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Labour Informality in Latin America: Poverty and Vulnerability

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LABOR INFORMALITY IN LATIN AMERICA: POVERTY AND VULNERABILITY

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Abstract

The analysis of the informal sector is very relevant in Latin America. More than half of the workers in the region are employed in informal activities, mainly as own-account workers or wage earners in small enterprises. The number of informal workers grew steadily during the nineties –associated to an insufficient generation of formal jobs in a context of low social protection- and stopped increasing in recent years as a consequence of a greater expansion of employment.

However, beyond this regional global panorama, the relevance and structure of informality is very heterogeneous within the region. In some countries, the informal sector represents a relatively low proportion of employment and it is more structured. In other countries, the sector is more precarious and workers are at the bottom end of income distribution. Additionally, a close relationship between informality, precariousness and poverty can be found in the countries of the region.

This paper aims at analyzing two important aspects related to informality from a comparative point of view. The first one is the association between informality and labor precariousness and income segmentation. The second one is the relationship between informality and poverty. In order to conduct the study, we selected four countries whose informal sectors are significantly different from each other in their sizes and characteristics. On the one hand, Argentina and Chile whose informal sectors are relatively small in the Latin American context, and, on the other hand, Brazil and Peru, where the opposite is verified. Data used in this paper comes from household surveys. This study will contribute to the debate on both the design of public policies for the informal sector and of those policies aimed at giving higher social protection, especially for the most vulnerable groups.

Keywords: Labor informality, Latin America, poverty, social protection.
JEL: J80, I30

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INTRODUCTION[1]

Latin America continues to be a region characterized by high inequality, labor precariousness, poverty and social vulnerability. According to ECLAC (2008), the most recent available estimations for Latin American countries indicate that 34.1% of the population lived in poverty in 2007, while 12.6% was indigent. For that same year, the total amount of poor people was around 184 million, of which 68 million were indigent.

One of the factors directly related to economic and social deprivation is the high level of inequality of opportunities and outcomes that still persists in these countries. Despite the distribution of income has improved in the last years, inequality continues to be one of the distinctive features of Latin American countries.

A significantly precarious labor market in a context of a very limited social protection network lies behind this situation, while the two dimensions reinforce each other. The meager coverage of unemployment insurance compels individuals who do not have a job in the formal sector of the economy to quickly resort to other labor alternatives such as precarious jobs or own-account activities, since they are not able to undertake an extensive job-search. Therefore, the excess supply of labor in the region manifests itself not only through open unemployment but also through precariousness and labor informality.

Given that the lack of an extended social protection system, a strong link between the individuals' labor situation and the poverty situation of the households they belong to is verified. In fact, the poor labor insertion -in terms of the amount of hours worked and the quality of the job- constitutes the "*working poor*" phenomenon, which is a relevant dimension in Latin America and indicates that the unemployment is not the only problem that arises in the labor market of these countries. This phenomenon is not only related to supply factors (like the educational level) but also to demand factors (mainly, the quality of the job). In general, the probability of being poor is negatively associated with the level of education and positively associated with the precariousness of the job. These variables in turn reinforce each other thus leading to a high correlation between low educational levels and low quality of occupations.

Hence, in a region with high incidence of informality, precariousness and poverty, it seems relevant to analyze how these phenomena relate to each other resulting in a situation of high social vulnerability. In particular, this paper aims at analyzing different aspects related to informality from a comparative point of view. The first one is the association between informality, labor precariousness and income segmentation. The second one is the relationship between informality and poverty and, especially, the direct and indirect mechanisms through which this association is verified.

In order to do so, we test for the existence of wage gaps that are directly related to informality, ie. the labor market segmentation hypothesis. Afterwards, we quantify the independent effect of this dimension on poverty incidence.

For this, we selected four countries whose informal sectors are significantly different from each other in their sizes and characteristics. On the one hand, Argentina and Chile

[1] [1] This paper has counted on the valuable collaboration of Ana Laura Fernández.

whose informal sectors are relatively small in the Latin American context, and, on the other hand, Brazil and Peru, where the opposite is verified. Data used in this paper come from household surveys with the most recent available information. In order to get comparable results, the analysis will be concentrated only in the urban area of the selected countries.

The study -still a work in progress- is the first one analyzing the linkages between informality, segmentation and poverty in Latin America from a comparative perspective. In this sense, we hope that it will contribute to the debate on the design of public policies for the informal sector and also of those aimed at giving higher social protection, especially for the most vulnerable groups.

The document follows with a review of different conceptual frameworks on informality and labor market segmentation. Section 2 specifies several alternative criteria for measuring informality as well as the estimation methods employed. Section 3 describes the information sources. Section 4 presents an initial outlook on informality incidence and its characteristics in the four countries selected. The two sections that follow present the estimation results: in section 5 we analyze the evidence related to the existence of wage gaps related to informality whereas in section 6 we estimate the impact of the latter on poverty incidence. Finally, section 7 presents the conclusions.

1. INFORMALITY, PRECARIOUSNESS, SEGMENTATION AND POVERTY: SOME THEORETICAL ISSUES

1.1 Employment in the Informal Sector and Informal Employment

Labor informality is one of the categories of analysis that highly contributed to characterize the conditions of occupational insertion in Latin America. However, there are at least two different approaches with different associated conceptualizations related to the labor informality, as shown next:

Approach	Related concepts
Productive	Informal Sector / Formal Sector. Employment in the IS/ employment in the FS
Labor	Informal Employment (informal workers) / Formal Employment (formal workers)

The concept of *informal sector* (IS) emerged for the first time in the early seventies, in the International Labor Organization's (ILO) documents for African countries (ILO, 1972). It was then developed in the Latin American region by the Regional Employment Program for Latin American and the Caribbean ("PREALC" for its acronym in Spanish), with the objective of explaining the growth of wide sectors of the population that were not able to participate in the processes of productive modernization through a formal labor market, in a context of relatively low levels of unemployment and a light countercyclical behavior.

Under this "productive approach", informality reflects the inability of the economies of the region to generate a sufficient amount of formal jobs in relation to the growth of the labor force. Also, given the shortage or lack of social protection mechanisms that provide incomes to those individuals that cannot access a job, some of them decide to embark on any sorts of activities that would allow them to obtain incomes which are sometimes just enough to survive.

In the nineties, ILO (ILO, 1993) defined a productive unit pertaining to the informal sector as one characterized by fixed assets that do not belong to the company but rather to their owners; therefore, it is often not possible to distinguish which part of the expenses should be assigned to the company's productive activities and which corresponds to the household. Also, labor relationships in these units are mainly based on personal and social ties. Given these characteristics, the IS is usually associated with small productive units with no clear separation between capital and labor, and low levels of productivity. For this approach, the functioning logic of enterprises in the IE is survival and not accumulation. On the other hand, the jobs generated in this sector constitute the *employment in the informal sector* (EIS).

Along with these conceptual developments based on a "productive approach", *informal employment* (IE) is another concept that has developed in more recent years. Based on a "labor approach", IE refers to a different dimension of informality because it focuses directly on job conditions. In particular, this approach associates informality with the evasion of labor regulations, defining IE as that of workers not covered by labor legislation.

In the last years ILO has gone further in the distinction between IE and EIS. According to Hussmanns (2004) *"Employment in the informal sector and informal employment refer to different aspects of the 'informalisation' of employment and to different targets for policymaking. One of the two concepts cannot replace the other. However, the two concepts need to be defined and measured in such a way that they are consistent and that one can be clearly distinguished from the other"*.

The empirical evidence for the region suggests that there is often a close relationship between IE and the EIS since, as it is explained below, the units belonging to this sector are the ones generating a high percentage of occupations that are not subject to labor regulations. In this paper we consider both the "productive approach" and the "labor approach" for the analysis of informality with the objective of not only identifying the distinctive characteristics of each dimension –EIS and IE- but also the interrelation between them.

1.2 Informality and income segmentation

The concept of labor market segmentation is used here to refer to wage differentials that are not explained by the workers' individual characteristics. That is to say, we attempt to identify the wage gaps associated with certain characteristics of the job. In particular, we use this concept to find out to what extent informality is the source of wage segmentation. In other words, we aim at analyzing whether two workers with equal personal attributes obtain different wages because one works in the *formal sector* (FS) and the other in the IS. The same way of reasoning is applied to wage differentials between IE and formal employment (FE).

