Journal of International Development
J. Int. Dev. (2015)
Published online in Wiley Online Library
(wileyonlinelibrary.com) DOI: 10.1002/jid.3074

SELF-EMPLOYMENT AND QUEUES FOR WAGE WORK: EVIDENCE FROM CHILE

DANTE CONTRERAS[1], ROBERTO GILLMORE[2*] and ESTEBAN PUENTES[3]
[1]*Department of Economics, University of Chile, Santiago, Chile*
[2]*Economic Research Department, Central Bank of Chile, Santiago, Chile*
[3]*Departaments of Economics and Microdata Center, University of Chile, Santiago, Chile*

Abstract: Self-employment can be considered as either the result of a self-selection process or a reflection of rigidities and skill mismatch in the labour market or both. We estimate a double selection model where individuals queue for wage work instead of being self-employed in the first stage, followed by employers selecting from the queue in the second. We find statistical support for the double selection model, implying that some individuals are self-employed because they cannot find wage work, while other self-select to be self-employed. Individuals with higher education are more often chosen as wage workers, and belonging to an ethnic group decreases the likelihood of being chosen. Additionally, earnings equations suggest that high ability individuals perform better in both the wage work and self-employment sectors. Copyright © 2015 John Wiley & Sons, Ltd.

Keywords: Labour Markets; Self-Employment; Wage Work; Double Selection Model
JEL Classification: J24; J30; J31; J40; J42; J71

1 INTRODUCTION

There are several studies that try to model and explain why individuals chose self-employment over wage work. Self-employment, defined as being an own-account worker and without any employees, is associated with certain benefits compared with wage work, such as labour flexibility and not having to contribute to social security in Chile. At the same time, there are disadvantages in self-employment such as income variability and not having access to labour accident insurance, unions or unemployment insurance. Thus, being self-employed can be seen as the result of a maximisation utility process in which the worker quantifies the self-employment cost/benefit trade-off as better than that

*Correspondence to: Roberto Gillmore, Economic Research Department, Central Bank of Chile, Agustinas 1180, Santiago, Chile.
E-mail: rgillmore@bcentral.cl
This article represents only the opinions of their authors and do not necessarily reflect the opinion of the Board of the Central Bank of Chile.

of being wage earner. However, self-employment can also be seen as a default option for individuals who do not find wage work, left without any other choice but to work in an unregulated sector, lacking access to social security, and without paying taxes. Moreover, it could be the case that labour markets are heterogeneous and self-selected self-employed individuals coexist with those excluded from wage work (Maloney, 2004). In this paper, we investigate the extent of self-selection between self-employment and wage work.

The data for Chile reveal that male wage earners have an average monthly salary of CLP $410 362, while self-employed men earn CLP$306 579 (equivalent to US$807 and US $608, respectively).[1] Moreover, the self-employed tend to be older, less educated, more likely to belong to an ethnic group and to have had a parent who was self-employed. They also, not surprisingly, contribute less to social security. What explains these differences in earnings? On one hand, the models of Lewis (1954), Todaro (1969) and Harris and Todaro (1970) suggest the presence of segmented labour markets, where some individuals are left out in the modern wage sector and have to look for a job in the precarious self-employment sector. On the other hand, Roy (1951), Carneiro and Henley (2001) and Gong and van Soest (2002) argue that unobservable characteristics affect the choice of a particular sector; self-selection due to those characteristics may be compatible with wage differentials.

In order to study the presence of exclusion from wage work, several authors have tested for the presence of queues into the wage sector. The research for Latin America finds that some individuals queue for wage work in Mexico (Maloney, 1997), Nicaragua (Pisani & Pagán, (2003)) and Brazil (Soares, 2004). However, as Maloney (2004) discusses, evidence of queues does not imply extreme dual markets, as suggested by the Todaro model, but a more heterogeneous view where some individuals choose the informal or self-employment sector, while others are queuing for wage work. The presence of wage sector queuing can have several explanations. For example, Asea (1996) suggests that in developing economies, the informal sector is a consequence of market imperfections, creating queues for formal jobs; Soares (2004) argues that the queuing mechanism indicates the existence of rigidities in the labour market caused by excessive regulation.

In this paper, we study the degree of self-selection in the Chilean labour market. Chile presents an interesting case of wage work queues because despite the high growth during the past twenty years and important economic reforms, self-employment has been very stable over time, consistently averaging almost 20 per cent in the past 40 years (Puentes, Contreras, & Sanhueza, 2007).

We focus on independent workers who do not have employees, without making a distinction based on social security contributions. Using this definition, we depart from Maloney (2004) who focuses on 'owners of firms from 0 to 5 employees who are not covered by social benefits and have no more than a high school diploma'. We choose to focus on those who are self-employed individuals because we want to characterise self-employment as a whole, and while self-employed individuals could contribute to social security, that contribution does not immediately indicate that they are not queuing for wage work. In our sample, 24 per cent of the self-employed individuals contribute to social security, and those individuals could be queuing to wage work to take advantage of unemployment insurance, union protection or wage stability. Moreover,

[1]In November 2009, the average exchange rate was CLP$508 per US dollar.

DOI: 10.1002/jid

in our definition of wage work, we consider both formal and informal wage work, where formality is defined as having a signed contract. In our sample, 83 per cent of the wageworkers have a contract. Then, our comparison is between mainly informal self-employment and mainly formal wage work. In principle, we could expect that comparing total self-employment with total wage work, instead of using informal self-employment and formal wage work, could make it more difficult to find queues into wage work.[2]

In order to measure the degree of involuntary self-employment, we use the data from self-employed individuals who are willing to move to the wage sector. Of the total sample of workers from the 2009 CASEN Survey, 20.5 per cent are self-employed, and 65 per cent of those individuals would not like to work in the formal work market for the same earnings.[3] This is an indication that about one third of the self-employed have some interest to change to the wage sector and wage work queues.

To test the presence of queues into wage work, we estimate a double selection model. We follow Roy's (1951) self-selection model, where workers choose either the wage sector or self-employment; individuals who chose to become wage worker are called 'in the queue'. But we add another selection equation, because not all individuals who choose or queue for wage sector are hired. Some are not hired and do not actually become wage workers, and this is where the second selection appears. Individuals who are selected to become wage workers are called 'chosen from the queue'.

The estimation result indicates the correlation between the equations 'in the queue' and 'chosen from the queue' and is significant in statistical terms, which indicates the relevance of the double selection model and therefore of wage work queues. This result indicates that while self-selection is an important part of self-employment in Chile, about one third of the current self-employed individuals are queuing for wage work. Following Maloney (2004), our finding indicates that the Chilean labour market is heterogeneous, exhibiting voluntary and involuntary self-employment. This finding is even more relevant given that our definition of self-employment and wage work should make less likely to find queues for wage work.

From the double selection model, we estimate wage equations for each sector that correct for double selection. As expected, the wage equations suggest evidence that years of schooling are positively correlated with wages for both self-employment and wage work. Moreover, we find evidence of a mismatch of skill demand between workers and sectors. In the wage sector, an additional year primary schooling does not have any return on wages. Individuals with low education levels might not be hired in the wage sector because they are not productive enough, and they are consequently likely to be self-employed by queuing for wage work, obtaining a positive but low return to education of 3.7%.

Furthermore, we find evidence that, after controlling for observable factors, individuals who prefer to be in the queue for wage work earn not only a higher wage than the average

[2]We do not include employers in our specification because employers more clearly represent the business owners, who tend to be different than other self-employed individuals and who might more expose to exclusion from wage work. Earle and Sakova (2000) find statistical evidence that the self-employed without employees are different from employees. Similarly, de Mel *et al.* (2008) find important differences in ability, motivation and personality between self-employed (own-account workers) and employers.

[3]Maloney (2004) reports that 80 per cent of the self-employed individuals in Argentina and 62 per cent in Brazil do not want to change occupations.

DOI: 10.1002/jid

worker in the wage sector but also a higher income than the average worker in the self-employment sector. This result indicates that the Chilean labour market is consistent with a model of absolute advantages.

The remainder of this paper is organised as follows: the second section presents the model and estimation strategy, the third section details the data used, the fourth section shows the results and the fifth section concludes.

2 MODEL AND ESTIMATION

2.1 The Model

The Roy model indicates that individuals choose a sector according to an income maximising procedure. One of the important results of this self-selection process is that wage inequality is lower if individuals were randomly allocated to each sector. Thus, the long-term implications of wage work queues are greater inequality and economic efficiency loss.

The existence of queues could be the result of labour market regulations, which could negatively affect the likelihood that low skill individuals find wage work (Montenegro & Pagés, 2003). Another explanation is that employers do not value certain attributes or types of human capital. This could be the case of individuals with secondary education in Latin America who lack skills needed in the formal wage sector despite their schooling levels (Bassi & Urzúa, 2010).

The question then is as follows: do individuals choose self-employment to maximise earnings or are there queues for the wage sector? Several papers have tried to answer similar questions, for instance Pisani and Pagán (2003) for Nicaragua, Soares (2004) for Brazil and Puentes and Contreras (2009) for Chile. In the case of Nicaragua, the authors use two different definitions of informal work: one is working for a business with fewer than six employees and the other is not being enrolled in social security. Meanwhile, for Brazil and Chile, the studies compare informal work, measured as lack of written contract, with formal work. All of the authors find evidence of queues for formal jobs.[4]

We estimate the following model. In the first stage, the decision to become a wage worker is modelled by a latent variable I_{1i} as follows:[5]

$$d_{i1} = 1 \text{ if } I_{1i} = X_{1i}\beta_1 + u_{1i} > 0$$
$$d_{i1} = 0 \text{ if } I_{1i} = X_{1i}\beta_1 + u_{1i} \leq 0$$

The variable d_{i1} is an indicator that takes the value 1 if the individual decides to join the wage work queue and zero if not. This equation is normally known as being in the queue (IQ). X_{1i} is a vector of characteristics that influence the worker's decision to queue; β_1 is a vector of parameters; and u_{1i} captures idiosyncratic effects of omitted variables and unobserved heterogeneity. For instance, u_{1i} could capture a preference for wage work, risk aversion, or wage work versus self-employment abilities.

