Research article

Social networks and job quality in Mexico: 2005–2019

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ABSTRACT

This investigation analyzes labor implications of employment procurement through friends and family on wages, workers’ benefits and job longevity in comparison to other job search methods in Mexico during 2005–2019. Various econometric models are performed. For salary, fixed effects by city and year will be estimated through Pooled Ordinary Least Squares (OLS). Second, it is analyzed if jobs obtained through friends and family are more likely to provide benefits equal to or greater than those required by law, for this, a logistic model and an ordered logistic model are employed with fixed effects; and finally, for the duration of employment we use a parametric survival model. The results indicate that employment procured through family and friends result in higher salaries and longer work durations but less work benefits.

1. Introduction

There are some perceptions about labor relations such as that one needs to be lucky to find a good job, or that one has to know someone to help him/her out in the hiring process. This implies that job success does not depend only on the education and skills of the person. These relationships are acquired through socialization among families and influential groups (Wial, 1991).1

It has been established as a stylized fact that resorting to friends and family as a job search method has increased over time (Ioannides and Datcher, 2004);2 in this regard, it has been found that people who found employment through the aforementioned method are more senior and productive, which in turn is related to better earnings.3

In Mexico during 2005, approximately 54.7 percent of workers used the aforementioned method to find employment, and by 2019 this number increased to 55.5 percent.2 Despite of being the most widely used job search method and the fact that its use has grown over time, there are no research studies conducted in Mexico that study the implications this has on the labor market, and therefore, we believe that this study can contribute to the literature relating to employment quality and search methods in our country.

The objective of this article is to study the implications of resorting to family and friends to seek employment in the labor market in Mexico. In specific, this paper analyses if salaries obtained through this method are higher than those obtained through other processes; if the probability of obtaining a job by this means provides greater benefits, and if the jobs acquired through friends and family networks last long (longevity). The analysis is performed separately for men and women to obtain the differences in job search patterns between both the groups.

Data from the National Occupation and Employment Survey (ENOE) are used for the 2005–2019 period. Various econometric methodologies, such as Pooled Ordinary Least Squares (OLS), logistic and ordinary logistic, and parametric survival models were employed for the population that was between 14 and 64 years of age during 2005–2019. The results indicate that workers who obtain their employment through family and friends have higher salaries and work for a longer period. However, the evidence also suggests that workers who use this search method, find jobs that provide less work benefits, even after considering the type of benefit.

The investigation of these issues is important because it helps to better understand the functioning of the labor market in Mexico, and this information can be utilized by workers, employers, and public

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policymakers to conduct better labor matches on the basis of income, benefits, duration, and the all factors that influence the quality of employment. In general, the term “good quality employment” is a multidimensional and elusive concept measured through different attributes; however, it is found that wages (which is considered as the main attribute), access to social security (Muñoz de Bustillo et al., 2011), and their duration (Datcher, 2006) are the factors that are mostly considered. The article is organized as follows. Section 2 illustrates the literature review. Subsequently, Section 3 shows the methodology. The results are analyzed in Section 4. In Section 5, the conclusions and discussion of the research are presented.

2. Literature review

Access sources to labor information can be classified as formal and informal (Rees, 1966). Specifically, the informal method of job search refers to whether the person resorted to a family member, friend, or acquaintance to find employment. In contrast, formal employment methods include if the person went directly to the workplace (factory, shop, workshop, etc.); to an agency or private job bank; to a public recruitment service; to a union or guild; to a government employment service; used the Internet, media (newspaper, radio); or through an advertisement seen at a public place. According to the literature, the decision to resort to one or other method varies according to gender, race, occupation, and country of residence of the person (Rees and Schultz, 1970; Concoran et al., 1980; Pissarides and Wadsworth, 1994; Bentolila et al., 2008; Pellizzari, 2010). Resorting to friends and family as a job search method is the least expensive search method (Holzer, 1988; Mortensen and Vishwanath, 1994); furthermore, employers often use references from their best employees who tend to recommend responsible family and friends who are also similar to them because their reputation would be affected by the quality of the people they recommend (Rees, 1966; Doering and Piore, 1971). In addition, Hensvik and Skans (2016) show that firms that use coworker networks recruit workers with better militarily drafts test scores but shorter schooling, they argued that this represent evidence that these networks help the firms to find qualities in workers in hard-to-observe dimensions.

Another idea of how family and friend might affect labor market outcomes can be found in O’Connor (2013), who argue that social network contacts have access to resources and help job seekers by sharing them. Her results also show that contacts are better able to help when they are male, employed, better educated than job seekers and perceive them to be “good” workers.

The base model for the relationship between salary and the job search method was developed by Montgomery (1991). In his two-period model he assumes that in the period 1 the firms know the productivity of their employees, and in the period 2 there are two types of workers that can be employed: those hired by employee referral (informal method) and others hired through the labor market; in both cases the employer determines the productivity of the hired person (assumption of adverse selection). In the equilibrium, the firm offers a higher salary at the referral person, that is determined by the number and type of social ties he holds. Later, Simon and Warner (1992), developed a job matching model, where additionally to earn higher initial salary, the referred workers also display lower turnover than the non-referred workers, this is because these workers have similar productivity with the current employees and their variance is lower compared with non-referred workers.

Mortensen and Vishwanath (1994) used distributions of wages rates for each method of search and indicated that job duration and wages are independent of the last labor condition (unemployed and employed), gender and occupations. Calvo-Armengol and Jackson (2004) used probability functions and correlation coefficients and found that the outcomes on wages and duration when using family and friends as a job search method depends of the structure of the network and the length of time the person was unemployed. Pellizzari (2010) developed a search model for analyzing the impact on wages depending of the method and his results indicated that the expected wage depends on the quality of job references, while Tumen (2016) indicated that the impact depends of peer effects and unobserved worker heterogeneity.

There is no consensus on the empirical relationship between salary and this informal job search method. On the one side, Concoran et al. (1980), Simon and Warner (1992), Fernandez et al. (2000), Kugler (2003) and Hensvik and Skans (2016) find a positive relationship, on the other side Pistaferri (1999), Bentolila et al. (2008), Antoninis (2006) and Oliveire et al., 2020 find a negative relationship, and finally, Pellizzari (2010) finds mixed results when studying a sample of countries.