The basic model of human capital theory in a competitive context with free labor mobility establishes that wages are determined by the labor productivity of individuals, which, in turn, is directly related to the level of human capital -both specific and general- and the skills of workers. Therefore, these attributes are the only factors that can explain the observed wage differentials between workers. However, in this analytical framework, the presence of certain labor institutions, such as labor unions or labor mobility restrictions, invalidates the basic premises of the model and originate wage differentials that are not explained by the workers' personal characteristics.

The existence of informality in its two approaches (EIS / IE) is consistent with both a situation of labor segmentation and without it. For example, in the "productive approach" it could be argued that were there no restrictions, the excess of labor that cannot enter the formal sector and thus goes to the informal sector with its lower levels of productivity, would cause a global fall in wages, both in the formal and informal sectors. In the "labor approach", informality without segmentation could take place if formal and informal wage earners ended up receiving equal net remunerations even when in the second case the employers face additional costs related to labor regulations.

At the same time, there are other arguments that account for the existence of segmentation associated with informality even when there are no restrictions on labor mobility or other restrictions generated by labor institutions. One of them states that small firms –typical of the informal sector- usually operate with lower productivity levels, and therefore pay lower average remunerations. Likewise, the non-fulfillment of tax obligations could make the firms work with lower levels of efficiency and productivity, which would once again result in lower wages for informal workers than those obtained by formal workers (Beccaria and Groisman, 2008). However, the important issue is that the mere existence of productivity differentials is not sufficient to produce wage segmentation. Therefore, it is necessary to explain why the equalizing forces of the market do not operate and why some companies –those of higher productivity- pay higher wages than the rest of the firms.

One hypothesis that can be mentioned here is that of *efficiency wages*, which says that employers may decide to pay wages above the market as an instrument to reduce labor turnover, or to encourage higher work efforts. Therefore, segmentation could arise if firms in the formal sector use this mechanism more often than firms in the informal sector. At the same time, the existence of internal labor markets within the firms of the formal sector can isolate workers from external competition, especially the less educated workers, thus creating a wage gap with informal workers.

In addition, within the labor approach, it can be stated that the fulfillment of labor norms not only affects total labor costs but also the net wages paid to workers. The impact of minimum wages, collective bargaining and unions on wage structure are examples of the latter. Therefore, an additional source of wage segmentation may be the fact that certain workers are protected by labor legislation or unions while others with equal attributes are not.

Lastly, if the two approaches overlap and the non-fulfillment of labor legislation is greater within informal firms, the mentioned factors will complement each other to explain the presence of segmentation. For example, one worker with certain personal attributes working in a small firm could get a lower wage than another worker with

equal characteristics working in a larger firm, both due to lower productivity levels and because the former firm faces less union pressure or does not abide by labor institutions, such as the minimum wage.

On the side of workers, an important condition for these results to manifest is the presence of a significant deficit in the creation of jobs within the formal sector, what makes them accept lower remunerations or more precarious working conditions. This type of behavior is encouraged by the lack or weakness of social protection mechanisms. To a greater or lesser extent, this is the case of Latin American countries.

1.3 Informality and poverty

Finally, it seems relevant to analyze the association between informality and poverty incidence. The objective in this case is to evaluate to what extent informality has independent explanatory power over the poverty situation of households. If it turns out to be significant, this would mean that one would be able to reduce poverty and social vulnerability by reducing informality.

Following Beccaria and Groisman (2008), it is possible to identify a relationship between informality and poverty incidence that may or may not be mediated by segmentation. In the former case, as long as segmentation implies that certain workers are not capable of obtaining enough remuneration to meet the needs of the households they belong to, informality will constitute an important independent factor related to the households' poverty situation.

The case without segmentation associated to informality may occur when the situation of poverty comes as a result of workers not being able to obtain sufficient remunerations in any of the two circumstances, formality and informality, due to certain personal characteristics. But, if these characteristics are more frequent in informal than in formal workers (or in the IS than FS), then this different composition of employment would mean that informal workers (EIS) would be obtaining, on average, lower remunerations than formal workers (EFS) and thus, would face a higher probability of falling into poverty. This could be identified as a "composition effect". As mentioned by Beccaria and Groisman (2008), this could be the case of low-skilled workers, who obtain low wages independently of being informal or formal and are overrepresented in the informal sector and/or within informal occupations.

According to what is mentioned above, it is evident that there is a variety of different arguments to explain informality and its associations with other dimensions relevant to the households' welfare. By taking all these aspects into account, the document aims at evaluating the presence of possible associations between informality, segmentation and poverty in the four mentioned Latin American countries. The following section describes the methodology employed for that purpose.

2. EMPIRICAL APPROACH AND METHODOLOGY

2.1 Measurement of informality

The 15th and 17th International Conference of Labor Statistics (ICLS) of ILO have established the classification criteria for formal and informal workers: according to the "productive approach", the EIS is defined as the group of workers employed in small productive units that are not legally registered as firms, employ a reduced amount of capital and make limited use of technology.

However, given that household surveys do not inquire in depth into the characteristics of the firms, ILO suggests adopting a measurement criterion based on the combination of occupational categories, occupation groups defined according to job qualifications, and the size of the firm. In this way, it is possible to identify the two major components of the IS: (1) family units comprised of own-account workers and family workers; and (2) microenterprises comprised of employers and wage-earners in establishments of less than five employees. In the case of independent workers, only those with no professional skills (approximated by those individuals with complete university studies) are considered as part of the IS, as an operational way to leave in this sector only independent workers with low productivity. Finally, the public sector is completely excluded from the IS.

On the other hand, as it was mentioned, the IE is defined as the group of occupations for which labor regulations are not fulfilled: non-registered wage earners and own-account workers and employers that do not fulfill their tax obligations. According to Hussmanns (2004) *"Employees are considered to have informal jobs if their employment relationship is, in law or in practice, not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (advance notice of dismissal, severance pay, paid annual or sick leave, etc.) for reasons such as: non-declaration of the jobs or the employees; casual jobs or jobs of a limited short duration; jobs with hours of work or wages below a specified threshold (e.g. for social security contributions); employment by unincorporated enterprises or by persons in households; jobs where the employee's place of work is outside the premises of the employer's enterprise (e.g. outworkers without employment contract); or jobs, for which labour regulations are not applied, not enforced, or not complied with for any other reason"*.

In addition, also by recommendation of ILO, in the case of independent workers, their formal/informal character is directly determined by the characteristics of their enterprises: informal own-account and employers are those performing in enterprises of the IS. Therefore, the classification of workers according to whether they belong to the IS or the FS being, simultaneously, part of the EIS or the EFS is more interesting in the case of wage earners given that for non-wage earners both classifications are coincident. Finally, unpaid family workers are considered simultaneously as a part of IE and of the EIS. Following chart details the classification of the workers taking into account both approaches:

	Formal Employment	Informal Employment
Employment in the Formal Sector	- Formal wage earners (Registered wage earners) in the FS - Formal non-wage earners	- Informal wage earners (Non-registered wage earners) in the FS
Employment in the Informal Sector	- Formal wage earners (Registered wage earners) in the IS	- Informal wage earners (Non- registered wage earners) in the IS - Informal non-wage earners – Unpaid family workers

2.2. The absolute poverty line approach to poverty identification

In this paper we follow each country's official for identifying poor units and for estimating poverty incidence (the absolute poverty line approach), with the exception of Peru. Specifically, a household is classified as poor if its total monetary income -as measured in the household surveys- is below an absolute poverty line that takes into account the household's size and composition.[2] In the case of Peru, official poverty is calculated based on the comparison between poverty line and the total expenditures of the household. In order to apply the methodology explained below, we built a new household poverty status comparing total income with the poverty line.

