemen, which was discussed in Section 3.2, may mitigate the effect. Modernized middlemen may call upon workers regardless of blood or territorial relationships. However, if the first factor is the main cause of the worker origin effect, the emergence of modernized middlemen is not sufficient to mitigate the effect. Modernized middlemen must be able to compete with traditional middlemen, by building networks with farmers and also seasonal workers.

Unfortunately, we do not have sufficiently rich data to investigate which of these factors is the main cause of the worker origin effect. Furthermore, this study is based on a small sample from only the irrigated area of Adana. In other areas of Turkey with high demand for seasonal labor, the majority of seasonal workers may be from provinces other than Şanlıurfa. There are no public statistics on the origins of seasonal workers in Turkey. Our results may be case specific.

6. Conclusion

In this study, we have investigated the network effects and the role of intermediaries in the seasonal agricultural labor market in the irrigated area of Adana, Turkey. The estimated network indices confirm that, in the area, farmers' networks and seasonal agricultural workers' networks differ. The regression analyses of seasonal workers' working days shows that seasonal workers who do not have strong networks with farmers have difficulty finding jobs. Middlemen serve to mitigate seasonal workers' lack of networks with farmers. In

situations in which sufficient networks between farmers and workers do not exist, middlemen play a key role in the area's seasonal agricultural labor market. At the same time, however, the blood or territorial ties between middlemen and workers cause a distinction among seasonal workers based on their origins.

We hesitate to generalize these results to other areas of Turkey. Accumulation of evidence in other areas and further investigation to determine the main causal factor of the distinction among seasonal workers based on their origins will help policy makers who may consider intervening in the labor market in order to alleviate the poverty of seasonal agricultural workers.

Acknowledgments

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[i] The poverty rate of the surveyed seasonal-worker households was approximately 50% and 30%, respectively, based on the poverty thresholds for the Mediterranean Region and the Southeastern Anatolia Region, which were set by the Turkish Statistical Institute (2014).

[ii] Some older seasonal workers we interviewed could not speak Turkish well. Therefore, we relied on other seasonal workers to translate for us.

[iii] We have also conducted some tests for selection bias as discussed in the models with the network indices. The results also indicate that the OLS estimates do not suffer from serious selection bias.

[iv] Farmers' preference for hiring workers from specific regions may cause differences in workers' outcomes. However, the farmers we interviewed generally stated that they do not consider the origins of workers and do not ask middlemen to gather workers from any specific region.