Other research has focused on analyzing issues arising from the relationship between salary and the informal method of job search; for example, Berger (1995) focus on the gender of the contact in the United States. Results indicate that when men and women were referred by a man, there is a positive and significant effect on salary; in contrast, if men were referred by a woman, their salary is even lower than those who did not use any contact.5 Analyzing a different aspect, Melicranici and Radicchino (2010) distinguish whether employment was found by a friend’s recommendation or through an acquaintance within the profession (to consider different pairing qualities). The results indicate that, if the person found employment through a friend, there is a dip in the salary, and hence, the relationship is negative, indicating a bad match (mismatch); while if the employment was found through someone known in the profession, there is a hike in salary, which would reflect a good match. Likewise, the authors conclude that hiring through friends and family is not a way to reduce information asymmetry, but it does reduce the cost of recruitment.6

Some researches had focus on special groups. For example, Fang et al. (2016) analyzed several job search procedures for migrant workers in China and found that the use of informal procedures (related with family and friends) are associated with earnings that are 33–43% below compared with more formal procedures. Beaman (2012) studied the role of social networks in labor market outcomes for refugees resettled in the U.S., her results indicate that an increase in the number of members in the social network resettled around the same year leads to a deterioration of outcomes, while a greater number of tenured persons in the network is associated with higher probability of employment and higher wages.

Additionally, it has been documented that jobseekers receive more job offers when they use family and friends for searching employment (Reynolds, 1951; Rees and Shultz, 1970; Granovetter, 1974, 1983; Concoran et al., 1980; Holzer, 1987).

Datcher (2006) studied the relationship between this informal search method and employment tenure. His analysis distinguishes between the gender of the friend or relative for whom he found the job (parents, cousins, grandparents, etc.). The results indicate that those who found jobs through the informal method (friends and family) are less likely to leave their job, and this probability is even lower, if the person who recommended it is a male.

Finally, a different approach from traditional data bases is used by Gee et al. (2017), they used Facebook users’ data to analyze the use of “weak ties” and “strong ties” to find jobs. Their outcomes indicate that “weak ties” are important in aggregate because of their large number.

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5 Another additional consideration would be finding out if the person who made the recommendation has previously worked with the recommended person.

6 Considering the fact that social networks in the United States are highly differentiated on the basis of gender.
However, “strong ties” are associated with a higher probability of job help and with working with the specific friend who help to find the job.

3. Research methodology

The objective of this research paper is to analyze the functioning of the labor market in Mexico during the period 2005–2019. In particular we want test these hypotheses: i) the jobs found through friends and family have the higher salaries compared with the other methods; ii) job benefits are higher when the employment was obtained with help of friends or family; iii) employment duration is higher for those workers who found a job by using family or friends as a job search method.

3.1. Research design

The approach used is quantitative using a pooled data base specialized in the labor market in Mexico. Various econometric exercises are performed, controlled by variables that influence each of the aforementioned dimensions.

The first labor outcome analyzed is salary. The following regression that considers fixed effects by city and year will be estimated through Pooled Ordinary Least Squares (OLS):

\[
\ln W_{ict} = \alpha_{ict} + \text{Friends}_{ict}\phi + X_{ict}\beta + N_{ict}\gamma + \xi_i + \theta_t + \mu_{ict} \tag{1}
\]

where \(i\) refers to the person; \(t\) and \(c\) refer to the year and city, respectively. \(W\) is the actual income per hour; \(\text{Friends}\) is a dichotomous variable equal to one if the person found employment through friends and family, or 0 if they found it through another method; \(X\) is a vector of personal variables including age, age squared, years in education, and if the person is married or has another marital status; \(N\) is a set of control variables on their employment: type of work (part- or full-time); size of company in which they work (small, medium, or large), and occupation and industry to which it belongs; \(\xi\) is the fixed effect by city, while \(\theta\) is the fixed effect per year. Finally, \(\mu\) represents the error term, which is assumed to have 0 mean, is normally distributed and has a standard deviation that varies for each city.

Given that for women the sample shows censored data, that is, only the salary of women who are employed at the time of answering the survey is observed and there is a big proportion of them not participating in the labor market; the results will be corrected by the selectivity bias using the method proposed by Heckman (1979), and therefore, the equation to estimate would be given by:

\[
\ln W_{ict} = \alpha_{ict} + \text{Friends}_{ict}\phi + X_{ict}\beta + \text{MIR}_{ict} + \xi_i + \theta_t + \mu_{ict} + \mu_{ict} \tag{2}
\]

where MIR is the Mills inverse ratio, defined as the ratio of the normal probability density function \(\phi(\mu_i)\), between the cumulative normal probability density function \(\Phi(\mu)\). MIR is obtained from the following equation (estimated through the probit model):

\[
E_{ict} = \pi_{ict} + V_{ict}\phi + X_{ict}\beta + \xi_i + \theta_t + \mu_{ict} \tag{3}
\]

where \(E\) is a dichotomous variable that takes the value of 1, if the woman is employed and 0 if she is not employed; \(V\) is the instrumental variable defined as the number of people working in the home normalized by household size. In theory, it would be expected that the more people who work in a particular household (considering its size) the less incentives there are for women to enter the labor market, and hence, it is expected that this instrument has a negative sign. The rest of the variables and vectors are defined in the same manner as the previous equation.

Second, it is analyzed if jobs obtained through friends and family are the ones that are most likely to provide benefits equal to or greater than those required by law. For this, a logistic model is employed with fixed effects by entity and year:

\[
P_{ict} = \alpha_{ict} + \text{Friends}_{ict}\pi + X_{ict}\beta + N_{ict}\gamma + \xi_i + \theta_t + \mu_{ict} \tag{4}
\]

where again the \(i\) refers to the person, and \(c\) and \(t\) to the city and the year, respectively. \(P\) is a dichotomous variable equal to 1 if the person has at least the benefits provided by law in their current employment (bonus, paid vacation, access to social security, and profit sharing) and equal to 0 if in their employment they are not given any type of benefit or have fewer benefits than those established by law; the rest of the variables are defined as in Eq. (1); with the exception of \(\mu\), the error term, is assumed to follow a logistic distribution.