That absolute poverty line was estimated following the approach by Orshansky for the USA[3] -which was later on generalized to Latin America by ECLAC[4]. First the value of a normative food basket that satisfies nutritional requirements and considers the consumption pattern of a "reference population" (the group of households with the lowest income that satisfy their nutritional requirements) is estimated. Then, the overall poverty line is computed by multiplying the value of the normative food basket by the inverse of the Engel coefficient observed in the reference population. For the definition of the food basket, norms established by nutritionists –that differ according to age, gender, intensity of activities and other characteristics- and the consumption structure taken from expenditures surveys are used.

The value of the poverty line is then regularly updated according to the variation of food basket prices and by the changes experienced by the food/non-food consumer price ratio.

2.3 Methodology

The analysis conducted in this paper is structured in two major parts. In the first one, the objective is to estimate wage gaps associated with informality. Under the hypothesis of segmentation due to informality, workers in the IS and/or informal workers should be getting lower wages than workers with similar personal characteristics working in the FS or as formal workers, respectively.

[2] This approach is different from the one applied in European countries, where relative poverty is measured.
[3] Orshansky (1965).
[4] CEPAL (1991).

As in the study conducted by Beccaria and Groisman (2008) for Argentina, which aims at evaluating to what extent informality has independent explanatory power over wage determination, in this analysis we perform several parametric and non-parametric methods in order to give greater robustness to the results obtained. As it follows we present each of these methods.

Wage gaps, informality and segmentation

1. In the first place, we estimate the average wage gaps between the IE (EIS) and the FE (EFS) by using Mincer Equations by OLS regression. This is the most common approach to analyze the effect of one independent variable on labor income, while controlling for the rest of the covariates. In the case that matters in this study, the coefficient of the variable that identifies informality quantifies its independent impact on wage determination. The estimations are corrected for the sample selection bias using Heckman Two Step Estimator.

2. Despite the wide spread usage of OLS to estimate wage equations, this method estimates the effects of the covariates only at the center of the conditional distribution. However, this point may not be representative of the effect of the covariates at other positions in the distribution. Hence, it seems relevant to identify the impact of the covariates along the entire conditional distribution of income. To do that, we apply Quantile Regression Models (QR).[5] As with the classical linear regression method, which allows estimating models for conditional mean functions, QR proposes a procedure for modeling an entire range of conditional quantiles of the distribution, including the median (Koenker and Basset (1978).[6] With the application of QR, it is possible to verify whether wage gaps remain constant, grow or decrease along the conditional distribution. These estimations are also corrected by the sample selection bias.

In order to describe the application of the method in more detail, let y be the labor income. This is modeled in a log-linear way, as follows:

$$\ln y_i = x_i'\beta + \mu_i \qquad \text{with } i=1,\ldots\ldots N. \qquad [1]$$

where x represents a k covariates vector, β is a k coefficients vector and μ is a random variable with E(μ/x) = 0. From this specification it is possible to identify as parameters the effects of the covariates on the conditional mean of the distribution:

$$E(\ln y_i / x) = x_i'\beta_i \qquad [2]$$

These parameters are obtained by OLS (the conventional optimization problem of error minimization) or by Maximum Likelihood in the case that some error distribution is assumed.

Similarly, from QR the full range of conditional quantile functions of the log of income are modeled as a linear function of the covariates in each τ-quantile:

[5] Tannuri-Pianto and Pianto (2002) apply a similar procedure for Brazil.
[6] For more details about QR, see Koenker and Geling (2001).

$$\ln y_i = x_i^{'}\beta(\tau) + \mu_i(\tau) \qquad [3]$$

Given any random variable *t* with continuous and monotonic distribution function F(*t*), the τ-quantile is defined as the value $Q_{(\tau)}$ that satisfies:

$$F(Q_{(\tau)}) = \tau \qquad [4]$$

where $\tau \ \varepsilon \ (0,1)$ and denotes that the τ-quantile is the value of the support of the distribution that accumulates τ % of total observations.

Also, due to it is supposed that $Q_{(\tau)}(\mu_i / \vec{x}_i) = 0$, that is, the τ-quantile of the distribution of the error conditional to the covariate vector is zero, it is verified that:

$$Q_{(\tau)}(\ln y_i / x_i) = x_i^{'}\beta(\tau) \qquad [5]$$

where $Q_{(\tau)}(\ln y_i / x_i)$ denotes the τ-conditional quantile of the log of the income given *x*. Therefore, for each covariate a vector of coefficient $\vec{\beta}(\tau)$ is estimated resolving the following minimization problem:

$$\min_{\beta(\tau) \in R^K} \sum_{i=1}^{n} \rho_{(\tau)}(y_i - x_i^{'}\beta(\tau)) \qquad [6]$$

where $\rho_{(\tau)} = z(\tau - I[y_i - x_i^{'}\beta(\tau)]$, I[*] is the "check function" which adopts value 1 if $[y_i - x_i^{'}\beta(\tau)] < 0$ and 0 otherwise.

Finally, the equivariance property to monotone transformations of the conditional quantile function allows us to re-write expression [5] directly in terms of labor income, given the covariates set:

$$Q_{(\tau)}(y_i / x_i) = \exp(x_i^{'}\beta(\tau)) \qquad [7]$$

3. From the estimation of wage equations, the Oaxaca-Blinder Decomposition Method allows decomposing average income differences between formal and informal workers (or of the FS and IS) into three effects: the "Endowments effects", which is the part of the differential derived from the differences in the vector of characteristics of each group; the "Coefficient effects", which corresponds to the differences in the returns to those attributes; and the "Interaction effect". The segmentation hypothesis is verified if the second effect is statistically significant and positive, thus indicating that, given equal attributes, a formal worker (or worker of the FS) gets a higher wage than an informal worker (or worker of the IS). These estimations are also corrected by the sample selection bias.

4. Another way to measure segmentation associated with informality that is related to the previous procedure, is through individual wage gaps between formal and informal workers. In this case, segmentation is measured by considering the difference between an informal worker's income and the income he/she would obtain if he/she worked as formal (i.e. counterfactual income of the informal worker). In order to calculate the

latter, we first estimate wage equations for formal workers and we then apply the resulting parameters to each informal worker taking into account his/her characteristics. These parameters are estimated both by OLS. Once the wage gap is obtained for each informal worker, it is possible to obtain the distribution of this variable and estimate not only the mean value but also other indicators with appropriate properties for the analysis of discrimination and segmentation.[7] The individual gap is obtained as follows:

$$Gap_{ij} = \frac{e_{ij} - w_{ij}}{e_{ij}} \qquad [8]$$

where e_{ij} is the counterfactual estimation of the j-th individual's income as if he was formal, whereas w_{ij} is the estimated wage for the informal worker based on the parameters estimated for informal workers.

5. Finally, we also use the Matching Estimator Method as a non-parametric way to estimate the impact of informality on wages. This method is usually used in program evaluations where the results achieved for the variable of interest within the participants of the program (treated group) are compared to those obtained by individuals with equal observable characteristics that did not participate in such program (non-treated group). The differences in the results obtained are then interpreted as the program's impact. The most important difference between this method and the Mincer regression method is that Matching Estimator does not impose a linear functional form between the covariates and the dependant variable (Smith, 2000).

The parameter of interest to be estimated in this method is the Average Treatment Effect on the Treated (ATT), which is defined as:

$$\theta_{ATT} = E(\tau \mid D = 1) = E[Y(1) \mid D = 1] - E[Y(0) \mid D = 1] \quad [9]$$

where $E[Y(1) \mid D = 1]$ is the expected value for the treated group given it was under treatment, and $E[Y(0) \mid D = 1]$ is the expected value for the treated group had it not been treated.

Given that this counterfactual situation is not observed, it is necessary to resort to an alternative method in order to estimate the ATT. If the selection of the treated group and the control group was random, it would be possible to use the difference in the expected value of the variable of interest between both groups as an estimate of the treatment's effect.

However, when this is not the case, the most accurate way to identify what would have happened to the group under treatment had it not been treated, is by considering the situation of the non-treated individuals with equal (or similar) characteristics. In order to do so, it is necessary to match up similar individuals that belong to both groups. If the matching is correct, then the only difference between both groups would be their participation in the program, and thus the difference between the variable of interest would be exclusively explained by the latter. In the case we are analyzing, we consider

[7] Del Río *et al.* (2006) applied the individual gap method to estimate wage discrimination between men and women in Spain.

the IE (and the EIS) as being the treated group, whereas the EF (and the EFS) is the control group.