[4]The evidence for other developed economies is mixed. For instance, Earle and Sakova (2000) find evidence that some self-employment is due to the lack of opportunities in transitional economies in the 1990s, while Mohapatra *et al.* (2007) find that self-employment is highly productive in China.
[5]This model was developed and estimated by Poirier (1980) and Abowd and Farber (1982).

DOI: 10.1002/jid

The second part of the model is the probability of finding a job in the wage sector. One could think of this process as being selected from the queue by employers. This selection is modelled by a latent variable I_{2i} as follows:

$$d_{i2} = 1 \text{ if } I_{2i} = X_{2i}\beta_2 + u_{2i} > 0$$
$$d_{i2} = 0 \text{ if } I_{2i} = X_{2i}\beta_2 + u_{2i} \leq 0$$

The variable d_{i2} is an indicator that takes the value 1 if the queuing worker is hired and zero if not hired. This equation is often noted as being chosen from the queue (CFQ). X_{2i} is a vector of characteristics that influence the hiring decision of employers. β_2 is a vector of parameters, and u_{2i} is an idiosyncratic error that captures the effects of omitted variables and unobserved heterogeneity, such as wage work abilities observed by employer but not the econometrician.

The equations are related because there are non-observable characteristics (motivation, skills and non-observed productivity) that make some individuals more likely to be in and at the same time being CFQ. If the correlation between the unobserved factors ρ is negative, it implies that individuals with higher unobservable factor u_{1i}, which makes them more likely to be IQ, tend to have a lower u_{2i} and then are less likely CFQ. A positive correlation implies that individuals who are more likely to be IQ because of a high u_{1i} are also more likely to be selected from the queue because they tend to have a higher u_{2i}. A negative correlation might occur if individuals tend to prefer wage work because of its access to a stable income or to unemployment insurance, but also have lower levels of abilities valued by employers and consequently have a lower probability of being selected. A positive correlation could occur if individuals with a higher motivation or preference for wage work are at the same time more productive in the wage sector and thus more likely to be selected.

It is important to note that we cannot observe the complete hiring process made by firms or the application process made by workers, so, as in the case of the original Roy model, this is a hypothetical model that we test using the available data.

We also estimate the wage equations for the two sectors, controlling for the double selection mentioned previously. For the wage earners, the wage equation is as follows:

$$W_{ai} = Z_{ai}\delta_a + v_{ai}$$

In the self-employment sector, there are two types of workers: those who choose to be self-employed and thus did not queue and those who queued but were not chosen and thus excluded from the wage sector. Therefore, the two wage equations for both types of workers are as follows:

$$W_{cp1i} = Z_{cp1i}\delta_{cp1} + v_{cp1i}$$
$$W_{cp2i} = Z_{cp2i}\delta_{cp2} + v_{cp2i}$$

where W_{ai}, W_{cp1i} and W_{cp2i} are the logs of the hourly earnings for wage work,[6] self-employed who are queuing and self-employed individuals who do not queue, respectively. Z_{ai}, Z_{cp1i} and Z_{cp2i} are the vectors of characteristics; δ_a, δ_{cp1} and δ_{cp2} are the earnings

[6]The hourly wage is calculated as the relation between primary job salary and the hours worked monthly. In the case of wage work, income is based on the question 'income received last month', and in the case of self-employment, the questions are 'how much money did you withdraw from your business the past month to pay for your own expenses or your household expenditures (include your salary if paid)' and 'calculate the value of products from your business that were used as home consumption'. The question for work hours is as follows: 'How many hours of work did you work in your principal occupation? (hours per week).' We calculate the monthly hours worked based on the assumption that reported weekly hours are consistent over time.

DOI: 10.1002/jid

parameters. Additionally, v_a, v_{cp1} and v_{cp2} are unobservable factors that affect wages such as ability, persistence or social networks.

The earning equations have to be estimated, correcting for selection. The model indicates that it could be the case that $E(v_{ai} \mid Z_{ai}) \neq 0$ in the wage sector, because only individuals who queued and were chosen end up in the wage sector. So the correlation between v_{ai} and Z_{ai} will be different from zero, working through the correlation between u_{1i} and u_{2i} with v_{ai}. Thus, the estimators are biassed to the extent that $E(v_{ai} \mid Z_{ai}, I_1 > 0, I_2 > 0) \neq 0$.

For the self-employment sector, there are two types of workers: those who did not queue and those who unsuccessfully queued. In these two cases, we could have that $E(v_{cp1i} \mid Z_{cp1i}, I_1 > 0, I_2 < 0) \neq 0$ and $E(v_{cp2i} \mid Z_{cp2i}, I_1 < 0) \neq 0$.

2.2 Estimation

The estimation of the previous model is done in two stages. The first stage involves the estimation of decisions d_1 and d_2 simultaneously. The second stage estimates the income equations correcting for the double selection of the first stage. The methodology we use is a modified Heckman two-stage estimation proposed by Tunali (1985). We assume that the stochastic terms (v_j, u_1, u_2) are normally distributed with a zero mean and the following variance covariance matrix:

$$\Sigma_j = \begin{bmatrix} \sigma^2_{vj} & \sigma_{vju_1} & \sigma_{vju_2} \\ & \sigma^2_{u_1} & \sigma_{u_1u_2} \\ & & \sigma^2_{u_2} \end{bmatrix}$$

where, j = (a, $cp1$, $cp2$). Additionally, we will assume that $\sigma^2_{u_1}$ and $\sigma^2_{u_2}$ are equal to one.

In the first stage, we estimate a probit model with selection or heckprob. To identify the parameters of the model, we need an exclusion variable that affects the queuing decision but does not affect the probability of being hired (or vice versa).[7]

Assuming that u_1 and u_2 follow a bivariate normal distribution with variances equal to one and correlation ρ, the maximum likelihood function of being IQ and being CFQ equations is as follows:

$$L = \Pi_{I_1>0, I_2>0} \Phi_2(X_1\beta_1, X_2\beta_2; \rho) \Pi_{I_1>0, I_2\leq 0} \Phi_2(X_1\beta_1, -X_2\beta_2; -\rho) \Pi_{I_1\leq 0} \Phi_2(-X_1\beta_1)$$

where Φ_2 and Φ are the bivariate and univariate cumulative normal distributions, respectively.

Based on the results of the probit with selection, the following probabilities can be calculated as follows: (a) probability of being in the wage sector; (b) probability of queuing for wage work; (c) probability on being selected for wage work conditional on queuing; and (d) the queue length:

$$\begin{aligned} &\text{a) } Pr(I_1 > 0, I_2 > 0) = \Phi_2(X_1\beta_1, X_2\beta_2; \rho) \\ &\text{b) } Pr(I_1 > 0) \qquad\quad = \Phi(X_1\beta_1) \\ &\text{c) } Pr(I_2 > 0 \mid I_1 > 0) = \Phi_2(X_1\beta_1, X_2\beta_2; \rho) / \Phi(X_1\beta_1) \\ &\text{d) } Q = \frac{N}{\Sigma_{i=1}^{N} \Phi_2(X_1\beta_1, X_2\beta_2; \rho) / \Phi(X_1\beta_1)} \end{aligned}$$

We calculate marginal effects using these probabilities.

[7]We discuss the exclusion variables in the following section.

DOI: 10.1002/jid

In the case of the wage equations, we need to include the expectations of the error terms conditional on being in each sector. Following Tunali (1985), the correction terms are as follows: for wage workers, we have that $E(v_{ai} \mid Z_{ai}, I_{1i} > 0, I_{2i} > 0) = \sigma_{1a}\lambda_{1ai} + \sigma_{2a}\lambda_{2ai}$, where

$$\lambda_{1ai} = \frac{\Phi(X_{1i}\beta_1)\Phi\left[X_{2i}\beta_2 - \rho X_{1i}\beta_1/\sqrt{1-\rho^2}\right]}{\Phi_2(X_{1i}\beta_1, X_{2i}\beta_2; \rho)}$$

and

$$\lambda_{2ai} = \frac{\Phi(X_{2i}\beta_2)\Phi\left[X_{1i}\beta_1 - \rho X_{2i}\beta_2/\sqrt{1-\rho^2}\right]}{\Phi_2(X_{1i}\beta_1, X_{2i}\beta_2; \rho)}$$

and σ_{1a} and σ_{2a} are the respective covariance terms between the wage work error term and the error terms of being IQ and being CFQ.

The correction terms for self-employment wages of individuals who prefer to be wage workers but are not chosen are as follows: $E(v_{cp1i} \mid Z_{cp1i}, I_{1i} > 0, I_{2i} \leq 0) = \sigma_{3cp1i}\lambda_{3cp1i} + \sigma_{4cp1}\lambda_{4cp1i}$, where

$$\lambda_{3cp1i} = \frac{\Phi(X_{1i}\beta_1)\Phi\left[-(X_{2i}\beta_2 - \rho X_{1i}\beta_1)/\sqrt{1-\rho^2}\right]}{\Phi_2(X_{1i}\beta_1, -X_{2i}\beta_2; -\rho)}$$

and

$$\lambda_{4cp1i} = \frac{-\Phi(X_{2i}\beta_2)\Phi\left[X_{1i}\beta_1 - \rho X_{2i}\beta_2/\sqrt{1-\rho^2}\right]}{\Phi_2(X_{1i}\beta_1, -X_{2i}\beta_2; -\rho)}$$

where σ_{3cp1i} and σ_{4cp1i} are the covariance between the error term of the wage equation and the error terms of being IQ and being CQF, respectively.