To distinguish the fact that a job with benefits superior to those required by law is better than a job with the benefits required by law; which in turn is better that a job without benefits, we will proceed to estimate an Ordered logistic model with fixed effects by city and year:

\[
R_{ict} = \alpha_{ict} + \text{Friends}_{ict}\pi + X_{ict}\beta + N_{ict}\gamma + \xi_i + \theta_t + \mu_{ict} \tag{5}
\]

where \(i, c, \) and \(t\) are defined as in the previous models. \(R\) is a variable that takes the value of 0 if the job does not provide any kind of benefit, 1 if the job provides benefits according to the law, and 2 if the job provides benefits superior to those of the law. The rest of the variables are defined in the same way as described in the previous equation.

Finally, the duration of employment is measured as a key element of the labor market that is measured through a continuous variable, indicating the number of years of employment in the same company; this is because long-term jobs are often seen as secure and desirable jobs. Therefore, it is said that the extent to which the duration of employment increases, its quality also improves.

To find out if the jobs found through friends and family are the jobs where people stay longer, that is to say, have more longevity, it is necessary to use a survival model because the dependent variable does not meet the assumptions of the classic linear regression model due to the presence of the conditioning effect and the censored data (explained...
below). In this case, it was decided to use the following parametric survival model:

\[
\ln(T_{ict}) = a_{ict} + \text{Friends}_{ict} \pi + K_{ict} \beta + \xi_{ict} + \gamma_{ict} + \epsilon_{ict}
\]

where i refers to the person, c to the city, and t indicates the year. T is the years of longevity in the current company until the time of the survey. Friends is a dichotomous variable equal to 1 if the employment was obtained through friends and family and equal to 0 if the person learned of their current employment through another method. K is a covariance matrix of the following variables: logarithm of the actual income per hour of the person; age; years in education; if the person is married; type of benefit (without benefit, benefits according to the law, and benefits superior to those required by law); type of company (small, medium, or large); type of work (part- or full-time); occupation; and industry. As in the previous models, fixed effects are included by state and by year (\(\xi_{ict}, \gamma_{ict}, \) respectively). Finally, \(\epsilon_{ict}\) is the error term with density function \(f()\) where the distribution form of the error term determines the regression model to be employed.

In studies where the measurement variable is time (which has a continuous distribution), the conditioning effect and censored data should be considered. This sample should consider that there is only a dichotomous variable equal to 1 if the employment was obtained through friends and family and equal to 0 if the person obtained their current employment through another method. As in the previous models, fixed effects are included by state and by year (\(\xi_{ict}, \gamma_{ict}, \) respectively). Finally, \(\epsilon_{ict}\) is the error term with density function \(f()\) where the distribution form of the error term determines the regression model to be employed.

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3.2. Data collection

Data were obtained from the National Occupation and Employment Survey (ENOE) of the National Institute of Statistics and Geography (INEGI). ENOE is a national representative and has been applied every trimester since 2005 to urban and rural households in the form of a rotating panel (each household appears for a maximum of five trimesters). This survey enables information to be obtained on the occupation characteristics of the national population and other economic and demographic variables that are found in two questionnaires that have quarterly periodicity: The Sociodemographic Questionnaire and the Occupation and Employment Questionnaire. The Sociodemographic Questionnaire contains information on the sociodemographic characteristics of each resident in a particular household, while the Occupation and Employment Questionnaire contains information on the occupation and employment of the population. For certain trimesters, this last questionnaire in its expanded form indicates information on the means by which people obtained their employment; it, particularly, asks the following: How did you hear about that job?; in this regard, people could choose only one of the options provided, i.e., went directly to the workplace (factory, shop, workshop, etc.); went to an agency or private job bank; went to a public recruitment service; through a temporary employment program of the government (federal, state, and/or municipal); went to a union or guild; online; through an advertisement in a public place or in the media (newspaper and radio); through a family member, friend, or acquaintance; and they were offered the employment or other means. The period for which this information is shown is 2005–2019. Thus, the database consists of a cross-sectional pool of 985,470 male and 623,494 female employees who are of working age (between 14 and 64 years). Employers, self-employed, and workers without pay were not considered because they did not provide the information that was relevant for this study.

3.3. Data analysis

Table 2 shows the descriptive statistics of the sample. Regarding personal characteristics, in both men and women, the average age is 35 years. Men have an average of 11 study years and 65% are married; however, women in the sample have more years in education (12), and only 46% are married.

In relation to employment characteristics, data indicate that 48% of men work in small businesses, 21% in medium-sized companies, and 31% in large companies. For women these percentages are 53%, 19%, and 28%, respectively. In addition, 88% of men work full-time, and for women, this percentage is lower (73%). As for the type of contract, 49% of the men have an employment contract, 41% do not have a contract, and finally, 10% have a temporary contract. For the female population, the percentages are 49%, 41%, and 10%, respectively.

In reference to the occupation of workers, 35% of men are industrial workers, craftsmen, or assistants, and the largest proportion of them (21%) work in the manufacturing industry. As for women, the highest percentage is employed in personal services (27%), and these are concentrated in the service industries, both in other services and social services (about 40% of them).

To measure good quality jobs, salary, benefits, and duration of the current job will be considered. Table 3 analyzes three aspects of quality and their relationship with the method of job search.

Among men, it is observed that jobs found through a union have higher salary on average than the rest, being practically double than those found through friends and family. Additionally, it is found that 95% of the jobs hired through unions are granted at least the legal benefits, followed by those found through the private job board (92.5%), while the job was offered has the lowest percentage. As for employment duration, the longest lasting employment, by far, is found through unions (14 years on average).

For women, as well as for men, the jobs obtained through unions have higher average salaries, while those obtained through friends and family job search methods are among the lowest paid, when not controlled by personal and employment characteristics.