In the literature there are different methods to build the control group. One of the most used ones is the "Propensity Score Matching Estimator"[8], in which the propensity score of participation for the whole sample is estimated and the individuals of the treated group and the control group with similar scores are matched. Besides, there are different ways to determine accurately which individuals of the control group will be the counterpart of the group under treatment. One of them, which is employed here, is the Kernel Estimator, in which the outcome of the treated individual is associated with a matched outcome given by a kernel-weighted average of the outcome of all non-treated individuals. Finally, the ATT is estimated as follows:

$$ATT = \frac{1}{N_n} \sum_{i \in n} \left(w_i - \sum_{j \in f} \kappa_{ij} w_j \right) \quad [10]$$

where w_i y w_j indicate the wage of each formal and informal worker, respectively, κ_{ij} is the Kernel and N_n is the quantity of informal workers.

Informality and poverty

As it was mentioned, one of the objectives of this study is to evaluate to what extent the segmentation associated with informality is a relevant factor to explain the poverty situation of households. In fact, other factors such as unemployment episodes or the workers' low educational level may have greater explanatory power over the probabilities of entering and remaining in poverty.

Hence, after estimating the wage gaps associated with informality we try to quantify the independent impact of informality on poverty incidence. In order to do so, we perform several microsimulation exercises that simulate what poverty rate would result if the IE were remunerated the same as the formal workers (or if the EIS were paid as the EFS) with equal personal characteristics. To do this we compute a counterfactual total family income that is calculated by multiplying the actual monthly remuneration of informal workers times the value of the ratio between the estimated income of a formal worker and that of an informal worker with equal attributes. The estimated labor incomes are those previously obtained by OLS. It is assumed that the rest of the family incomes remain constant.

Finally, the counterfactual total family income is compared to the poverty line value in order to compute the new situation of poverty and estimate which would the incidence of the latter be in the absence of segmentation due to informality.

3. SOURCE OF INFORMATION

Data used in this paper come from the regular household surveys of each country considered. For each case, we use the most recent microdata base available, as follows:

[8] Developed by Rosenbaum and Rubin (1983).

- Argentina. Encuesta Permanente de Hogares (EPH) carried out by the National Statistical Office (Instituto Nacional de Estadísticas y Censos- INDEC) which covers urban areas and collects information especially on labor market variables. Most recent microdata base available: Second semester 2006.

- Brazil. Pesquisa Nacional por Amostra de Domicilios (PNAD) carried out by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estadistica -IBGE). It covers urban and rural areas. Most recent microdata base available: 2006.

- Chile. Encuesta de Caracterización Socioeconómica Nacional (CASEN) carried out by the Ministry of Planification (Ministerio de Planificación -MIDEPLAN). The CASEN is a household survey representative of the national, regional, urban and rural levels. Most recent microdata base available: 2006.

- Perú. Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAHO) carried out by the National Institute of Statistics and Computing (Instituto Nacional de Estadísticas e Informática). The ENAHO is conducted at a national level in urban and rural areas, covering the 24 local governments of the country and the Provincia Constitucional del Callao. Most recent microdata base available: 2007.

The empirical identification of the wage earners' registration condition in each of these countries is based on the availability of information derived from the employed data-bases. In the Argentine case, a wage earner is considered as registered in the social security system if his/her employer pays the contributions to the social security system. In the Brazilian and Chilean cases, a wage earner is considered as registered if he/she has signed a labor contract. In the Peruvian case, registered workers are those who are affiliated to a pension system.

Given that the strong heterogeneity between urban and rural labor markets and due to the fact that the Argentine household survey only covers urban areas, this first version of this article will concentrate only in this sector.

4. AN OVERVIEW OF THE CHARACTERISTICS AND RELEVANCE OF INFORMALITY IN LATIN AMERICAN LABOR MARKETS

The aim of this section is to present a general panorama of the importance of the IE and the EIS in the occupational structure of each of the four countries under study. Also, we characterize these groups of workers in order to evaluate to what extent there are significant differences in their composition according to several relevant dimensions. Table 1 below shows the great importance of informality (from both approaches, IE and EIS) in the employment structures of the all countries under study.

Table 1
Proportion of informality in the urban labor market (%)
2006/07

Categories	ARGENTINA	PERU	CHILE	BRAZIL
Formal non-wage earners	4.4	5.6	3.7	2.8
Informal non-wage earners	21.6	31.1	20.6	22.6
Formal wage earners in FS	38.4	24.8	51.8	36.2
Informal wage earners in FS	10.4	13.5	9.1	10.3
Formal wage earners in IS	3.8	2.2	4.0	5.6
Informal wage earners in IS	10.6	10.7	3.8	8.7
Formal domestic service	0.8	0.6	2.3	2.5
Informal domestic service	8.7	5.0	3.9	6.4
Unpaid familiar workers	1.3	6.4	0.9	4.9
Total Employment	**100**	**100**	**100**	**100**
Employment in the Informal Sector (includes domestic services)	**46.8**	**56.1**	**35.4**	**50.6**
Employment in the Informal Sector (excludes domestic services)	**37.3**	**50.5**	**29.3**	**41.8**
Informal Employment (includes informal domestic services)	**52.6**	**66.8**	**38.3**	**52.9**
% Informal wage-earners in the total wage earners	**40.8**	**51.5**	**22.4**	**36.5**

Source: Authors' elaboration based on data from Household Surveys

In particular, employment in the informal sector or informal employment represent at least more than one third of total workers in these countries. Peru is placed in one extreme, where the EIS (including domestic workers) represents 56% of the employed workforce whereas the IE (including informal domestic workers) reaches 67% of total workers. Furthermore, almost 52% of wage earners are not registered in the social security system. On the other extreme, in Chile these figures fall to 35%, 38% and 22% respectively.

From these data it is possible to construct a two-way table (Table 2) with a classification of countries combining the two approaches of informality, displaying them according to the importance of each of them (below or above 50% of total employment).

Table 2
Classification of countries by the relative importance of urban informality

	INFORMAL EMPLOYMENT	
EMPLOYMENT IN THE INFORMAL SECTOR	**More than 50%**	**Less than 50%**
More than 50%	Peru: 56 / 67 Brazil 51/53	
Less than 50%	Argentina: 47 / 53	Chile: 35 / 38

Source: Authors' elaboration based on data from Household Surveys

Clearly, Brazil and Peru are the countries with larger relative size of the EIS, while the opposite is the case for Argentina and Chile. Regarding the IE, in Argentina, Brazil and

Peru it represents more than 50% of total employment, while in Chile its relative importance is 38%. Hence, considering both approach of informality, it is possible to classify on one side Brazil and Peru with a high proportion of IE and EIS, on the opposite side is Chile. Finally, Argentina is an "intermediate case", where EIS represents less than 50% of employment while IE represents more than 50%. As shown, in all cases the IE is more important than the EIS. If domestic service is excluded, the reduction of the relative weight of the EIS is more important in Argentina – due to the higher proportion of these activities in total employment- than in other countries. The difference between Argentina-Chile on one side and Brazil-Peru on the other becomes, thus, more evident.

Different categories that arise from the double classification of informality also indicate important discrepancies among countries. For example, the larger participation of informal non-wage earners stands out in Peru, where they represent approximately one third of total employment. In Chile half of the total workers are formal wage earners of the formal sector, while that figure diminishes to around 40% in Argentina and Brazil (although they still represent the majority) and to 25% in Peru. In all countries the most important groups are informal non-wage earners (due to the importance of independent workers) and formal wage earners of the formal sector. Formal wage earners in the informal sector and formal non-wage earners are of little importance in all cases.

Nevertheless, beyond these differences this general panorama shows the importance that the informal sector, informal employment and precarious wage earners not registered in the social security system have in the employment structure of the region.