The last correction term is for self-employment wage in the case of individuals who prefer self-employment to wage work and who are not in the queue: $E(v_{cp2i} \mid I_{1i} \leq 0) = \sigma_{5cp2}\lambda_{5cp2i}$, where

$$\lambda_{5cp2i} = \frac{-\phi(X_{1i}\beta_1)}{1 - \Phi(X_{1i}\beta_1)}$$

and σ_{5cp2} is the correlation between the error term in the earnings equation in the self-employment sector and the error term of the decision to queue.

The estimation of the wage equation allows us to recover five covariance terms $\sigma_{1a}, \sigma_{2a}, \sigma_{3cp1}, \sigma_{4cp1}$ and σ_{5cp2}. These covariates are informative about the relationship between the unobserved factors considered by employers and unobserved productivity factors in the wage equation and, at the same time, the existence of comparative or absolute advantages in the labour market. For instance, if σ_{1a} is positive, it would indicate that workers who are more productive in the wage sector tend to prefer the wage sector. That is, workers that are more likely to be IQ would earn higher earnings than the average individual in the wage sector. Similarly, if σ_{2a} is positive, it indicates that those workers who are more likely to be selected also earn a higher wage than the wage sector average. In the case that σ_{1a} was negative, it would imply that individuals who prefer wage work are, on average, less productive in the wage sector. Meanwhile, a negative σ_{2a} indicates that employers are more likely to select individuals who are less productive than the average worker that is consistent, with employers minimising costs.

DOI: 10.1002/jid

Covariance terms would provide evidence of a labour market of absolute advantages if $\sigma_{1a} > 0$, $\sigma_{3cp1} > 0$ and $\sigma_{5cp2} > 0$. In this case, individuals who are more likely to prefer wage work (IQ) are more productive than the average in both the wage and self-employment sectors. On the contrary, if we find that $\sigma_{1a} > 0$ and $\sigma_{3cp1} < 0$ or $\sigma_{1a} > 0$ and $\sigma_{5cp2} < 0$, there would be evidence of a comparative advantage labour market, where, for instance, individuals with higher propensity choosing wage work perform better in the wage sector than the average worker but in the self-employment sector would perform worse than the average.

3 DATA DESCRIPTION AND VARIABLE DEFINITIONS

One important difference of our paper compared with the rest of the literature is that we focus on self-employment and wage work. The focus of the previous research has been on whether 'informal' workers queue for jobs in the 'formal' sector. Moreover, informality has not been uniformly defined across papers. For instance, Maloney (1997) defines informal workers as 'owners and workers in firms under 16 employees who do not have social security or medical benefits and are therefore not protected', while Maloney (2004) redefines informal workers as 'those males who are self-employed or owners of unregistered microenterprises with less than five employees' and calls them the 'informal self-employed'. Sometimes, the literature uses the term 'wage work informality' to refer to wage workers without a signed contract (Soares, 2004). We partially follow Maloney's (2004) definition but focus our attention on self-employment without making a distinction on whether they contribute or not to social security. At the same time, we compare self-employment with wage work, which also includes formal (with a signed contract) and informal (without a signed contract) workers. We compare all self-employed with all wage workers for three reasons. First, the evidence for queues in Latin America is mostly for 'informal wage work'; thus, it is important to study the presence of queues in the self-employed sector. Second, even those self-employed individuals contributing to social security could be queuing for wage work to get access to more benefits, such as union protection, employment insurance or collective bargaining of health insurance. Third, contributing to social security, which has also used in the literature, is highly correlated with our occupational distinction: 24 per cent of self-employed individuals contribute to social security.[8] Because we are focusing on total self-employment and not only on 'informal' self-employment, the likelihood of finding a queue for wage work decreases because we would expect 'formal' self-employed individuals to be less interested in changing occupations.

An important part of the literature on small entrepreneurship and self-selection has focused on the possibility that some individuals could be excluded from small entrepreneurship and self-employment because of financial restrictions (e.g. Evans & Jovanovic (1989); Evans & Leighton (1989); Holtz-Eakin, Joulfaian, & Rosen (1994); Lindh & Ohlsson (1996); Blanchflower & Oswald (1998); and Paulson & Townsend (2004)). With this type of exclusion, there would be one queue for wage work and also one for self-employment. In principle, this type of restriction should not be relevant for our paper because we focus on self-employed individuals that do not have employees, reducing the importance of start-up capital. Additionally, the data we use in this paper

[8]We cannot estimate a model of queuing for formal wage work because the question that allows us to measure wage work queues was only asked of independent workers.

DOI: 10.1002/jid

do not include the information about the lack of financial access, which would allow us to test that exclusion restriction to become self-employed.

In this paper, we use the 2009 CASEN survey. It is nationally representative and is used to calculate the Chile's official poverty rate.[9] The 2009 version has information for over 240 000 individuals and contains 14 different modules that collect information about employment, income, health and education. The 2009 sample was geographically stratified into 602 regions.[10] It contains a weighting factor that we use throughout the paper, which makes the sample representative at the regional level.

CASEN asks for current occupation. Of the individuals who answer this question, those that are blue-collar or white-collar workers in the private or public sector are labelled as wage workers, while individuals who answer that they are self-employed and do not hire employees are labelled as self-employed.

The 2009 CASEN collects information about individuals who want a job in the wage sector but who are currently self-employed. The question is as follows: 'For the same income? Will you be willing to work in a firm (as a dependent/salaried worker)?'[11] Those who answer no are labelled as not in the queue (NIQ). Answering no indicates that the individual is not willing to give up being self-employed. That is, they are not in the wage work queue. However, it could be the case that some of these individuals unsuccessfully queued at some point and thus could not be considered truly NIQ. Unfortunately, the data on former queues are not available, so we cannot refine the definition. We consider those who say yes as IQ because they are interested in moving into the wage sector for the same income.[12] However, the question incompletely measures the degree of queuing. Among other things, the question does not specify if the considered wage is before or after social security contributions; in the case individuals assumed that the wage offered was before social security contributions, they are not actually comparing the exact same income. Despite the shortcomings of this question, it identifies individuals who would for some reason prefer the wage sector to self-employment at a similar income. To complete the model, individuals who are currently wage workers are labelled as CFQ.

We estimate the model using the sample of men who report either being the head of household or the spouse of the head of the household, are between 23 and 60 years old[13] and have reported their hours worked per week and their main source of income.[14] We restrict our sample to men because they are a more homogenous group of workers than women are. As mentioned by Panos, Pouliakas, and Zangelidis (2014), women's labour supply is more elastic with respect to family events and to labour market conditions. Women also tend to change jobs and leave the labour market more often than men, which can be explained by expected gender roles in a given society.[15] We do not restrict the estimation to full-time workers because the decision

[9]CASEN has been conducted in the following years: 1987, 1990, 1992, 1994, 1996, 1998, 2000, 2003, 2006, 2009 and 2011.

[10]Sections are built from administrative (municipality) and geographic (urban/rural) information.

[11]This question was only asked in the 2009 CASEN.

[12]We include the individuals who answered 'do not know' as saying yes. This allows us to single out the individuals who are not in the queue (8 per cent of the self-employed individuals answered 'do not know').

[13]The age restriction allows us to avoid contaminating the work decision with education and retirement decisions.

[14]The percentages who declare either earnings or hours of work are the following: 89, 81 and 84 per cent of wage earners, self-employment being not in the queue (NIQ) and being in the queue, respectively. The higher rate of non-respondents in the NIQ category is consistent with higher job dissatisfaction. Because a greater proportion of NIQ cases are dropped, we would expect that it would be more difficult to find wage work queues.

[15]In the case of Chile, Contreras and Plaza (2010) find that female labour force participation is affected by gender views, while gender roles do not affect male labour force participation.

DOI: 10.1002/jid

Table 1. Descriptive statistics

Variables	Mean	SD	Definition
Dependent variables			
Wage	388 997.20	480 679.20	Monthly salary
Hours	199.85	57.99	Hours worked in the month
Hourly wage	2210.00	3618.07	Hourly wage
Self-employed	20.59%	40.43%	Percentage of self-employed
Switchers self-employed	35.23%	47.77%	Percentage of switchers self-employed
Permanent work	78.11%	41.35%	Percentage of permanent work
Social Security System	70.72%	45.50%	1 if contributes to Social Security System, 0 otherwise
Independent variables			
Age	42.83	9.72	Age
Partner	89.00%	31.29%	1 has partner, 0 otherwise
Urban	86.11%	34.58%	1 lives in urban place, 0 otherwise
Ethnicity	6.85%	25.26%	1 belongs to ethnicity, 0 otherwise
School years	10.98	3.92	Number of school years
Without education	1.57%	12.43%	1 has no education, 0 otherwise
Primary	26.30%	44.03%	1 has some primary education, 0 otherwise
Incomplete secondary	14.60%	35.31%	1 has incomplete secondary education, 0 otherwise
Secondary	34.49%	47.53%	1 has complete secondary education, 0 otherwise
College	23.04%	42.11%	1 has some college education, 0 otherwise
Tenure	7.64	9.09	Number of years in the actual job
North	33.50%	47.20	1 lives in the north, 0 otherwise
Centre	12.07%	32.58%	1 lives in the central region, 0 otherwise
South	14.09%	34.79%	1 lives in the south, 0 otherwise
Metropolitan region	40.34%	49.06%	1 lives in the metropolitan region, 0 otherwise
Non-labour income	9501.91	39 038.23	Per capita total non-labour income of the household (in thousand Chilean Pesos, exchange rate US$1 = CLP$490)
Number of children under 6 years old	0.31	0.56	Number of children less than 6 years old
Number of children between 7 and 17 years old	0.79	0.90	Number of children less than 17 years old
Older people	0.07	0.28	Number of old people more than 70 years old
Own house	42.87%	49.49%	1 own house, 0 otherwise
Rooms	6.08	1.83	Number of rooms in the house
Household head	90.25%	29.67%	1 if is household head, 0 otherwise
Self-employed father	21.07%	40.785	1 self-employed father before he was 15 years old, 0 otherwise
Mother works	32.85%	46.97%	1 mother worked before he was 15 years old, 0 otherwise
Mother without education	11.96%	32.45%	1 mother has no education, 0 otherwise
Mother primary	34.32%	47.48%	1 mother has some primary education, 0 otherwise
Mother secondary	20.48%	40.35%	1 mother has some secondary education, 0 otherwise