Within the female population, it is also observed that 98% of the jobs found through unions grant benefits required by law or more, followed by jobs found through the Internet (88%). Furthermore, it is observed that the friends and family method is one of the methods with the lowest percentage of benefits. In terms of employment duration, the jobs obtained through unions are the ones that last the longest on average (15 years) for women.

| Table 1. Risk functions employees. |
|-----------------------------------|
| **Model** | **Risk Function** | **Integrated Risk Function** |
|----------|------------------|-----------------------------|
| Exponential | \(\lambda\) | \(\lambda t\) |
| Weibull | \(\lambda \alpha (t)^{-\alpha-1}\) | \(\lambda t^{-\alpha}\) |

Source: Compiled by author on the basis of data obtained from Klein and Moeschberger (2006).
In short, it is noted that according to the data presented in both the tables, the method with better quality employment characteristics is obtained through a union.

4. Results

Table 4 presents the regression estimates of Pooled OLS (Equation (1)) for the male population, and for women, the results corrected by the self-selection bias (Equation (2)) are also shown.  

The results indicate that there is a positive and significant relationship between salary and jobs obtained through the family and friends method in Mexico, once it is controlled by personal and work characteristics. For men, on average, getting a job through friends and family increases the salary by 1.7% as the same for women.  

In short, it is noted that according to the data presented in both the tables, the method with better quality employment characteristics is obtained through a union.

Table 2. Descriptive statistics of the sample.

| Variables                        | Men Mean | Men Standard deviation | Women Mean | Women Standard deviation |
|----------------------------------|---------|------------------------|------------|--------------------------|
| Personal Characteristics:        |         |                        |            |                          |
| Age                              | 34.65   | 11.98                  | 34.99      | 11.31                    |
| Years of Education               | 11.56   | 4.22                   | 12.28      | 4.54                     |
| Married                          | 0.6474  | 0.4778                 | 0.4624     | 0.4986                   |
| Tenure                           | 6.4621  | 7.5302                 | 6.2799     | 7.3678                   |
| Job Characteristics:             |         |                        |            |                          |
| Type of Company:                 |         |                        |            |                          |
| Small (1–20 employees)           | 0.4823  | 0.4997                 | 0.5273     | 0.4993                   |
| Medium (21–100 employees)        | 0.2090  | 0.4066                 | 0.1911     | 0.3921                   |
| Large (>100 employees)           | 0.3087  | 0.4620                 | 0.2816     | 0.4498                   |
| Type of work                     |         |                        |            |                          |
| Part-time (≤34 h a week)         | 0.1197  | 0.3246                 | 0.2724     | 0.4452                   |
| Full-time (>35 h a week)         | 0.8803  | 0.3246                 | 0.7276     | 0.4452                   |
| Type of Contract:                |         |                        |            |                          |
| No Contract                      | 0.4089  | 0.4916                 | 0.4074     | 0.4914                   |
| Temporary                        | 0.1003  | 0.3004                 | 0.1007     | 0.3009                   |
| Base pay or Compensation         | 0.4902  | 0.4999                 | 0.4913     | 0.4999                   |
| Occupation                       |         |                        |            |                          |
| Professinals, Technicians, Art Workers | 0.1011 | 0.3015               | 0.1227     | 0.3281                   |
| Education Workers                | 0.0334  | 0.1796                 | 0.0853     | 0.2794                   |
| Civil Servants and Managers      | 0.0220  | 0.1468                 | 0.0176     | 0.1314                   |
| Office Managers                  | 0.1191  | 0.3239                 | 0.2211     | 0.4150                   |
| Industry Workers, Craftsmen, and Apprentices | 0.3536 | 0.4781               | 0.1394     | 0.3464                   |
| Traders                          | 0.1140  | 0.3179                 | 0.1395     | 0.3465                   |
| Transport Operators              | 0.1002  | 0.3002                 | 0.0008     | 0.0290                   |
| Personal Service Workers         | 0.1050  | 0.3666                 | 0.2655     | 0.4416                   |
| Security and Protection Workers  | 0.0418  | 0.2001                 | 0.0065     | 0.0806                   |
| Farming Workers                  | 0.0097  | 0.0982                 | 0.0015     | 0.0381                   |
| Sector                           |         |                        |            |                          |
| Agriculture, Farming, Forestry, Hunting and Fishing | 0.0116 | 0.1069           | 0.0024     | 0.0485                   |
| Extractive and Electricity Industry | 0.0162 | 0.1264             | 0.0057     | 0.0751                   |
| Manufacturing Industry           | 0.2065  | 0.4048                 | 0.1352     | 0.3420                   |
| Construction                     | 0.1266  | 0.3326                 | 0.0116     | 0.1070                   |
| Trade                            | 0.1666  | 0.3726                 | 0.1719     | 0.3773                   |
| Restaurants and Accommodation    | 0.0619  | 0.2411                 | 0.0856     | 0.2798                   |
| Transport, Communications, Mail, and Storage | 0.0914 | 0.2882           | 0.0226     | 0.1485                   |
| Professional Services, Finance, and Corporate | 0.0727 | 0.2597             | 0.0809     | 0.2727                   |
| Social Services                  | 0.0743  | 0.2623                 | 0.2044     | 0.4033                   |
| Other Services                   | 0.0788  | 0.2694                 | 0.1871     | 0.3900                   |
| Government and International Organizations | 0.0932 | 0.2907             | 0.0926     | 0.2899                   |
| Size of Sample                   | 985,470 |                        | 623,494    |                          |

Source: Compiled by author on the basis of data obtained from ENOE and INEGI.

It should be noted that the total sample of women is made up of 1,857,208 observations, of which approximately 30% are employed.

19 It should be noted that the total sample of women is made up of 1,857,208 observations, of which approximately 30% are employed.
For both men and women, age and age squared variables have the expected result, and therefore, the relationship between salary and age is in the form of an inverse U. As expected and according to the theory of human capital (Mincer, 1974), education has a positive effect on wages for both men and women. Specifically, the coefficient indicates that, on average, with an increasing in the year of education, the salary increases by 4.2% for male and 3.95 for female.