As for the composition of informality in terms of different attributes, some common patterns arise, but there are also important differences across countries (Table A.1 in the Annex). Specifically, in all cases an important predominance of workers with low education levels is verified, being the proportion of those who have not finished secondary school very high among informal workers –IE- (as an example, it reaches 69% in Brazil). Even higher is the incidence of low skilled workers in the informal sector. The opposite situation is observed among formal workers and workers of the formal sector, where the proportion of low education workers drops significantly. A similar scenario arises if the analysis is restricted to the group of wage earners. For example, in Brazil workers with unfinished secondary education (or less) represent almost 70% of total non registered wage earners (40% among registered) while that figure drops to 4% for workers with university degree (16% of registered wage earners).

Moreover, women represent a higher proportion in informality than in total occupation. This is particularly evident for the case of Peru, where the weight of women in informality is approximately 13 percentage points (p.p.) than in formality: while they concentrate near one half of IE and EIS, their share decreases to 37%/ 39% of FE and EFS, respectively. In Argentina and Brazil, although the general bias of women to activities in the informal sector is also observed, differences in the distribution of IE and EIS between men and women are less important than in Peru and Chile. If the analysis is restricted to wage earners, the differences in occupational insertion according to sex widen. One example is the case of Argentina where women are clearly overrepresented in precarious jobs. Anyway, given the strong predominance of men in the labor markets in these countries, they are the majority in informality in almost all cases, even though their "specific informality rate" is lower than that of women (Table A.1 in the Annex).

It is also observed that the weight of young workers and elderly is higher in IE and EIS (except for the case of the elderly in Peru) than in total employment, while the opposite happens with workers in central ages. In the case of the young these findings intensify if one analyses the structure of wage earners, since their share in not registered jobs more than duplicates that corresponding in jobs registered in social security. On the contrary, these divergence decreases for young workers if the composition of the formal and the informal sectors is observed. Even though they are also overrepresented in informality, the differences between their share in the formal and the informal sectors are smaller than in the former case. The opposite occurs with the elderly, where the differences in favor of the informal sector are clearly higher than those observed between FE and IE. This is in part explained by the higher incidence of independent workers in the adult workers (Table A.1 in the Annex).

Additionally, the importance IE and EIS varies across industries. In general terms, informality has a higher relative incidence in commercial activities, construction and domestic service, while the contrary is verified in the case for manufactures, the public sector, financial services and –to a lesser extent- personal services. If the analysis is restricted to wage earners, these features are repeated in almost all countries, where the former three industries concentrate more than 60% of informal activities (in Argentina and Brazil) or around 50% (in Peru and Chile) (Table A.1 in the Annex).

It is also relevant to note the close correlation between being a non-registered wage earner and a worker in the informal sector (Table 3). Approximately 45% of the total non-registered wage earners work in the informal sector in Chile and Peru whereas this figure increases to 65% and 68% in the cases of Argentina and Brazil, respectively. On the other hand, more than a half of wage earners of the informal sector in Chile are not registered in the social security system reaching almost 90% in Peru. This suggests the precarious character the jobs generated in the informal sector where, probably, the combination of low productivity and non fulfillment of labor regulation derive in low wages.

Table 3
Employment in the Informal sector and non-registered wage earners

	ARGENTINA			PERU		
	Registered	Non-regist.	Total	Registered	Non-regist.	Total
Formal Sector	78.7	21.3	100	58.3	41.7	100
	89.3	35.2	67.2	92.0	53.6	70.8
Informal Sector	19.4	80.6	100	12.3	87.7	100
	10.7	64.8	32.8	8.0	46.4	29.2
Total	100	100	100	100	100	100

	BRAZIL			CHILE		
	Registered	Non-regist.	Total	Registered	Non-regist.	Total
Formal Sector	85.1	14.9	100	84.4	15.6	100
	82.6	31.9	66.8	88.4	54.4	80.5
Informal Sector	36.0	64.0	100	45.9	54.1	100
	17.4	68.1	33.2	11.7	45.6	19.5
Total	100	100	100	100	100	100

Source: Authors' elaboration based on data from Household Surveys

Finally, there is a clear positive relation between informality and poverty. The incidence of poverty among workers in informal jobs or of the informal sector is between 2 and 5

times the observed among formal workers. This leads to the fact that, for example, around one third of informal workers are poor in Argentina and Brazil, while only 5% of formal workers in Argentina and 10% in Brazil are in that situation (Table A.1 in the Annex).

Therefore, the results presented in this section allow us to conclude that informal workers (also workers in the informal sector and non-registered wage earners) have lower educational level than the formal workers. Furthermore, they show a higher presence of young and women, and are more frequent than formal workers in commercial activities, construction and domestic service. This differential structure suggests that *informals* will have lower average incomes than formals[9] because the groups that are relatively more important among *informals* usually receive lower incomes than those who are in a higher proportion in formality; that is to say, there is a "composition effect" against *informals*. Next section analyzes to what extent the wage gaps are explained, also, by differences in the returns obtained by *formals* and *informals* for each of the considered characteristics.

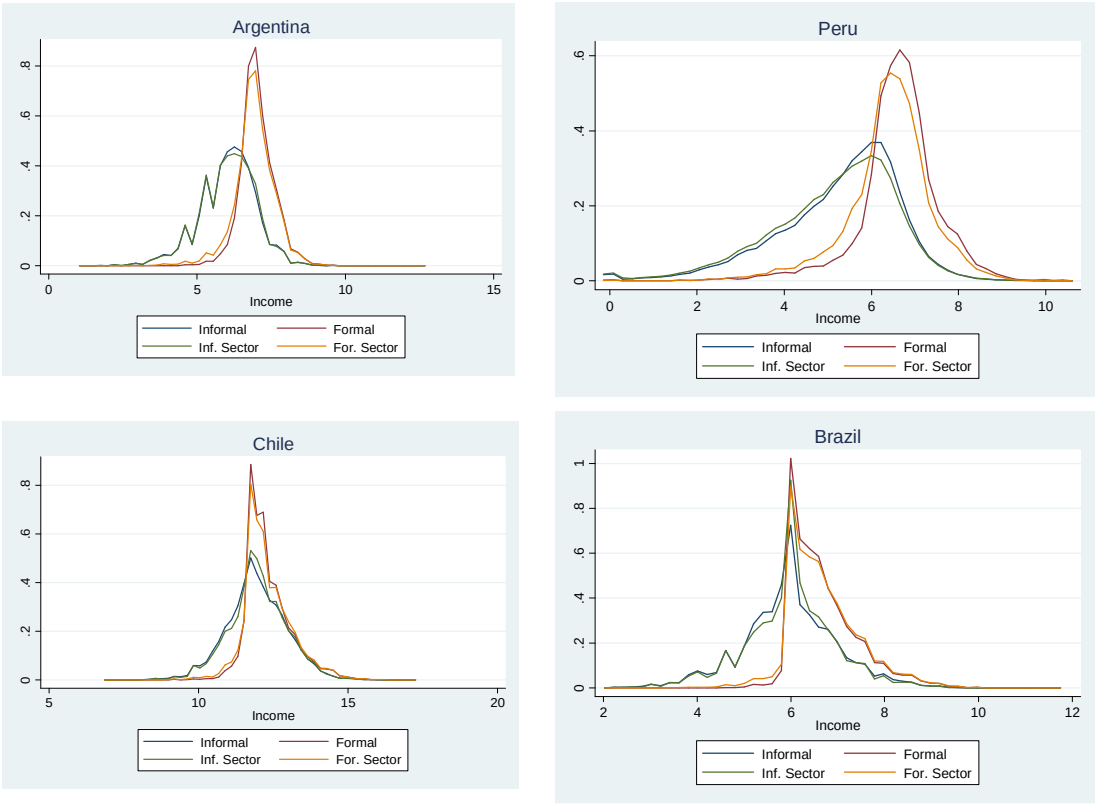
5. EMPIRICAL EVIDENCE ABOUT INFORMALITY AND SEGMENTATION

After having analyzed the relative importance and the composition of the IS and the EIS in the countries under study, this section presents the results obtained from the parametric and non-parametric methods explained in section 2.3. We start analyzing the results of the OLS income estimations and then those obtained by QR. Then, the Oaxaca-Blinder decomposition and the individual wage gaps are analyzed. Finally, the results of the Matching Estimator Method are presented. The main objective is to determine the presence of segmentation, which implies to find a significant independent effect of informality on wages.