(*Continues*)

DOI: 10.1002/jid

Table 1. (Continued)

Variables	Mean	SD	Definition
Mother college	3.96%	19.50%	1 mother has some tertiary education, 0 otherwise
Father without education	11.19%	31.52%	1 father has no education, 0 otherwise
Father primary	30.77%	46.15%	1 father has some primary education, 0 otherwise
Father secondary	20.22%	40.17%	1 father has some secondary education, 0 otherwise
Father college	5.56%	22.92%	1 father has some tertiary education, 0 otherwise
Agriculture	14.41%	35.12%	1 if works in agriculture sector, 0 otherwise
Mining	3.74%	18.97%	1 if works in mining sector, 0 otherwise
Manufacturing	12.64%	33.235	1 if works in manufacturing sector, 0 otherwise
Electricity	1.08%	10.325	1 if works in electricity sector, 0 otherwise
Construction	14.44%	35.15%	1 if works in construction sector, 0 otherwise
Trade	15.13%	35.84%	1 if works in trade sector, 0 otherwise
Transport	11.62%	32.05%	1 if works in transport sector, 0 otherwise
Financial	8.99%	28.61%	1 if works in financial sector, 0 otherwise
Other services	16.95%	37.52%	1 if works in social sector, 0 otherwise

SD, standard deviation.
Note: Male household heads or spouses of household heads between 23 and 60 years old.

to queue could be more relevant for part-time, self-employed workers. Table 1 shows that self-employment was 20.6 per cent of the sample with 35 per cent of those respondents saying they would like to switch to paid employment. Interestingly, 21 per cent of the sample had a father that was self-employed when the interviewers were 15 years of age, which may show that self-employment rates have been consistent over time. Of the sample, 71 per cent contributed to social security and 7 per cent belongs to an ethnic group. The average educational amount is 10 years.

Table 2 shows the descriptive statistics by type of worker: wage, self-employed NIQ and self-employed IQ. According to our model, we should expect that IQ workers are less productive than their NIQ counterparts, because NIQ individuals voluntarily choose their sector while IQ individuals are there by default. Among other characteristics, NIQ workers should have higher human capital, better family backgrounds, lower contributions to social security (more informality) and higher wages. The statistics from Table 2 are consistent with these assumptions. For instance, hourly and monthly incomes are statistically higher for NIQ compared with IQ individuals. Interestingly, despite the fact that average income is statistically higher for wage workers compared with both self-employed groups, the hourly wage is statistically similar between wage workers and self-employed NIQ, suggesting than individuals who do not want to switch jobs are self-selecting into self-employment, while individuals who do want to switch to wage work might be there

DOI: 10.1002/jid

Table 2. Descriptive statistics by type of worker

	Wage earners	Self-employed IQ	Self-employed NIQ	Mean difference test		
Variables	Mean	Mean	Mean	Test A	Test B	Test C
Dependent variables						
Wage	410 362.3	248 598.7	338 109.3	161 763.6***	72 253***	−89 510.6***
Hours	200.6	191.8	199.9	8.79***	0.64	−8.15*
Hourly wage	2281.6	1599.1	2115.8	682.49***	165.76	−516.73***
Permanent work	80.34%	58.15%	75.65%	0.22***	0.05***	−0.17***
Social Security System	82.70%	20.01%	26.95%	0.63***	0.56***	−0.07***
Independent variables						
Age	42.07	44.44	46.46	−2.36***	−4.39***	−2.02***
Partner	89.60%	89.72%	85.01%	0.00	0.05***	0.05***
Urban	86.80%	84.39%	82.97%	0.02***	0.04***	0.01
Ethnicity	5.92%	11.94%	9.67%	−0.06***	−0.04***	0.02
School years	11.20	9.89	10.28	1.31***	0.92***	−0.39**
Without education	1.44%	2.15%	2.01%	−0.01	−0.01	0.00
Primary	24.22%	36.00%	33.40%	−0.12***	−0.09***	0.03
Incomplete secondary	14.08%	17.95%	15.86%	−0.04***	−0.02*	0.02
Secondary	35.77%	29.88%	29.36%	0.06***	0.06***	0.01
College	24.48%	14.01%	19.37%	0.10***	0.05***	−0.05**
Tenure	6.55	10.00	12.85	−3.45***	−6.29***	−2.84***
North	12.07%	12.54%	11.79%	0.00	0.00	0.01
Centre	34.68%	27.65%	29.61%	0.07***	0.05***	−0.02
South	12.69%	21.29%	18.55%	−0.09***	−0.06***	0.03*
Metropolitan region	40.56%	38.52%	40.05%	0.02	0.01	−0.02
Non-labour income	8843.90	9762.06	13 279.15	−918.16	−4435.25***	−3517.09**
Number of children under 6 years old	0.32	0.27	0.22	0.05**	0.10***	0.05**
Number of children between 7 and 17 years old	0.80	0.81	0.70	−0.01	0.10***	0.11**
Older people	0.07	0.07	0.09	0.00	−0.02	−0.02
Own house	41.08%	48.56%	50.46%	−0.07***	−0.09***	−0.02
Rooms	6.09	5.80	6.19	0.29***	−0.10	−0.39***
Household head	90.45%	89.03%	89.69%	0.01	0.01	−0.01
Self-employed father	18.48%	31.83%	30.63%	−0.13***	−0.12***	0.01
Mother works	32.83%	33.62%	32.55%	−0.01	0.00	0.01
Mother without education	11.29%	15.16%	14.26%	−0.04***	−0.03***	0.01
Mother primary	33.37%	37.28%	38.35%	−0.04**	−0.05***	−0.01
Mother secondary	21.52%	15.24%	17.08%	0.06***	0.04***	−0.02
Mother college	4.03%	2.80%	4.16%	0.01	0.00	−0.01
Father without education	10.70%	13.16%	13.01%	−0.02**	−0.02***	0.00
Father primary	29.75%	34.02%	35.09%	−0.04**	−0.05***	−0.01
Father secondary	20.95%	16.18%	18.10%	0.05***	0.03	−0.02
Father college	5.66%	4.45%	5.54%	0.01	0.00	−0.01
Agriculture	14.22%	14.59%	15.49%	0.00	−0.01	−0.01
Mining	4.52%	0.36%	0.89%	0.04***	0.04***	−0.01***

(*Continues*)

DOI: 10.1002/jid

Table 2. (Continued)

	Wage earners	Self-employed IQ	Self-employed NIQ	Mean difference test		
Variables	Mean	Mean	Mean	Test A	Test B	Test C
Manufacturing	13.65%	8.58%	8.84%	0.05***	0.05***	0.00
Electricity	1.31%	0.01%	0.27%	0.01***	0.01***	0.00*
Construction	13.86%	22.90%	13.26%	−0.09***	0.01	0.10***
Trade	12.85%	19.52%	26.36%	−0.07***	−0.14***	−0.07***
Transport	11.28%	12.43%	13.22%	−0.01	−0.02*	−0.01
Financial	9.27%	5.83%	9.05%	0.03***	0.00	−0.03
Observations	24 806	2638	4830			

IQ, in the queue; NIQ, not in the queue.
Source: CASEN 2009.
Note: Male household heads or spouses of household heads between 23 and 60 years of age. Test A corresponds to mean test differences between wage earners and self-employed IQ group. Test B corresponds to mean test differences between wage earners and self-employed NIQ group. Test C corresponds to mean test differences between self-employed IQ and self-employed NIQ group. Significant at
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.

involuntarily because they are earning, on average, 70 per cent of the salary workers' hourly wages. These income differences are not only for average income; the whole distribution differs. In Figure 1, we observe that IQ individuals have an income distribution to the right of the NIQ ones that is consistent with the structural differences between these two groups. The hours of work also differ by occupation; Table 2 shows that IQ individuals work fewer hours than other employed individuals. This heterogeneity also indicates that IQ workers are different than NIQ workers. Additionally, NIQ workers tend to contribute more often to social security than IQ, which again suggests that these two types of self-employment could have important differences. IQ individuals also have less schooling and lower 'other household income' than NIQ ones; however, both groups have similar parental characteristics. In terms of the type of work, the 20 per cent of wage employment jobs are not permanent[16] against the 42 per cent of IQ and 24 per cent of self-employed NIQ workers. Again, these figures indicate that being IQ is related to less desirable jobs. Also, a higher percentage of the self-employment workers are in the construction and trade industrial sector. On the other hand, we found that wage earners are more likely to be employed in mining, manufacturing and other service industrial sectors.

As mentioned in Section 3, exclusion restrictions are needed to identify the model's parameters. In the case of the probit with selection, following Pisani and Pagán (2003) and Soares (2004), we assume that household characteristics could affect the probability of preferring wage work to self-employment, affecting the IQ equation, but household characteristics are not observed by employers and thus do not affect the selection from the queue. These variables include the following: the number of children and elderly people in the household, being head of the household and the income of the other household members. We also include the family background measures, such as parent's education and occupation, as exclusion variables.

[16]Temporary, occasional or fixed-term jobs.