The results also reveal that the part-time coefficient has a positive result, which indicates that, on an average, men who have a part-time job earn an hourly salary 43% higher than those who have a full-time job, while for women, it is 38% higher.21

Regarding the size of the company, the results show that men who work in a medium-sized company earn an average salary that is 12% higher than those who work in a small company (base group), while those who work in a large company, earn on average 17% more than those who work in a small company. The same relationship is observed for women, but salaries are 10% and 16%, respectively, higher in relation to the female population working in small businesses.

Mills inverse ratio highlights that there is negative self-selection in women, which could indicate that the employed women are not the ones with the best unobservable characteristics.

Regarding the number of standardized people working in a particular household variable, it has a positive result in the selectivity equation, which indicates that instead of representing a disincentive to work (due to leisure preference), the persons employed provide information about jobs, that is, there is an effect of transmitting labor information. The other coefficients of the selection equation are shown in the Annex.

The next aspect of quality to consider is whether employment grants the benefits required by the law. Table 5 shows the marginal effects of the logistic model described in Eq. (4), which helps to identify if the jobs obtained through family and friends are more or less likely to grant the benefits established by law in relation to other job search methods.

Table 3. Jobs according to the search method.

| Jobs According to the Search Method | Actual Salary per Hour (Average) | Benefits (Percentage) | Duration in the Job (Years) |
|------------------------------------|---------------------------------|-----------------------|-----------------------------|
|                                    | Men                             | Women                 | Men                         | Women                 | Men                         | Women                 |
| Applied in Place of Work           | 145.82                          | 152.03                | 79.3                        | 81.1                  | 7.3                         | 7.3                    |
| Agency or Private Job Board        | 218.71                          | 185.92                | 92.5                        | 88.7                  | 5.2                         | 5.3                    |
| Public Service Recruitment         | 139.62                          | 130.64                | 92.0                        | 85.2                  | 4.2                         | 4.0                    |
| Temporary Employment Program       | 158.93                          | 163.91                | 88.1                        | 84.1                  | 5.4                         | 5.9                    |
| Union or Guild                     | 276.03                          | 288.45                | 95.3                        | 98.2                  | 14.5                        | 14.8                   |
| Internet                           | 203.38                          | 186.24                | 92.3                        | 89.1                  | 2.8                         | 2.4                    |
| Advert or Communication Media      | 125.06                          | 109.08                | 87.6                        | 82.4                  | 4.5                         | 3.7                    |
| Family and Friends                | 140.17                          | 137.80                | 65.5                        | 67.0                  | 6.4                         | 6.1                    |
| The job was offered                | 173.30                          | 167.87                | 54.1                        | 57.5                  | 6.7                         | 7.0                    |
| Others                             | 250.89                          | 234.33                | 81.7                        | 80.3                  | 9.4                         | 10.2                   |

Source: Compiled by author on the basis of the data obtained from ENOE and INEGI.

Table 4. Salary regression results.

| Variables                        | Men Pooled OLS | Women Pooled OLS | Men Heckman | Women Heckman |
|----------------------------------|----------------|------------------|-------------|---------------|
| Friends                          | 0.0176*        | 0.0180*          | 0.0179*     | 0.0179*       |
| Age                              | 0.0332*        | 0.0296*          | 0.0284*     | 0.0284*       |
| Age Squared                      | -0.0004*       | -0.0003*         | -0.0003*    | -0.0003*      |
| Years in Education               | 0.0424*        | 0.0391*          | 0.0388*     | 0.0388*       |
| Married                          | 0.0991*        | 0.0460*          | 0.0494*     | 0.0494*       |
| Tenure                           | 0.0089*        | 0.0137*          | 0.0138*     | 0.0138*       |
| Type of work                     |                |                  |             |               |
| Part-time                        | 0.4271*        | 0.3788*          | 0.3789*     | 0.3789*       |
| Size of Company                  |                |                  |             |               |
| Medium                           | 0.1176*        | 0.1047*          | 0.1048*     | 0.1048*       |
| Large                            | 0.1731*        | 0.1660*          | 0.1661*     | 0.1661*       |
| Constant                         | 3.4797*        | 3.3875*          | 3.4178*     | 3.4178*       |
| Mills inverse ratio              | -0.0111*       |                  |             |               |
| R²                               | 44.32%         | 52.12%           |             |               |
| Number of Observations           | 985,470        | 623,494          | 623,494     |               |
| Instrumental Variable:           |                |                  |             |               |
| Number of people that work in a particular household | 4.3394* |                 |             |               |
| Number of Observations           | 2,075,104      |                  |             |               |

*p < 0.05.

Note: All regressions were controlled by occupation, industry, city, and year.

21 One possible explanation for this is that people who work part-time do not receive benefits (this is corroborated in the logistic regression) and are compensated with a higher hourly wage. However, the monthly salary of part-time workers is lower than that of full-time workers.
For both men and women, it was found that jobs found through friends and family are approximately 3.5% less likely to have at least the benefits established by law compared to jobs obtained through other methods. It is possible that as the employment was obtained through a family member or friend, the worker is willing to receive less benefits than those required by law due to the bond of trust and friendship. From the employer’s viewpoint, it could be that they dare offer benefits that are lower than those required by law to people recommended by one of their employees.

Additionally, the results indicate that the more years a person has spent in education, the probability of finding a job with benefits according to the law increases by 1.1% and 0.8% for men and women, respectively.

For married men, the probability of finding a job with benefits according to the law is 8%, which is higher than that for men with another marital status. For women, the difference between both groups is 1.5%.

Another interesting result reveal that jobs related to large companies for men are 37% more likely to include benefits compared to jobs related to small companies, while medium-sized companies show a 27% greater probability than small businesses. For women, these percentages are 22% and 16% higher, respectively.

As you can see, the results shown in Table 5 do not distinguish between the type of benefit granted to employees, and hence, to consider the fact that some jobs provide greater benefits than those required by law, the regression was estimated (5) through an orderly logistics model. The marginal effects are illustrated in Table 6.

Results indicate that the likelihood that a job found through friends and family does not provide benefits is 1.2% higher compared to the jobs found through other methods, while the probability that a job obtained through family and friends will provide benefits required by law is 0.2% lower than for jobs found by other methods. Finally, if the job has benefits that are greater than those required by law, the probability is 1% lower for this search method. Therefore, it can be concluded that there is a negative relationship between this informal method of job search and the quality of employment measured in this aspect for men.