However, before we start with the analysis of the regressions, it is interesting to show the Kernel Density Functions of the monthly incomes (in logs) of each of the countries, identifying formal and informal workers, and workers of the formal and the informal sector. As shown in Graph 1, there is a tight relationship between the density functions of informal workers and workers of the informal sector *vis à vis* those of formal workers and workers of the formal sector. Otherwise, there is an important gap between the incomes of these two groups of workers, where the functions of *formals* (formal workers and workers of the formal sector) are clearly shifted to the right in all cases, indicating higher mean wages. This feature shows up more markedly in Argentina and Peru. In the case of Chile it is interesting to note that the most important differences associated to informality seem to arise at the lower extreme and at the center of the distribution, while they are smaller at the higher extreme.

[9] *Informals* refers both to IE and EIS. In a similar way, *formals* is used to refer to the group of FE and EFS.

Graph 1
Kernel Density of monthly labor income



Source: Authors' elaboration based on data from Household Surveys

However, even though these results suggest the presence of important wage gaps between *formals* and *informals*, this is not necessarily an evidence of segmentation, to the fact that the observed gap might be attributable to the differences in other characteristics of *formals* and *informals* (sex or education, as shown before). For this reason it is important to resort to other procedures that allow the identification of the independent effect of informality on wages.

In Table 4 below, the wage gaps resulting form OLS estimates for all workers are shown. These figures correspond to the dummies that identify informality –through IE as well as EIS in the income equations. Dependent variable is, alternatively, the log of monthly or hourly wages. The complete regressions are shown in Table A.2 of the Annex.

Table 4
Wage Gaps. Mincer Equations by OLS

	Argentina	Peru	Brazil	Chile
IE/FE				
Monthly wages	**-0.655*** **	**-0.324*** **	**-0.245*** **	**-0.0673*** **
	[0.00733]	[0.0181]	[0.00374]	[0.00589]
Hourly wages	**-0.517*** **	**-0.258*** **	**-0.200*** **	**0.0359*** **
	[0.00676]	[0.0177]	[0.00382]	[0.00590]
EIS/EFS				
Monthly wages	**-0.486*** **	**-0.390*** **	**-0.179*** **	**-0.0109** **
	[0.00798]	[0.0175]	[0.00405]	[0.00479]
Hourly wages	**-0.387*** **	**-0.298*** **	**-0.135*** **	**0.0724*** **
	[0.00725]	[0.0171]	[0.00413]	[0.00480]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' elaboration based on data from Household Surveys

As shown, in the four countries a statistically significant "penalty" due to informality is verified, both for being informal worker (IE) and for being employed in the informal sector (EIS). This is showing that, for workers of similar characteristics, wages are significantly lower in comparison to those of formal workers. Also, the gaps are wider if monthly incomes are compared than if comparison is made between hourly wages. This is indicating that informal workers obtain lower wages not only because of a lower income per hour, but also because they work fewer hours. Against this general panorama, the magnitude of the gap is clearly different across countries. Specifically, the gap of monthly wages between IE and FE is near of 66% in Argentina, 32% in Peru, 25% in Brazil and 7% in Chile.

The differences in wages are also significant if the comparison is made between workers of the informal and the formal sectors. Except for Peru, a narrower gap is observed in this case, indicating that informality measured through the labor relationship (IE) seems to be more important than informality measured through the "productive approach" (EIS). In this case, the "penalty" of monthly wages is 48% in Argentina, 39% in Peru, 18% in Brazil and 1%in Chile. The existence of lower wages associated to informality already suggests that this could be one of the factors associated to poverty, a matter that will be subject to a detailed analysis in next section.

Finally, it is relevant to note that the wage gap in Chile seems to arise only because of the difference in the worked hours between *informals* and *formals* because for the hourly wages the gaps revert their sign.

As has been mentioned before, OLS estimate the effects of the covariates only in the centre of the conditional distribution. For this reason it is of interest to know, additionally, the impact of the covariates along the whole conditional income distribution. In order to advance in this direction, QR are applied both to monthly and hourly labor incomes. The results shown in Tables A.3 and Graphs A.1 in the Annex[10] are particularly interesting because they suggest that the gap associated to informality is not constant. Instead, it is wider in the lower extreme of the distribution. What is more,

[10] Only coefficients of informality are shown.

in Chile and Brazil the difference reverses in the higher end of the distribution. This result is verified both for monthly incomes and for hourly incomes. In the case of Chile this outcome seems to be consistent with the density functions previously commented, where the informality gaps were more evident in the lower extreme than in the higher extreme of the distribution. Likewise, the wider gap at the lower tail of the distribution strengthens the hypothesis that informality might be closely associated to poverty

A similar panorama is obtained from the decomposition of the differences of monthly incomes that is obtained from the application of the Oaxaca-Blinder procedure for both approaches to informality (Table 5). Very interesting patterns arises for all four countries. First, in all cases the total difference of mean incomes is significantly larger than that found through OLS and QR.

Table 5
Oaxaca-Blinder Decomposition
Monthly income

	Argentina		Peru		Brazil		Chile	
	IE/FE	EIS/EFS	IE/FE	EIS/EFS	IE/FE	EIS/EFS	IE/FE	EIS/EFS
Difference	-1.019***	-0.848***	-0.900***	-0.855***	-0.476***	-0.678***	-0.350***	-0.262***
	[0.00765]	[0.00829]	[0.0151]	[0.0151]	[0.00440]	[0.00451]	[0.00562]	[0.00542]
Endowments	-0.335***	-0.322***	-0.417***	-0.480***	-0.207***	-0.367***	-0.229***	-0.214***
	[0.00683]	[0.0335]	[0.0186]	[0.0377]	[0.00344]	[0.00405]	[0.00324]	[0.00352]
Coefficients	**-0.544*** **	**-0.296*** **	**-0.279*** **	**-0.313**	**-0.162*** **	**-0.160*** **	**-0.100*** **	**-0.0643*** **
	[0.0125]	[0.0516]	[0.0222]	[0.306]	[0.00411]	[0.0351]	[0.00611]	[0.00575]
Interaction	-0.140***	-0.230***	-0.204***	-0.0627	-0.106***	-0.151***	-0.0207***	0.0163***
	[0.0123]	[0.0610]	[0.0253]	[0.308]	[0.00375]	[0.0351]	[0.00467]	[0.00435]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' elaboration based on data from Household Surveys

Second, when this difference is decomposed in the three above mentioned components, in all cases the "Coefficient effect" is statistically significant and negative. Therefore, the segmentation hypothesis is verified again thus indicating that, given equal attributes, an informal worker (or a worker in the informal sector) gets a lower wage than a similar formal worker (or a worker in the formal sector). However, in all cases (with the exception of Chile when comparing the FS and the IS) the wage gap seems to be smaller than that obtained as the value of the coefficient of the dummy for informality in the OLS regressions.

Third, also the "Endowments effect" results significant and negative. This effect is, in most cases, the factor explaining the highest proportion of the wage gap. This reflects the fact that formal workers (workers in the formal sector) have a vector of characteristics that is more favorable than that of informal workers (workers in the informal sector), as described in previous section. Specifically, it has been shown that *formals* have more human capital and present a lower proportion of women – who are usually discriminated in the labor market and thus receive lower wages than men with similar attributes. Thus, total differences between wages of *formals* and *informals* are explained not only because the formers have a more favorable endowment vector, but also because the returns to their attributes are higher than those of *informals*.

Meanwhile, the estimation of the average wage gaps also confirms that informality has a negative independent effect on monthly labor incomes. For example, as shown in Table 6, the effect of informality is -0.7% in Argentina, -0.64 % in Peru, -0.29 % in Brazil and

-0.11% in Chile when the estimation is made by OLS, comparing formal and informal workers.

Table 6
Average of individual wage gaps
Monthly income

	Argentina	Peru	Brazil	Chile
FE/IE	0.7044*	0.6355*	0.2884*	0.1092*
EFS/EIS	0.3551*	1.0035*	0.2911*	0.0395*

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' elaboration based on data from Household Surveys

Finally, the non-parametric estimations based on the Matching Estimator Method (Table 7) are consistent with previous results and confirm again the existence of a "penalty" for informality. Specifically, the value of the ATT is significant and negative in all cases, even if the magnitude of the differences tend to be larger than those found with previous methods.