DOI: 10.1002/jid

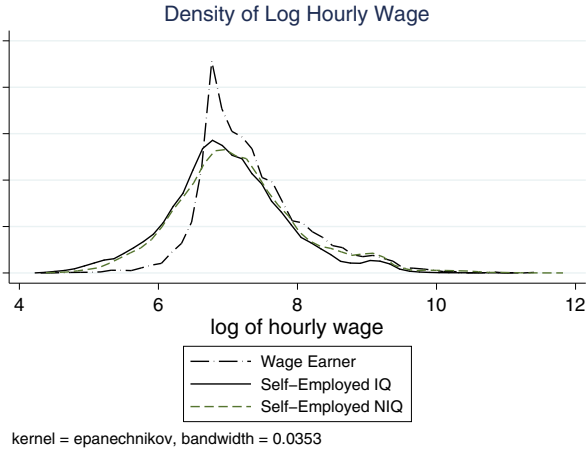

Figure 1. Hourly wage density by type of worker

Household characteristics can affect the willingness to work as wage worker in different ways. For instance, fathers might prefer a wage job because it provides more stable earnings than self-employment. Overall, household income can affect the urgency to find a job or the probability of accepting riskier (in terms of income) jobs, while, at the same time, higher household income can facilitate starting a business. Parental education is a measure of intergenerational transfer of skills and captures resources available at home during childhood. We also include whether the worker's father was self-employed when the individual was 15-years old, which serves as a proxy for career role model or family business ownership. In the CFQ equation, we only include the variables that capture labour costs and productivity that could be observed by employers, for example age, age squared, marital status, educational attainment and residency geographical zone. We also include variables that are related to potential discrimination in the wage sector such as ethnicity. Industrial dummies are included as control for labour demand.[17] Geographic dummies are also included in both equations.[18]

The exclusion restrictions are chosen following the previous literature, but additional observational and statistical justifications can be made. In Table 3, we show the correlation between the dependent variables and the IQ and CFQ variables; we would expect that the exclusion variables to be more correlated with being IQ than CFQ, that is, the case for most household characteristics, such as the number of children, the number of adults, other household income and owing a house, which are more correlated with the IQ than the CFQ variable. Only being the head of the household is more highly correlated with being

[17]Industries are based on International Standard Industrial Classification of All Economic Activities Rev. 2 and 3 reported in CASEN 2009. They are as follows: agriculture, hunting and forestry and fishing (agriculture); mining and quarrying (mining); manufacturing industry (manufacturing); electricity, gas and water supply (electricity); construction (construction); wholesale and retail trade, and restaurants and hotels (trade); transport, storage and communications (transport); financing, insurance, real estate and business services (finance); and community, social and personal services (other services).

[18]Chile's regions are the superior territorial divisions. We group into four zones: the north zone (north) corresponds to the I, II, III, IV and XIV regions; centre zone (centre) is the V, VI and VII regions; south zone (south) is the VIII, IX, X, XV, XI and XII regions; and Metropolitan, which is the base geographic category, is the defined Metropolitan Region.

DOI: 10.1002/jid

Table 3. Correlations between main variables and explanatory variables

Correlation	IQ	CFQ	College	Self-employed father	Non-labour income	Father primary
Age	−0.146***	−0.067***	−0.091***	0.007	0.076***	0.003
Partner	0.050***	−0.001	−0.081***	0.001	−0.064***	0.022***
Urban	0.036***	0.020***	0.155***	−0.048***	0.014**	−0.057***
Primary	−0.063***	−0.075***	−0.327***	0.047***	−0.04***	0.038***
Incomplete secondary	−0.014**	−0.031***	−0.226***	−0.001	−0.03***	0.044***
Secondary	0.042***	0.034***	−0.397***	−0.023***	−0.024***	0.040***
College	0.034***	0.068***		−0.021***	0.095***	−0.116***
School years	0.070***	0.093***	0.706***	−0.04***	0.083***	−0.071***
Tenure	−0.225***	−0.113***	0.006	0.047***	0.027***	0.025***
Ethnicity	−0.044***	−0.068***	−0.079***	0.091***	−0.01*	0.027***
North	0.003	−0.004	−0.038***	−0.011*	−0.008	−0.016***
Centre	0.032***	0.041***	−0.093***	−0.046***	−0.018***	0.003
South	−0.050***	−0.070***	−0.083***	0.129***	0.007	0.068***
Metropolitan region	0.002	0.012*	0.173***	−0.04***	0.018***	−0.040***
Number of children under 6 years old	0.060***	−0.002	0.044***	−0.003	−0.04***	−0.004
Number of children between 7 and 17 years old	0.038***	−0.007	−0.052***	−0.02***	−0.062***	0.012**
Non-labour income	−0.038***	0.025***	0.095***	−0.016***		−0.020***
Older people	−0.026***	−0.002	0.003	−0.025***	0.161***	0.012**
Own House	−0.060***	−0.04***	−0.156***	0.018***	0.051***	0.038***
Rooms	−0.023***	0.044***	0.313***	−0.013**	0.161***	−0.058***
Household head	0.007	0.013**	0.013**	0.017***	−0.011*	0.057***
Self-employed father	−0.092***	−0.093***	−0.021***		−0.016***	0.094***
Mother works	0.002	−0.005	0.121***	0.078***	0.024***	−0.044***
Mother primary	−0.033***	−0.023***	−0.112***	0.07***	−0.01*	0.638***
Mother secondary	0.033***	0.043***	0.286***	−0.039***	0.011*	−0.209***
Mother college	−0.004	0.018***	0.309***	−0.015***	0.071***	−0.098***
Father primary	−0.037***	−0.026***	−0.116***	0.094***	−0.02***	
Father secondary	0.021***	0.033***	0.241***	−0.026***	0.016***	−0.336***
Father college	0	0.015**	0.354***	−0.039***	0.08***	−0.162***
Agriculture	−0.012**	−0.003	−0.174***	0.047***	−0.017***	0.034***
Mining	0.058***	0.058***	0.011*	−0.011**	−0.012**	−0.004
Manufacture	0.045***	0.041***	−0.033***	−0.03***	−0.014**	−0.002
Electricity	0.031***	0.0330***	0.011**	−0.013**	−0.009	0.007
Building	0.013**	−0.071***	−0.114***	0.014**	−0.026***	0.036***
Trade	−0.123***	−0.054***	−0.037***	0.004	−0.003	0.013**
Transport	−0.020***	−0.010*	−0.035***	−0.007	0	−0.006
Financial	0	0.033***	0.178***	−0.017***	0.065***	−0.062***
Other services	0.050***	0.023***	0.214***	−0.005	0.014**	−0.019***
N	32 274	27 444	32 274	32 274	32 274	32 274

IQ, in the queue; CFQ, chosen from the queue.
Source: CASEN 2009.
Note: Male household heads or spouses of household heads between 23 and 60 years old. Correlations significant at
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.

DOI: 10.1002/jid

CFQ than being IQ. This result shows the plausibility of using these variables as excluded variables. In the case of family background characteristics, we find that parental education variables are more highly correlated with being CFQ than being IQ; however, it is unlikely that employers observe these characteristics. We also include the correlations with father primary, non-labour income, father self-employed and college (own education). Table 3 shows that self-employed fathers usually have only primary-level education and to be married to women who only have primary-level education and to be in the workforce. Also, self-employed fathers tend to have children that only complete primary education. Non-labour income is lower when the men does not have a partner, and increases with age, while men with a college degree are younger than average and were more likely to have working mothers when they were 15 years of age.

We include the following in the earnings equation: age, schooling, tenure, ethnicity, rural sector and other geographical and industrial variables. Age measures the life cycle profile of earnings while tenure is the number of years in their current job and measures the specific job knowledge. To study if the effect of one additional year of schooling varies by educational level, we define three dummy variables: $D_1 = 1$ if the individual has any schooling, zero otherwise; $D_2 = 1$ if the individual has more than 8 years of schooling, zero otherwise;[19] and $D_3 = 1$ if the individual has more than 12 years of schooling. Each of these variables is multiplied by a different schooling variable so that we can obtain a different return for each educational level. In the case of primary education, we multiply $D_1 = 1$ with the years of schooling ($D_1 * S$), in the case of D_2, we multiply it with the years of schooling minus 8 ($D_2 * (S - 8)$) and finally, D_3 is multiplied by the years of schooling minus 12 ($D_3 * (S - 12)$). These three multiplicative variables are included in the wage equations, so the returns for primary school are equal to the coefficient of ($D_1 * S$), the returns from secondary are equal to the sum of the return to primary plus the coefficient of ($D_2 * (S - 8)$) and finally, the returns for tertiary education are equal to the return of secondary plus the coefficient of ($D_3 * (S - 12)$). Ethnicity approximates the differences in human capital accumulation and potential discrimination in the labour market. Industrial variables approximate labour demand characteristics, and rural and geographical variables measure price and wage rate differences.

4 RESULTS

4.1 Selection Models: Double and Simple Selection

First, we estimate a simple choice model for the decision between choosing a wage job and being self-employed by using a univariate probit. We then compare the probit with the double selection model.

In Table 4, the probit model indicates that having completed at least secondary education increases the probability of being a salaried worker. Household characteristics are important; having a partner and being the head of a household increase the probability of being a wage worker. This may be related to individuals looking for greater income stability when having a family. At the same time, as the incomes of other household members increase, the likelihood of individuals becoming wage workers decreases, which could indicate that the households pool risk or that a higher income allows for starting a

[19] In Chile, primary education lasts 8 years.