In the case of women, the probability that a job found through friends and family does not provide benefits is 1.9% higher compared to jobs found through other methods. With respect to jobs that provide benefits according to the law, there is practically no difference (0.08% lower) among the search methods used, while if the employment provides benefits higher than those required by law, the probability is 1.9% lower when compared to jobs found through other methods. Thus, the conclusion is similar in relation to their male counterparts.

When considering large companies, for men and women, employment is less likely to do not provide benefits when compared to jobs related to small businesses. Furthermore, it was found that jobs in these types of companies are 0.4% more likely to have legal benefits compared to small businesses (0.7% for women). Finally, it was found that they are 23.3% more likely to offer benefits greater than those required by law compared to the jobs offered in small businesses (18.5% for women).

The last aspect of quality is employment duration. As the interest lies in knowing if the jobs found through friends and family are those in which people stay longer (duration is longer), taking into account the limitations mentioned in Section 2, Table 7 shows the instantaneous risk rates (hazard ratios) for parametric models that use Weibull and exponential distribution functions.

Estimates indicate that if the person (whether male or female) found his/her job through friends and family, the failure rate is reduced (which in this case means losing the job) compared to the formal method sought, and thus, the person lasts longer in his/her employment. As expected, this also occurs as the person receives a higher salary.

Further, the older the person is, it is found that the failure rate is lower, and thus, people would last longer in their jobs. Probably because as age increases, the worker values work stability more; if he loses his job, it may be more difficult to get another, and therefore, he takes better care of his current job. In contrast, the more years in education a person has, the failure rate is greater, and hence, people do not stay that long in their jobs. One possible explanation is that people with greater human capital find employment more easily (they have greater labor mobility), and they are likely to end their current employment relationship for another that offer them better facilities.

Regarding benefits, if the person receives either the benefits required by law or greater, there is a negative effect on the risk of no longer being in that job compared to jobs that do not provide any kind of benefit. That is to say, the results indicate that people will stay longer in those jobs that provide benefits, which is as expected.

In the case of company size, the results indicate that for men who work in medium-size or large companies, the failure rate reduces compared to those who work in small companies, and hence, they remain more time in those companies. For women, similar results are seen.

### 5. Conclusions and discussion

The number of people who find their employment through friends and family has increased in recent times. In Mexico, the percentage of people who find their employment through the aforementioned informal method is higher than that for any other search method (above 50%).

This research paper contributes to the analysis of labor markets in Mexico because it is the first study that analyzes the impact of procuring work through family and friends (informal job search method) on wages, benefits, and duration, which are considered as measures of employment quality.

In relation to salary, there is evidence of a positive relationship between jobs obtained through family and friends and salary (for both men and female). Furthermore, once it is controlled by selection bias, it is found that Mills inverse ratio indicates that there is positive self-selection, revealing that employed women are the ones with more unobservable characteristics.

In accordance with the above, when considering employment duration, it is estimated that people who found employment through friends and family have a lower risk of not being employed in relation to other search methods, that is, these jobs have a longer duration.

In contrast, when analyzing the impact on benefits, for both men and women, jobs found through friends and family are less likely to provide

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*Table 5. Logistic regression of benefits: Marginal effects.*

| Variable                     | Men          | Women         |
|------------------------------|--------------|---------------|
| Friends                      | -0.0354*     | -0.0310*      |
| Personal Characteristics:    |              |               |
| Age                          | 0.0004*      | 0.0005*       |
| Years in Education           | 0.0117*      | 0.0087*       |
| Married                      | 0.0797*      | 0.0110*       |
| Job Characteristics:         |              |               |
| Tenure                       | 0.0083*      | 0.0153*       |
| Type of Company              |              |               |
| Medium                       | 0.2660*      | 0.1636*       |
| Large                        | 0.3720*      | 0.2200*       |
| Type of work                 |              |               |
| Part-time                    | -0.1903*     | -0.1621*      |
| Size of Sample               | 1,091,205    | 698,585       |

*p < 0.05.

Note: The marginal effects show the increase in probability in relation to the sample mean, corresponding to the particular characteristics in relation to the reference group. The results of the occupation coefficients, industries, cities, and year are not shown in the table but are available to those interested.

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22 If the coefficient is less than 1, the failure rate is reduced.
The result is robust because even when the type of benefit (required by law and greater than that required by law) is considered, it is concluded that the likelihood of receiving benefits in the jobs found through friends and family is lower compared to the likelihood of receiving benefits in jobs found by other methods.

To summarize, with the results shown in this investigation, it cannot be concluded that jobs obtained through this search method are of a good quality in all the indicated aspects. However, the evidence found does suggest that these jobs on average have higher salaries and longevity, which are desirable characteristics in a job.

The investigation of these issues is important because it helps better understand ways in which the labor market functions in Mexico, and this information can be used by workers, employers, and public policymakers to perform better labor matches understood in terms of income, benefits, and employment duration, which are all factors that influence the quality of employment. Additionally, efficient work matches help companies reduce their turnover costs and increase their productivity, as well as allowing workers to achieve better working conditions, while being socially desirable because they encourage employment and could have an effect in long-term pension and health systems (which are part of work benefits). These topics are particularly relevant in Mexico for several reasons: i) the use of family and friends is the main job search method and it has been growing in recent years; ii) it is well known that labor productivity had registered very low growth rates in the last decade; iii) official estimates from the National Institute of Statistics indicate that labor informality (very related with job benefits) is around 56%; and iv) job turnover has been identified as big problem in some industries in Mexico.