Table 7
Matching Estimator Method
Monthly income

	Argentina	Peru	Brazil	Chile
Informal Employment	**-0.759*** **	**-0.666*** **	**-0.416*** **	**-0.147*** **
	[0.00819]	[0.00968]	[0.000713]	[0.00326]
Informal Sector	**-0.287*** **	**-0.560*** **	**-0.301*** **	**-0.0296*** **
	[0.0414]	[0.00809]	[0.00225]	[0.000947]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' elaboration based on data from Household Surveys

In line with previous results, wage gaps are more important in Argentina and Peru than in Brazil and Chile. This is an important result –that should be studied more in depth- because it does not seem to be completely related to the size of informality. In particular, even if one could think that the wider wage gap in Peru and the lower wage gap in Chile would be accounting for a direct relationship between the weight of informality and the magnitude of the wage gap, this seems not to be the case of Argentina and Brazil where the weight of the informal sector is very similar in both but the penalty is significantly higher in the former than in the latter case.

Up to this point the gaps have been estimated for informality defined by the two approaches ("productive approach" and "labor approach"). However, it might be the case that both dimensions combine in the determination of wages, which would difficult the identification of the independent effect of each of them on wages. For example, the "penalty" suffered by informal workers might be due to the fact that an important proportion of them work in the informal sector, as shown previously. In that case, low productivity - and not the labor relationship- might be the factor that determines the lower wages. It could also happen that workers of the formal sector receive higher wages because there is a higher proportion of formal workers in this kind of production units. This, in time, could be a consequence of certain labor regulations as, for example,

legal minimum wages or collective bargaining, which are probably not accomplished in the case of informal workers.

In order to achieve a measure of the independent effect of each dimension, OLS regressions –similar to those shown before and corrected by sample selection bias- have been performed for monthly incomes, this time incorporating all categories arising form the combination of both approaches. The baseline group is composed by formal workers in the formal sector. As shown in Table 8, in the case of Argentina all categories suffer a "penalty" in relation to the baseline group. It is also possible to observe that the labor relation is more relevant than the sector in order to explain the wage differentials. For example, an informal worker receives an income 57% lower than that of a formal worker when both work in the formal sector. The gap is narrower if one compares formal workers of the formal and the informal sector. In this case, the gap drops to 22%.

Table 8
Wage Gaps. Mincer Equations by OLS
Monthly income

Categories	ARGENTINA	PERU	BRAZIL	CHILE
Formal Non-wage earners	-0.2161*	-0.6887*	0.3246*	0.6556*
Informal Non-wage earners	-0.7271*	-0.6095*	-0.1422*	0.2271*
Informal wage earners in FS	-0.5730*	-0.2969*	-0.2016*	-0.2754*
Formal wage earners in IS	-0.2233*	-0.5177*	-0.1021*	-0.146*
Informal wage earners in IS	-0.8012*	-0.6703*	-0.4172*	-0.5081*

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' elaboration based on data from Household Surveys

Chile and Brazil show similar results. In those countries the gaps are also wider between formal and informal workers than between workers in the formal and the informal sectors. Anyhow, and consistently with previous results, the gaps are not as wide as in Argentina. What is more, in Chile informal non-wage earners have higher incomes than the baseline group. Likewise, both in Chile and Brazil formal non-wage earners obtain the highest returns.

Like in Argentina, in Peru formal workers in the formal sector are those who, if other characteristics are the same, obtain the highest wages. However, among wage earners the sector (formal/ informal) in Peru seems to be more important than the labor relation in explaining the wage gap. While the incomes of informal wage earners of the FS are 29.6% lower than those of formal wage earners in the same sector, the gap rises up to 52% when compared with formal wage earners of the IS.

Finally, in all cases both dimensions combine in order to produce larger income differences than those corresponding to each dimension taken separately, being the group of informal workers in the IS those obtaining the lowest incomes when controlling for all remaining characteristics. Specifically, in comparison with formal workers of the formal sector, they experiment a "penalty" of 80% in Argentina, 67% in Peru, 51% in Chile and 42% in Brazil.

Therefore, the different (i.e. parametric and non-parametric) estimations signal to the existence of significant income gaps in favor of formality that are not completely

explained by differences in the observed attributes of workers. These results seem to be robust to the different estimation methodologies. This takes us to the conclusion that there effectively exists income segmentation associated to informality in the four analyzed countries.

Here again the question about which are the factors that explain the differences in the magnitude of the income gap across countries and, especially, the wage gap among wage earners (registered and non-registered) in the FS arises. While in Argentina that difference is around 57%, it reduces to 20% - 30% in the other countries. One hypothesis might relate these results with the role of labor institutions as, for example the bargaining power of unions or the relevance of the minimum wage.

Specifically, it could be thought that the magnitude of the difference between these two groups of wage earners positively depends on how "binding" are these labor institutions: as long as minimum wage is relatively high in comparison with average wages or the bargaining power of unions in the negotiation of wages is high, it could be thought that this would generate a wider wage gap between workers who are subject or not to these labor institutions. In this sense, one possible measure could be the relation between the minimum wage and the average wage of the economy. According to Marinakis (2008), in 2004/05 Argentina shows the highest value for this relation (49%) while it was 33% in Brazil, 44% in Chile and 39% in Peru. However, it is clear that, as mentioned before, it is important to deepen the analysis of this and other factors that might lie behind these results.

Finally, these results might be affected by variables that are not observable and, thus, not included in the regressions. For example, other non-monetary advantages that compensate the lower wages of informality might exist, which make these jobs more attractive to certain individuals. But, given that there seems to exist a tight link between informality and poverty (as has been shown in previous section and will be verified in the following), the argumentations suggesting that informality is a voluntary choice of workers is not likely to apply to all workers in the region. On the contrary, the high levels of unemployment and labor precariousness experienced by these countries suggest that the insertion in informality could be the only choice for an important group of people.

6. INFORMALITY AND POVERTY

The results presented in the previous section point to the existence of significant income differentials associated to informality. However, this is not proof enough to affirm that informality is a relevant factor in the determination of the probability of a household being poor. There are other factors that might also determine incomes above or below the poverty line, such as the incidence of unemployment, the incomes of formal workers (or workers in the formal sector), or the presence of high rates of dependency. Specifically, if the incomes of workers with low educational levels –both *formals* and *informals*- are very low, the probabilities of being poor (or falling into poverty) are higher in both cases, even though with more intensity in the latter case.

As mentioned in section 2.3, with the aim of evaluating the independent impact of informality in poverty incidence, microsimulation exercises have been carried out.

These exercises allow an estimation of a counterfactual household income that would result if family members who work as *informals* worked as *formals* (considering the two approaches of informality). As shown in Table 9, in all cases the "formalization" of informal workers would imply a reduction of poverty rates. However, the size of this reduction differs across countries. The different results are related, at least in part, to the different magnitudes of the income gap between *formals* and *informals*. For example, in Argentina and Peru, where the income gap is wider, the reduction of poverty due to the formalization of workers is also larger; in the case of Argentina this reduction is about 34% if informal workers were formal workers. In Peru, the decrease of poverty is also significant, around 30% of the initial rate. But given the fact that in these countries the initial incidence of poverty is very high, even if all workers were formal the percentage of poor people would remain high. The low impact of the "formalization" in Chile was, in part, expected given the fact that the informality gap is narrower. Finally, in the case of Brazil the reduction is also important but clearly lower than in Peru and Argentina. Again, in part, this could be explained by the lower informal wage gap the in those countries.

Table 9
Simulation of reduction of poverty associated to *formalization* of workers
(Poverty incidence in individuals)

	Argentina	Peru	Brazil	Chile
Inicial poverty rate	26.85	34.68	29.96	13.7
Initial poverty gap	0.4171	0.3792	0.4249	0.3179
Contrafactual				
FE/IE	17.81	24.44	26.35	13.12
EFS/EIS	22.59	20.69	26.32	13.61
Reduction				
FE/IE	-34%	-30%	-12%	-4%
EFS/EIS	-16%	-40%	-12%	-1%

Source: Authors' elaboration based on data from Household Surveys

In the Table 9 the poverty gap was also included given that it probably is another important factor that is has to be considered, since the probability of exiting poverty depends not only on the absolute increase in the total family income after the "formalization", but also on the initial distance to the poverty line. Brazil is the country with the higher poverty gap, which contributes, additionally, to the lower impact of the "formalization".