DOI: 10.1002/jid

Table 4. Probit model with sample selection and probit estimation for sector choice

Variables	Bivariate probit with sample selection				Probit	
	CFQ		IQ		*Pr* (wage earner)	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Age	−0.031	(0.022)	−0.039**	(0.018)	−0.047***	(0.017)
Age squared/100	0.027	(0.025)	0.016	(0.021)	0.026	(0.020)
Partner (=1)	−0.003	(0.057)	0.294***	(0.065)	0.231***	(0.058)
Urban (=1)	0.027	(0.036)	0.088**	(0.036)	0.119***	(0.036)
Primary (=1)	0.022	(0.121)	−0.027	(0.106)	−0.022	(0.097)
Incomplete secondary (=1)	0.081	(0.126)	0.010	(0.109)	0.050	(0.101)
Complete secondary (=1)	0.211*	(0.125)	0.107	(0.112)	0.178*	(0.101)
College (=1)	0.338**	(0.131)	0.193*	(0.117)	0.255**	(0.108)
Ethnicity (=1)	−0.240***	(0.087)	−0.128	(0.101)	−0.241***	(0.084)
Centre (=1)	0.090*	(0.049)	0.081**	(0.041)	0.071*	(0.037)
North (=1)	−0.106	(0.067)	0.018	(0.051)	−0.111**	(0.049)
South (=1)	−0.154***	(0.056)	−0.087*	(0.052)	−0.161***	(0.047)
Children less than 6 years old			−0.058*	(0.033)	−0.050	(0.034)
Children between 6 and 17 years old			0.010	(0.019)	0.004	(0.018)
Non-labour income			−0.001*	(0.000)	−0.001*	(0.000)
Older people			−0.041	(0.079)	−0.042	(0.068)
Own house (=1)			−0.047	(0.039)	−0.062*	(0.034)
Rooms			−0.014	(0.010)	0.004	(0.009)
Household head (=1)			0.144*	(0.074)	0.156**	(0.065)
Self-employed father (=1)			−0.317***	(0.037)	−0.365***	(0.035)
Mother works (=1)			−0.021	(0.044)	−0.032	(0.040)
Mother primary (=1)			−0.059	(0.056)	−0.019	(0.054)
Mother secondary (=1)			0.007	(0.085)	0.062	(0.077)
Mother college (=1)			−0.145	(0.149)	−0.080	(0.145)
Father primary (=1)			−0.055	(0.058)	−0.073	(0.055)
Father secondary (=1)			−0.067	(0.087)	−0.101	(0.078)
Father college (=1)			−0.105	(0.130)	−0.209*	(0.120)
Agriculture	0.119	(0.151)			−0.047	(0.139)
Mining	1.044***	(0.179)			0.754***	(0.160)
Manufacturing	0.189	(0.157)			−0.018	(0.143)
Electricity	1.706***	(0.258)			0.774***	(0.270)
Construction	−0.207	(0.153)			−0.287**	(0.140)
Trade	−0.252*	(0.152)			−0.633***	(0.139)
Transport	−0.072	(0.155)			−0.315**	(0.141)
Financial	0.099	(0.176)			−0.186	(0.162)
Other services	0.047	(0.156)			−0.043	(0.141)
Constant	2.128***	(0.489)	2.212***	(0.378)	2.178***	(0.395)
Athrho	−1.184***	(0.245)				
Rho	−0.829					
Likelihood ratio test for $\rho = 0$	23.37					

(*Continues*)

DOI: 10.1002/jid

Table 4. (Continued)

Variables	Bivariate probit with sample selection				Probit	
	CFQ		IQ		*Pr* (wage earner)	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Wald test for $\beta 1 = 0$	522.8				950.23	
Wald test for $\beta 2 = 0$	387.01					
Wald test over exclusion vars = 0	128.7					
N of observations	32 274				32 274	

CFQ, chosen from the queue; IQ, in the queue.
Source: CASEN 2009.
Athrho corresponds to the inverse hyperbolic tangent of rho, where rho is the covariance of the error terms for the heckprob model. Base category: metropolitan, without education, father and mother without education. (=1): binary variable. $\beta 1$ corresponds to the variables of IQ equations and $\beta 2$ to CFQ equation. Exclusion vars correspond to the following: the number of children younger than 6 years old and between 7 and 17 years old, no laboural income, older people, own house, rooms, head of core, self-employed father, mother works, mother's primary education, mother's secondary education, mother's college education, father's primary education, father's secondary education and father's college education.
Note: Male household heads or spouses of household heads between 23 and 60 years old. Robust standard error in parentheses, significant at
$^{***}p < 0.01$,
$^{**}p < 0.05$,
$^{*}p < 0.1$.

business. Belonging to an ethnic group decreases the probability of being a wage worker, which is consistent with the discrimination encountered previously in entering the labour market and also while in the labour market.[20] Additionally, the sons seem to have similar occupations as their fathers. The negative coefficient for having a self-employed father suggests that there could be a career role model or business transmission. However, at the same time, it could also be related to human capital accumulation during childhood; since 1965, wage workers have had higher incomes than self-employed individuals (Puentes *et al*., 2007); having a self-employed father implies lower childhood household income. On the demand side, the industry dummies indicate that mining and electricity are sectors more likely to have wage workers, while construction, transport and trade are negatively correlated with being a wage earner. The north and south zones are also negatively correlated with the probability of being a wage earner.

The double selection model delivers similar evidence. The main difference is that ethnic group is significant in the CFQ equation but not in the IQ one. This result implies that individuals who belong to an ethnic group have similar interest in being wage workers or self-employed as the overall population but are less likely to find wage work. The result is consistent with discrimination in the labour market and, at the same time, because ethnicity is highly correlated with poverty in Chile, ethnicity could also be acting as a proxy for other household characteristics.

The double selection model also indicates that men who live in urban areas are more likely to queue, but being in an urban area does not affect the probability of being chosen. The double selection model indicates that having a child younger than 6 years old is

[20]This result contrasts with the findings for the USA that suggest that differences in self-employment rates by ethnicity are mostly due to higher returns of self-employment (Fairlie & Meyer, 1996).

DOI: 10.1002/jid

negatively correlated with the probability of being in the wage work queue, which is not consistent with the hypothesis that workers seek higher income stability when having a family. In respect to labour demand variables, only mining, electricity and trade sectors are positively related with being CFQ.

In Table 4, we show a likelihood ratio test for independence between both decisions, being IQ and being CFQ, and find that the correlation between both decisions is statistically significant. This provides statistical evidence that a double selection model is more appropriate to describe the mechanics of occupation selection in the Chilean labour market. It also indicates that there is some friction in the labour market that does not allow all men who want the wage work to find it. This result indicates that some of the self-employed individuals are self-selecting but others are being excluded from wage work, especially individuals with low educational levels and who belong to an ethnic group.[21] The negative correlation term sign indicates that individuals who have a high probability of becoming wage workers (due to unobserved factors, that is, a higher u_{1i}) are less likely to be selected from the queue (tend to have a lower u_{2i}). This could be explained if these men who receive a positive preference shock for wage work have lower unobserved skills that make them less attractive to employers. For example, low productivity workers might prefer the wage sector because they can take advantage of the high firing costs or unemployment insurance, but employers prefer not to hire them precisely because they are less productive.

Additionally, we test the hypothesis of universal queue or no queue. In the first case, the test is that all coefficients of the CFQ equations are all zero except the constant. In the second case, the test implies that all coefficients of IQ equations are also zero except the constant. Table 4 shows that we reject the previous two hypotheses,[22] because the calculated values are above the critical ones. We also test that all exclusion variables are zero at the same time.[23] We reject that all variables have jointly no effect on the IQ equation, providing evidence that the exclusion restrictions are jointly relevant for desiring work in the wage earner or self-employment sectors (i.e. to be IQ).[24]

4.1.1 Probabilities, marginal effects and length of queue

After estimating the double selection model, we calculate certain probabilities of interest: being in the wage sector, being IQ, being CFQ conditional on being in it and the length of the queue. The bottom of Table 5 shows that the probability of being a wage worker is 79 per cent, the probability of being IQ is 87 per cent and the probability of being CFQ conditional on being in it is 91 per cent. The queue length implies that for every 100 working individuals with similar characteristics, there are 10 who are trying to enter the wage sector.

Next, we calculate marginal effects by changing one characteristic at a time.[25] Belonging to an ethnic group decreases the probability of being chosen by almost 3.6 percentage points (pp) equivalent to 4 per cent effect (pe), which translates to almost 5.5-pp (7-pe) drop in the probability of being a wage worker. As a consequence of

[21]As discussed in Section 2, there is also evidence for wage queues in Nicaragua and Brazil.
[22]The critical values for universal queue and no queue are $\chi^2(31) = 44.98$ and $\chi^2(21) = 32.67$, respectively.
[23]Compared with the instrumental variables case, the literature of selection models has slowly advanced to developed tests for over-identification of the exclusion variables. For instance, only recently, Huber and Mellace (2014) provided a test for the assumption that exclusion variables are not related to the error term in the main equation of a selection model. Note, however, that their test is for the case of a continuous dependent variable, where the exclusion variables are discrete or discretized; then, given that our dependent variable is discrete and we would have to discretize many exclusion variables, we cannot perform that test for our model.
[24]The critical value for this test is $\chi^2(19) = 30.14$.
[25]Marginal probabilities are evaluated at the mean of the remaining independent variables.

DOI: 10.1002/jid

Table 5. Marginal Effects

Variables	IQ		CFQ		*Pr* (wage earner)		Q
	Marginal effect	Percent change	Marginal effect	Percent change	Marginal effect	Percent change	Length
All							1.10
Partner	0.0593***	6.8474	0.0045	0.4933	0.0590***	7.4471	1.10
	(0.0134)		(0.0078)		(0.0139)		
Urban	0.0178**	2.0554	0.0052	0.5700	0.0211***	2.6633	1.09
	(0.0073)		(0.0050)		(0.0082)		
Primary	−0.0055	−0.6351	0.0026	0.2850	−0.0028	−0.3534	1.14
	(0.0213)		(0.0168)		(0.0239)		
Incomplete secondary	0.0020	0.2309	0.0116	1.2715	0.0120	1.5147	1.12
	(0.0220)		(0.0176)		(0.0249)		
Complete secondary	0.0215	2.4826	0.0314*	3.4419	0.0476*	6.0082	1.08
	(0.0225)		(0.0173)		(0.0252)		
College	0.0389*	4.4918	0.0507***	5.5575	0.0807***	10.1861	1.05
	(0.0235)		(0.0181)		(0.0264)		
Ethnicity	−0.0258	−2.9791	−0.0359***	−3.9352	−0.0554***	−6.9927	1.20
	(0.0204)		(0.0120)		(0.0202)		
Centre	0.0037	0.4272	−0.0146	−1.6004	−0.0094	−1.1865	1.08
	(0.0104)		(0.0093)		(0.0124)		
North	0.0164**	1.8937	0.0139**	1.5236	0.0275***	3.4711	1.10
	(0.0083)		(0.0070)		(0.0098)		
South	−0.0175*	−2.0207	−0.0231***	−2.5321	−0.0365***	−4.6071	1.16
	(0.0104)		(0.0077)		(0.0115)		
Self-employed father	−0.0639***	−7.3785	−0.0052***	−0.5700	−0.0639***	−8.0656	1.12
	(0.0073)		(0.0007)		(0.0074)		

IQ, in the queue; CFQ, chosen from the queue conditional on being in it; Q, length of the queue.
The predicted probabilities are the following: *Pr* (IQ) = 87%, *Pr* (CFQ) = 91% and *Pr* (wage earner) = 79%.
All predicted probabilities are evaluated at the mean of independent variables.
Percent change corresponds to a % change over the mean probability of each category.
Robust standard error in parentheses, significant at
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.

being less likely selected, men who belong to an ethnic group have the largest queues to wage work; for every 100 men that belong to an ethnic group, 20 are IQ for wage work. Another group that exhibits relatively low probability of being a wage worker is men whose fathers were self-employed; however, in this case, self-selection is the main reason for their lower participation in the wage sector; having a father who was self-employed decreases the probability of being IQ by 6.4 pp (7.4 pe).