There is still much to study on this subject, but this research represents a good starting point; it would be desirable to be able to distinguish

Table 6. Logistic regression arranged by type of benefit: Marginal effects.

| Variables                | Men                              | Women                             |
|--------------------------|----------------------------------|-----------------------------------|
|                          | No Benefits                      | Benefits Required By Law          | Benefits Greater than those Required By Law |
| Search Method:           |                                  |                                   |                                               |
| Friends                  | 0.011864*                        | -0.000200*                        | 0.019805*                                     |
|                          | -0.011664*                       | 0.000801*                         | -0.019004*                                    |
| Personal Characteristics:|                                  |                                   |                                               |
| Age                      | -0.011980*                       | 0.000202*                         | 0.011778*                                     |
|                          | 0.014974*                        | 0.000606*                         | 0.014369*                                     |
| Years in Education       | -0.007591*                       | 0.000128*                         | 0.007463*                                     |
|                          | 0.007258*                        | 0.000294*                         | 0.006965*                                     |
| Married                  | -0.039109*                       | 0.000659*                         | 0.038450*                                     |
|                          | 0.001864*                        | 0.000075*                         | 0.001789*                                     |
| Job Characteristics:     |                                  |                                   |                                               |
| Tenure                   | -0.005171*                       | 0.000087*                         | 0.005084*                                     |
|                          | 0.0009758*                       | 0.000395*                         | 0.009363*                                     |
| Type of Company          | -0.172162*                       | 0.002901*                         | 0.169262*                                     |
|                          | -0.125042*                       | 0.005507*                         | 0.119985*                                     |
| Large                    | -0.237662*                       | 0.004004*                         | 0.233658*                                     |
|                          | -0.192630*                       | 0.007790*                         | 0.184839*                                     |
| Type of work             | 0.085543*                        | -0.001441*                        | -0.084102*                                    |
|                          | 0.090946*                        | -0.004006*                        | -0.095040*                                    |
| Size of Sample           | 1,091,205                        |                                    | 698,585                                       |

*p < 0.05.

Note: The marginal effects show an increase in probability in relation to the sample mean, corresponding to the particular characteristics in relation to the reference group. The results of the occupation coefficients, industries, cities, and year are not shown in the table but are available to those interested.

Table 7. Survival model hazard ratios.

| Variables                | Men                              | Women                             |
|--------------------------|----------------------------------|-----------------------------------|
|                          | Exponential                      | Weibull                           | Exponential                      | Weibull                           |
| Ln Salary per hour       | 0.990772*                        | 0.973144*                         | 0.988576*                        | 0.967055*                        |
| Search Method:           |                                  |                                   |                                  |                                   |
| Friends                  | 0.995899*                        | 0.990986*                         | 0.996168*                        | 0.989573*                        |
| Personal Characteristics:|                                  |                                   |                                  |                                   |
| Age                      | 0.999965*                        | 0.999938*                         | 1.000034*                        | 1.000136*                        |
| Years in Education       | 1.000167*                        | 1.000471*                         | 0.999945*                        | 0.999907*                        |
| Married                  | 1.002865*                        | 1.008082*                         | 1.000363*                        | 1.001557*                        |
| Job Characteristics:     |                                  |                                   |                                  |                                   |
| Type of Contract         | Benefits Required By Law        | 0.789403*                         | 0.781565*                        | 0.687730*                        | 0.675625*                        |
|                          | Benefits Greater than those Required By Law | 0.690025*                         | 0.680843*                        | 0.590579*                        | 0.582658*                        |
| Type of Company          | Medium                           | 0.997671*                         | 0.993165*                         | 1.000341*                        | 1.005140*                        |
|                          | Large                            | 0.993731*                         | 0.983607*                         | 1.000352*                        | 1.002725*                        |
| Type of work             | Part-time                        | 1.005938*                         | 1.001846*                         | 1.007414*                        | 1.012980*                        |
| Size of Sample           | 967,347                          |                                    | 614,637                          |

*p < 0.05.

Note: The results of the occupation coefficients, industries, cities, and year are not shown in the table but are available to those interested.
whether family and friends who helped obtain employment are also known professionally (or only personally) because such a distinction could help generate more accurate estimates. Likewise, it would be useful to be able to identify whether workers were directly hired by a family member or a friend; however, data used in this research do not allow this distinction to be made.

Finally, we must acknowledge that this research paper has some limitations. For instance, we assume that the use of family and friends to get a job is an exogenous variable, but there is a possibility that the selection of the job search method and the labor outcome variables (wages, job benefits, and duration) might be endogenous, in such case the results might be biased. Also, our analysis only allows to compare the results obtained in the labor market when seeking employment through family and friends with respect to a grouped category of other methods, and does not allow to perform the analysis in relation to a specific category such as: the use of internet or the use of a job agency. In addition, since there are several search methods in the base category, it is possible, because of the heterogeneity among them, that some of their effects on the labor market (with respect to the job search method under analysis) are compensated, generating small differences between the use of family and friends and other search methods over wages, job duration, and formality.

ANNEX.

| Table A1. Salary Regression Results |
|------------------------------------|
| Variables                          | Men                      | Women                     |               |
|                                   | Grouped OLS              | Grouped OLS               | Heckman      |
| Friends                           | 0.0176*                  | 0.0180*                  | 0.0179*      |
| Age                               | 0.0332*                  | 0.0296*                  | 0.0284*      |
| Age Squared                       | -0.0004*                 | -0.0003*                 | -0.0003*     |
| Years in Education                | 0.0424*                  | 0.0391*                  | 0.0388*      |
| Married                           | 0.0991*                  | 0.0460*                  | 0.0494*      |
| Tenure                            | 0.0089*                  | 0.0137*                  | 0.0138*      |
| **Type of work**                  |                         |                          |              |
| Part-time                         | 0.4271*                  | 0.3788*                  | 0.3789*      |
| Size of Company                   | 0.1176*                  | 0.1047*                  | 0.1048*      |
| Medium                            | 0.1731*                  | 0.1660*                  | 0.1661*      |
| Large                             |                          |                          |              |
| Occupation                        |                          |                          |              |
| Professionals, Technicians, Art Workers | 0.2290*             | 0.3465*                  | 0.3460*      |
| Education Workers                 | 0.2834*                  | 0.4983*                  | 0.4980*      |
| Civil Servants and Managers       | 0.6149*                  | 0.7113*                  | 0.7106*      |
| Office Managers                   | 0.0711*                  | 0.1840*                  | 0.1836*      |
| Traders                           | -0.0425*                 | 0.0601                   | 0.0600*      |
| Transport Operators               | -0.0401                  | 0.0016                   | 0.0023       |
| Personal Service Workers          | -0.1425                  | -0.0068*                 | -0.0068      |
| Security and Protection Workers   | -0.2996                  | 0.0115                   | 0.0116       |
| Farming Workers                   | -0.1377                  | -0.0647*                 | -0.0647*     |
| **Sector**                        |                          |                          |              |
| Agriculture, Farming, Forestry, Hunting and Fishing | -0.0305*             | 0.0864*                  | 0.0867*      |
| Extractive and Electricity Industry | 0.3185*                | 0.3897*                  | 0.3904*      |
| Construction                      | 0.1699*                  | 0.1841*                  | 0.1840*      |
| Trade                             | -0.0559*                 | -0.0841*                 | -0.0841*     |
| Restaurants and Accommodation     | -0.0327                  | -0.0079                  | -0.0079*     |
| Transport, Communications, Mail, and Storage | -0.0346*          | 0.0733*                  | 0.0733*      |
| Professional Services, Finance, and Corporate | 0.0163*                | 0.0595*                  | 0.0593*      |
| Social Services                   | 0.1343*                  | 0.0898*                  | 0.0901*      |
| Other Services                    | 0.0048*                  | 0.0736*                  | 0.0736*      |
| Government and International Organizations | 0.1243*            | 0.1815*                  | 0.1818*      |

Declarations

Author contribution statement

M. Rodriguez-Villalobos and E. Rangel-González: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.
| Cities          | Men Grouped OLS | Women Grouped OLS | Heckman     |
|----------------|----------------|------------------|-------------|
|                |                |                  |             |
| 1              | Mexico City    | -0.1843*         | -0.1655*    | -0.1653*    |
| 2              | Guadalajara    | -0.0440*         | -0.0632*    | -0.0637*    |
| 4              | Puebla         | -0.2388*         | -0.2705*    | -0.2702*    |
| 5              | León           | -0.0733*         | -0.0866*    | -0.0869*    |
| 6              | San Luis Potosí| -0.1755*         | -0.1995*    | -0.2000*    |
| 7              | Mérida         | -0.2712*         | 0.2891*     | -0.2904*    |
| 8              | Chihuahua      | -0.0898*         | -0.0997*    | -0.1005*    |
| 9              | Tampico        | -0.1312*         | -0.2738*    | -0.2741*    |
| 10             | Veracruz       | -0.2356*         | -0.2660*    | -0.2660*    |
| 11             | Acapulco       | -0.3412*         | -0.3281*    | -0.3285*    |
| 12             | Aguascalientes| -0.1604*         | -0.1943*    | -0.1940*    |
| 13             | Morelia        | -0.1430*         | -0.2350*    | -0.2357*    |
| 14             | Toluca         | -0.2091*         | -0.2264*    | -0.2248*    |
| 15             | Saltillo       | -0.1085*         | -0.1230*    | -0.1224*    |
| 16             | Villahermosa   | -0.2112*         | -0.2186*    | -0.2192*    |
| 17             | Tuxtla Gutiérrez| -0.3383*         | -0.3400*    | -0.3406*    |
| 18             | Tijuana        | 0.0210*          | 0.0869*     | 0.0860*     |
| 19             | Culiacan       | -0.0674*         | -0.1113*    | -0.1123*    |
| 20             | Hermosillo     | -0.0107*         | -0.0652*    | -0.0659*    |
| 21             | Durango        | -0.3014*         | -0.3244*    | -0.3246*    |
| 22             | Tepic          | -0.2050*         | -0.2799*    | -0.2813*    |
| 23             | Campeche       | -0.3402*         | -0.3603*    | -0.3615*    |
| 24             | Guanajuato     | -0.1796*         | -0.2568*    | -0.2562*    |
| 25             | Oaxaca         | -0.3230*         | -0.3128*    | -0.3132*    |
| 26             | Zacatecas      | -0.2729*         | -0.3046*    | -0.3047*    |
| 27             | Colima         | -0.1067*         | -0.1839*    | -0.1855*    |
| 28             | Querétaro      | -0.0379*         | -0.0588*    | -0.0588*    |
| 29             | Tlaxcala       | -0.3945*         | -0.4149*    | -0.4143*    |
| 30             | La Paz         | 0.0001*          | -0.0483*    | -0.0489*    |
| 31             | Cancun         | -0.0075*         | 0.0190*     | 0.0175*     |
| 32             | Pachuca        | -0.2324*         | -0.2697*    | -0.2707*    |

| Year           | Men Grouped OLS | Women Grouped OLS | Heckman     |
|----------------|----------------|------------------|-------------|
|                |                |                  |             |
| 2006           | 0.0088*        | 0.0146*          | 0.0146*     |
| 2007           | 0.0364*        | 0.0362*          | 0.0360*     |
| 2008           | 0.0351*        | 0.0355*          | 0.0352*     |
| 2009           | -0.0310*       | -0.0199*         | -0.0198*    |
| 2010           | -0.0742*       | -0.0389*         | -0.0388*    |
| 2011           | -0.0724*       | -0.0497*         | -0.0496*    |
| 2012           | -0.0965*       | -0.0571*         | -0.0571*    |
| 2013           | -0.0954*       | -0.0550*         | -0.0549*    |
| 2014           | -0.1134*       | -0.0741*         | -0.0739*    |
| 2015           | -0.1229*       | -0.0754*         | -0.0753*    |
| 2016           | -0.1000*       | -0.0542*         | -0.0540*    |
| 2017           | -0.1290*       | -0.0146*         | -0.0148*    |
| 2018           | -0.1401*       | -0.0257*         | -0.0259*    |
| 2019           | -0.1245*       | -0.0101*         | -0.0103*    |
| Constant       | 3.4797*        | 3.3875*          | 3.4178*     |

| Mills inverse ratio | Men | Women | Heckman |
|---------------------|-----|-------|---------|
| R²                  | 44.32% | 52.12% | 43.994% |

| Number of Observations | 985,470 | 623,494 | 623,494 |

| Instrumental Variable: |
|------------------------|
| Number of people that work in a particular household | 43,394* |

| Number of Observations | 2,075,104 |

*p < 0.05.*
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