Schooling is another important factor in determining the chance of wage work; having a college degree increases the probability of being IQ by 3.9 pp (4.5 pe) and of being CFQ by 5 pp (5.6 pe), which translates to an 8-pp (10.2-pe) increase in being a wage worker. College-educated men have the shortest wage work queue; for every 100 individuals with a college education, there are 5 queuing for wage work. In terms of geographic variation, individuals that live in the south have 1.7 pp (2 pe) less probability of being IQ, and at the

DOI: 10.1002/jid

same time, 2.3 pp (2.5 pe) of being CFQ. That translates into 16 men queuing for the wage sector out of 100 living in the south part of Chile.

4.2 Earnings Equations: Bivariate correction

In this section, we analyse the earning determinants for the different types of workers based on the double selection model. The dependent variable is the logarithm of the hourly wage. As mentioned earlier, there are three types of workers: wage workers, self-employed workers IQ for the wage sector and self-employed workers NIQ. There are two types of regressions. One regression ignores the selection problem, and the other adds expressions for the expectations presented in Section 3. We focus our analysis on hourly but not monthly income because it allows a comparison among sectors, controlling for the fact that different sectors exhibit different distributions of work hours. Hourly income is a measure of productivity comparable across sectors.[26]

Table 6 shows the regression results. We find that two correction terms are statistically significant and that the inclusion of the correction terms has a limited effect on the rest of the equation's parameters. The most relevant change is that of ethnicity in the wage sector; it becomes significant when we correct for double selection. In the double selection model, men who belong to an ethnic group receive 8.9 per cent lower hourly wages. Interestingly, ethnicity does not have a negative return in the self-employment sector. This can be seen as consistent with the discrimination in the Chilean labour market occurring in queue selection but not in costumer decisions, because there is a higher contact between the self-employed and the consumer.

Schooling variables were included to capture the different returns by educational level. In Chile, primary school is 8 years of education, and secondary education is another 4 years. The schooling parameter of primary education ($D_1 * S$) (where $S > 0$, 0 otherwise) is interpreted as the marginal return of each year of primary school education. For the case of secondary education ($D_2 * (S - 8)$) (where $S > 8$, 0 otherwise), the parameter is interpreted as the marginal return of each year of secondary education school over the return from primary school. A similar interpretation follows for tertiary education returns ($D_3 * (S - 12)$) (where $S > 12$, 0 otherwise). Table 6 shows that the return to education varies considerably in the wage sector: secondary education has a return of 6 per cent, while each year of tertiary education has a return of almost 20 per cent. Meanwhile, years of primary education have a zero return in the wage sector. In the case of IQ individuals, the educational return is the same for primary, secondary and tertiary education, which indicates that this sector might be low skilled; thus, higher education does not have any additional value. For NIQ, primary education does not have any return, and secondary and tertiary education both have a 6.6 per cent return. This indicates that the work done by the voluntarily self-employed individuals requires higher human capital than the work done by those in IQ sector. The differences in the rate of returns are consistent with the two types of self-employment: a more productive NIQ that exhibits good qualities like secondary schooling being rewarded, while a less productive IQ that has very low educational returns. Overall, these educational returns suggest that Chilean labour market queues may be consistent with the hypothesis presented by Bassi and Urzúa (2010) who

[26]We also perform the analysis using monthly income and find similar results. The use of monthly or hourly income does not affect the estimation of the double selection model.

DOI: 10.1002/jid

Table 6. Earning equations by type of worker

Variables	Wage earner				Self-employed IQ				Self-employed NIQ			
	OLS		Corrected OLS		OLS		Corrected OLS		OLS		Corrected OLS	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Age	0.027***	(0.008)	0.025***	(0.008)	−0.027	(0.030)	0.013	(0.043)	0.018	(0.023)	0.012	(0.023)
Age squared/100	−0.031***	(0.009)	−0.032***	(0.009)	0.028	(0.034)	−0.006	(0.043)	−0.019	(0.026)	−0.016	(0.026)
Years school > 0	0.006	(0.005)	0.006	(0.005)	0.037**	(0.018)	0.037**	(0.018)	0.017	(0.011)	0.017	(0.011)
Years school > 8	0.063***	(0.008)	0.072***	(0.009)	0.040	(0.029)	−0.021	(0.053)	0.061***	(0.022)	0.066***	(0.022)
Years school > 12	0.129***	(0.009)	0.123***	(0.010)	0.027	(0.032)	0.049	(0.036)	0.054	(0.034)	0.047	(0.035)
Tenure	0.011***	(0.001)	0.011***	(0.001)	0.007**	(0.003)	0.007**	(0.003)	−0.002	(0.002)	−0.002	(0.002)
Urban (=1)	0.053***	(0.019)	0.065***	(0.019)	0.025	(0.067)	−0.014	(0.072)	0.077	(0.057)	0.094	(0.058)
Ethnicity (=1)	−0.034	(0.023)	−0.089**	(0.037)	−0.127*	(0.076)	0.181	(0.246)	0.090	(0.187)	0.063	(0.185)
North (=1)	−0.085***	(0.019)	−0.065***	(0.020)	−0.111	(0.073)	−0.236**	(0.110)	−0.218***	(0.054)	−0.196***	(0.054)
Centre (=1)	0.038	(0.028)	0.029	(0.030)	0.130	(0.103)	0.265*	(0.137)	−0.120*	(0.068)	−0.112*	(0.067)
South (=1)	−0.060**	(0.024)	−0.095***	(0.031)	−0.120*	(0.072)	0.080	(0.176)	−0.164**	(0.083)	−0.174**	(0.084)
Agriculture (=1)	−0.286***	(0.092)	−0.276***	(0.093)	−0.025	(0.146)	−0.173	(0.179)	−0.342**	(0.173)	−0.368**	(0.175)
Mining (=1)	0.261***	(0.097)	0.317***	(0.110)	0.111	(0.269)	−1.289	(1.099)	0.056	(0.188)	0.028	(0.189)
Manufacturing (=1)	−0.151	(0.093)	−0.133	(0.093)	−0.015	(0.157)	−0.262	(0.238)	−0.188	(0.175)	−0.204	(0.176)
Electricity (=1)	−0.060	(0.102)	0.002	(0.117)	−1.083	(0.859)	−3.584*	(2.134)	−0.808***	(0.173)	−0.827***	(0.176)
Construction (=1)	−0.138	(0.092)	−0.167*	(0.095)	0.152	(0.139)	0.422*	(0.253)	−0.267	(0.171)	−0.283*	(0.171)
Trade (=1)	−0.219**	(0.093)	−0.250**	(0.097)	−0.000	(0.149)	0.325	(0.276)	−0.265	(0.168)	−0.285*	(0.169)
Transport (=1)	−0.123	(0.095)	−0.133	(0.095)	0.244	(0.151)	0.342**	(0.164)	−0.077	(0.173)	−0.091	(0.174)
Financial (=1)	−0.042	(0.100)	−0.038	(0.100)	0.537***	(0.184)	0.413*	(0.215)	0.266	(0.257)	0.239	(0.256)
Other services (=1)	−0.185**	(0.094)	−0.184**	(0.093)	0.199	(0.154)	0.139	(0.156)	−0.206	(0.179)	−0.225	(0.180)
σ_{1a}			0.304**	(0.145)								
σ_{2a}			0.393	(0.405)								
σ_{3cp1}							0.614	(0.657)				
σ_{4cp1}							−1.394	(1.070)				

DOI: 10.1002/jid

σ_{5cp2}											0.207*	(0.121)
Constant	6.382***	(0.180)	6.339***	(0.179)	6.921***	(0.661)	3.422	(2.772)	6.564***	(0.506)	7.103***	(0.577)
Observations	24 806	24 806	24 806	24 806	2638	2638	2638	2638	4830	4830	4830	4830
R-Squared	0.389	0.389	0.390	0.390	0.190	0.190	0.192	0.192	0.237	0.237	0.238	0.238

IQ, in the queue; NIQ, not in the queue; OLS, ordinary least squares.
Source: CASEN 2009.
Dependent variable: log of hourly wage. Base category: metropolitan region and no specific industrial sector. (=1): binary variable.
Note: Male household heads or spouses of household heads between 23 and 60 years old. Robust standard error in parentheses, significant at
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.

postulate that there is a mismatch between the abilities demanded by the firms and those offered by low skilled individuals. In our case, individuals with low human capital have zero educational returns in the wage sector and can only obtain a higher return from self-employment while being IQ for wage work. The low returns for secondary education pose a challenge for the Chilean educational system. Because only individuals with tertiary education are more likely to be selected from the queue and they also obtain a higher return in the wage sector, it seems that primary and secondary education do not provide adequate preparation for the labour market.

In relation to economic sector and earnings, we found that agriculture has a negative relationship with wage work and NIQ. For the wage sector, workers in agriculture earn almost 30 per cent less than workers in no specific industrial category, while NIQ earn 37 per cent less if working in agriculture (compare to the base category: no specific industrial sector). However, electricity has the most negative relationship with earnings (80 per cent lower income than in the base category) for NIQ. For IQ, working in the financial sector is related with higher income; this could be the result of high skilled individuals being self-employed only in that sector.

The coefficients associated with the inverse Mills ratios 1 and 5 indicate that individuals who are more likely to be IQ earn a higher income than the average individual in the wage and NIQ. In terms of the unobservable factors of our model, individuals with higher u_{1i} have a higher preference for wage work. Those individuals with higher preferences for being IQ tend to receive a higher wage than the average worker in the wage sector, that is, tend to have a higher v_a and, at the same time, are more likely to earn a higher income in self-employment, because they are more likely to exhibit a higher v_{cp2}. This result indicates that the Chilean labour market is consistent with a model of absolute advantages.[27] The other Mills ratios are not significant, which indicates that individuals who are more likely to be selected have average incomes in all sectors. This indicates that employers do not hire workers according to their unobserved productivity in the wage sector.

5 CONCLUSIONS AND DISCUSSION

In this paper, we estimate a double selection model between self-employment and wage sectors for Chile in 2009. We find evidence that some self-employed individuals queue for a job in the wage sector, while others self-select into self-employment. This result indicates that the Chilean labour market is heterogonous with wage work, voluntary self-employment and involuntary self-employment. As discusses by Maloney (2007), this is a characteristic of many labour markets in Latin American and implies that the Todaro model of dual markets might be too extreme for the Latin American context.

Our results also indicate that belonging to an ethnic group reduces the probability of being selected for wage work. In this paper, we cannot identify if this result is due to

[27]It could be the case that individuals choose the wage sector because of the possibility of receiving a wage premium for overtime. In that case, part of the absolute advantage result could be related to this wage premium if individuals with higher probability of becoming wage workers are also more likely to work overtime. We include a dummy variable if individuals work more than the legal amount of hours per week (45 h) in the wage equation; finding a wage premium for overtime, however, the rest of the parameters are unchanged. This suggests that the unobservables in the decision to become wage worker are not related with the wage premium. This result is consistent with the evidence presented by Bell and Hart (2003), where workers tend to agree on wages and hours with their long-term employers. Consequently, the changes in wage premium are balanced by the changes in the standard hourly wage to maintain the total wage.

DOI: 10.1002/jid

discrimination or a different human capital accumulation process. It is possible that individuals who belong to an ethnic group only have access to low quality schools and health care, which results in lower human capital and therefore low productivity. At the same time, not only does belonging to an ethnic group reduce the probability of being a wage worker, it also reduces the expected earnings in the wage sector. We also find that only college education increases the probability of being selected from the queue, which suggests that primary and secondary education are not adequately preparing students for the wage sector.

Further research should investigate the dynamics of voluntary and involuntary self-employment. Maloney (2004) argues that informal self-employment can be used for individuals as a way to test new ideas and then to decide if they wish to stay self-employed or return to wage work. Thus, given our definition of self-employment as not having any employees, it could be the case that involuntary self-employment occurs when individuals realise that their business idea was not good enough, leading them to return to wage work. In this case, involuntary self-employment is just a part of the micro-entrepreneurship process that exhibits high failure rates [(Jovanovic, 1982); (Kulzer & Benavente, 2008), for evidence for Chile]. At the same time, self-employment, voluntary or involuntary, can be useful to acquire experience for future wage work. We are not able to test those hypotheses with our data, but future research should look at the transitions from and to self-employment, with special emphasis between voluntary and involuntary self-employment.

ACKNOWLEDGEMENTS

We are grateful to Jaime Ruiz-Tagle, Marcela Perticará, the participants at the SECHI seminar and the Centro de Microdatos lunch seminar for his useful comments. Contreras and Puentes acknowledge the financial support from the 'Iniciativa Científica Milenio' (Project NS100041). Dante Contreras also acknowledges the funding from the Centre for Social Conflict and Cohesion Studies (CONICYT/FONDAP/15130009).

REFERENCES

Abowd J, Farber H. 1982. Job queues and the union status of workers. *Industrial & Labor Relations Review* **35**(3): 354–367.

Asea P. 1996. The informal sector: Baby or bath water? a comment. *In Carnegie-Rochester Conference Series on Public Policy* **45**: 163–171.

Bassi M, Urzúa S. 2010. Educación en chile: El desafio está en la calidad. IDB Publications 37998, Inter-American Development Bank.

Bell D, Hart R. 2003. Wages, Hours, And Overtime Premia: Evidence From The British Labor Market. *Industrial and Labor Relations Review* **56**(3): 470–480.

Blanchflower DG, Oswald AJ. 1998. What Makes an Entrepreneur? *Journal of Labor Economics* **16**(1): 26–60.

Carneiro F, Henley A. 2001. Modelling formal vs. informal employment and earnings: micro-econometric evidence for Brazil. Tech. rep., Annals of the XXIX National Meeting of Economics of ANPEC.

Contreras D, Plaza G. 2010. Cultural factors in women's labor force participation in Chile. *Feminist Economics* **16**(2): 27–46.

DOI: 10.1002/jid

Earle JS, Sakova Z. 2000. Business start-ups or disguised unemployment? Evidence on the character of self-employment from transition economies. *Labour Economics* **7**: 575–601.

Evans D, Jovanovic B. 1989. An Estimated Model of Entrepreneurial Choice Under Liquidity Constraints. *Journal of Political Economy* **97**(4): 808–827.

Evans D, Leighton L. 1989. Some Empirical Aspects of Entrepreneurship. *American Economic Review* **79**: 519–535.

Fairlie RW, Meyer BD. 1996. Ethnic and Racial Self-Employment Differences and Possible Explanations. *Journal of Human Resources* **XXXI**(4): 757–793.

Gong X, Van Soest A. 2002. Wage differentials and mobility in the urban labour market: a panel data analysis for México. *Labour Economics* **9**(4): 513–529.

Harris JR, Todaro MP. 1970. Migration, Unemployment and Development: A Two-Sector Analysis. *American Economic Review* **60**(1): 126–142.

Holtz-Eakin D, Joulfaian D, Rosen H. 1994. Entrepreneurial Decisions and Liquidity Constraints. *Rand Journal of Economics* **23**(2): 334–347.

Huber M, Mellace G. 2014. Testing exclusion restrictions and additive separability in sample selection models. *Empirical Economics* **46**(1): 75–92.

Jovanovic B. 1982. Selection and evolution of industry. *Econometrica* **50**(3): 649–670.

Kulzer C, Benavente JM. 2008. Entry and Exit of Firms in Chile. *Estudios de Economia* **35**(2): 215–239.

Lewis WA. 1954. Economic development with unlimited supplies of labour. *The Manchester School* **22**(2): 139–191.

Lindh T, Ohlsson H. 1996. Self-Employment and Windfall Gains: Evidence from the Swedish Lottery. *Economic Journal* **106**: 1515–1526.

Maloney W. 1997. The structure of labor markets in developing countries: Time series evidence on competing views. World Bank Policy Research Working Paper No. 1940.

Maloney WF. 2004. Informality revisited. *World Development* **32**(7): 1159–1178.

Maloney W, Saavedra J. 2007. The Informal Sector: What Is It, Why Do We Care, and How Do We Measure It?. In *Informality: Exit and Exclusion*, Perry P, Maloney W, Arias O, Fajnzylber P, Mason A, Saavedra J (eds). Washington, DC: World Bank.

de Mel S, McKenzie D, Woodruff C. 2008. Who Are the Microenterprise Owners? Evidence from Sri Lanka on Tokman v. de Soto. IZA Discussion Paper No. 3511

Mohapatra S, Rozelle S, Goodhue R. 2007. The Rise of Self-Employment in Rural China: Development or Distress? *World Development* **35**(1): 163–181.

Montenegro CE, Pagés C. 2003. Who benefits from labor market regulations? Chile 1960-1998. Policy Research Working Paper Series 3143, The World Bank.

Panos GA, Pouliakas K, Zangelidis A. 2014. Multiple Job Holding, Skill Diversification, and Mobility. *Industrial Relations: A Journal of Economy and Society* **53**: 223–272.

Paulson A, Townsend R. 2004. Entrepreneurship and financial constraints in Thailand. *Journal of Corporate Finance* **10**: 229–262.

Pisani M, Pagán J. 2003. Sectoral Queuing in a Transitional Economy: The case of Nicaragua in 1990s. *LABOUR* **17**(4): 571–597.

Poirier D. 1980. Partial observability in bivariate probit models. *Journal of Econometrics* **12**(2): 209–217.

Puentes E, Contreras D. 2009. Informal jobs and contribution to social security: Evidence from a double selection model. Working Papers wp307, University of Chile, Department of Economics.

Puentes E, Contreras D, Sanhueza C. 2007. Self-employment in chile, long run trends and education and age structures changes. *Estudios de Economia* **34**(2): 203–247.

DOI: 10.1002/jid

Roy A. 1951. Some thoughts on the distribution of earnings. *Oxford Economic Papers* **3**(2): 135–146.

Soares F. 2004. Do informal workers queue for formal jobs in Brazil? vol. **1021**. Ipea.

Todaro M. 1969. A Model of Labor Migration and Urban Unemployment in Less Developed Countries. *American Economic Review* **59**(1): 138–148.

Tunali I. 1985. *Migration, earnings and selectivity: from theory to fact–evidence from Turkey, 1963-73*, Vol. **1**. University of Wisconsin: Madison.

DOI: 10.1002/jid