The fact that in some countries a high poverty incidence persists even if eliminating informality (for instance, in Argentina) or that in others the reduction associated to the elimination of informality is low (for instance, in Brazil) suggests that other factors also have an important influence on poverty. As mentioned, one of them might be the low incomes of unskilled workers even if they are formal. Remind that in all cases these workers represent an important proportion of informal workers and workers in the informal sector. This evidence, in turn, might be explained by the high income inequality that characterizes these countries and/ or the low levels of average incomes. Therefore, more "complete" microsimulation exercises are needed in order to evaluate the independent effect of other potential factors.

Last, it is important to mention that these microsimulations should be interpreted as analytical exercises and that the results to which we arrived arise as indicators of the relevance of informality in explaining the incidence of poverty, but do not show the effective situation that would take place in absence of informality. The "ceteris paribus" postulation behind these partial equilibrium exercises does not account for the fact that an important reduction of informality (particularly in those countries where its relative importance is high) would surely be accompanied by other changes in the labor market – for example in the unemployment rate or in the average wages- that could also have an impact on poverty levels.

7. FINAL REMARKS

The aim of this article has been to inquire on the links between informality, segmentation, precariousness and poverty from a comparative perspective in four Latin American countries: Argentina, Brazil, Chile and Peru. As mentioned before, its character is exploratory and constitutes the first joint study of these phenomena for these countries. However, the study presents interesting results about the studied links.

First of all, it has been shown that informality (EI and EIS) is an important phenomenon in the four countries, even if its relevance is not the same in all cases. In one extreme, there is Peru, where the urban EIS explains approximately 56% of total employment and where IE reaches 67% of workers. In the other extreme, in Chile these figures fall to 35% and 38% respectively. At the same time, the proportion of non-registered wage earners is significant in all cases, even in Chile where it represents about 22% of the total wage earners. In the rest of the selected countries this figure reaches 40%-50% of this group of workers. This suggests a very high level of labor precariousness given that the lack of registration in the social security system does not only imply lower wages than the rest of wage earners but the lack of other social benefits, like health insurance or future pensions. It is also important to note that probably the informality be even higher in rural areas than the urban areas analyzed.

In all cases informality proved to be an independent source of lower incomes, even if controlling by an extended set of personal and job characteristics. This suggests the presence of income segmentation in the labor markets of these countries. Additionally, the descriptive analyses and the microsimluation exercise suggest a positive relationship between informality and poverty. Nevertheless, it has also been shown that the elimination of informality does not seem to eliminate poverty, suggesting the presence of other factors that affect it. The higher incidence of unemployment, underemployment and low educational levels deriving in insufficient incomes even for formal workers (or workers in the formal sector),together with higher rates of dependency are factors that probably are also important in the explanation of poverty. Additionally, in Latin America, the low average labor income is goes along with a very high income inequality that also contributes to increase the levels of poverty incidence.

Therefore, the obtained results suggest, on one hand, the need to carry out different policies in order to reduce inequality and poverty, both through labor market policies and others of more universal character. A central preoccupation of those strategies should be to reduce the share of informal and precarious employment. It implies acting both at the supply and at the demand side of the problem: i.e. stimulating the creation of

formal jobs suited for those workers and assisting them in increasing their chances of getting this kind of jobs (through training and/ or better employment services, for example).

The level of wages also has to be considered as an objective when trying to reduce poverty as not always being employed insures leaving poverty, especially due to the just mentioned high relevance of informal occupations. In this sense, minimum wage policy as implemented in Brazil and Argentina, results a valuable instrument especially if it also affects wages of informal workers.

On the other hand, unlike developed countries, in Latin America the scope and coverage of unemployment insurance has been historically limited. Even in those few countries that do have policies of this kind (Argentina, Brazil, Chile, Ecuador, Uruguay and Venezuela), coverage rates are low among the unemployed population. This is due, fundamentally, to high labor precariousness, reduced registration rates, high occupational instability and –probably to a lesser extent than in Europe- long term unemployment. Therefore, it would be convenient to extend some kind of unemployment benefit to those leaving non–regular jobs. Specifically, it would be possible to design a program of monetary transfers covering those unemployed coming from self–employment or jobs as non –registered wage earners.

Even if extended programs of money transfers to the unemployed are enforced, households with low and unstable labor incomes will be still facing major difficulties. Facing this situation various countries of the region have been implementing non-contributive cash transfers, not only directed to the unemployed but also to low-income households. The "Bolsa Familia" in Brazil, the "Progama Familias" in Argentina, "Juntos" in Peru and "Chile Solidario" are examples of conditional cash transfers addressing poor households.

Although from the experience of different countries of the region there exists, generally speaking, consensus regarding the satisfactory focalization of these programs as well as their success in reducing poverty and extreme poverty, the intensity of their results has been low.[11] For this reason, and in parallel with other policies, it is necessary that these countries reinforce this kind of transfers (both in coverage and in the amount of the transfer, that is generally very low) at least until the labor market is able to generate enough jobs with incomes that allow households to escape poverty.

Hence, if enough jobs, especially decent jobs that generate sufficient incomes, are created, and if there is an unemployment insurance that supports an active search by the unemployed, the need of members of poor households to rapidly accept precarious and low-paid jobs will diminish, reducing in this way the flows to informality. In this sense, as mentioned in Beccaria and Groisman (2008), it is convenient to visualize informality not as a cause of poverty but both as the manifestation of the lack of labor opportunities in the formal sector of the economy, as well as the scarcity of formal jobs in countries

[11] For a description and joint evaluation of these programs see, for example, ILO/IPEC (2007). For revision of the debates around conditional cash transfer programs see Ribas *et al.* (2008), Villatoro (2007, 2008). For an analysis of the possibilities of implementing a basic non contributive floor of social protection see Bertranou *et al.* (2007a). For the Argentine case see Bertranou *et al.* (2007b) and Maurizio (2009).

where cash transfers and policies aimed at meeting situations of social vulnerability are scarce or inexistent.

Last, all these results open future research lines aimed at answering following questions: which are the factors that explain the differences of informality wage gap across countries? Why is the FE/ IE gap wider than the EFS/ EIS gap in some countries while in others the opposite result arises? What is the importance of other associated factors in the incidence of poverty? The answer to these questions will be of major value for the better design for public policies aimed at reducing the high levels of social vulnerability and poverty prevailing in Latin America.

REFERENCES

Beccaria, L. and F. Groisman (2008) Argentina desigual, Universidad Nacional de General Sarmiento, 2008. ISBN: 978-987-630-018-6.

Bertranou, F. L. Gasparini, F. Crosta, F. Haimovich, A. Ham, B. Álvarez and R. Sánchez (2007a) "Un piso de Protección Social en América Latina. Costos fiscales e impactos sociales", OIT (mimeo).

Bertranou, F. L. Gasparini, F. Crosta and F. Haimovich, (2007b) "Un piso de Protección Social para Argentina: Una discusión sobre sus costos fiscales e impactos sociales", OIT (mimeo).

CEPAL (1991) "Magnitud de la pobreza en América Latina en los años ochenta", Santiago de Chile.

Del Río, C; C. Gradín and O. Cantó (2006) "The measurement of gender wage discrimination: the distributional approach revisited", **Society for the Study of Economic Inequality**, Working Paper 2006-25.

ILO (1972) "Employment, income and equality: a strategy for increasing productive employment in Kenya, Geneva.

ILO (1993) "Resolución sobre estadísticas de empleo en el sector informal", Geneva.

ILO / IPEC (2007) Trabajo Infantil y los programas de transferencias en efectivo condicionadas en América Latina.

Hussmanns, R. (2004) "Measuring the informal economy: from employment in the informal sector to informal employment", Working Paper 53.

Koenker, R. and G. Bassett (1978) "Regression Quantiles", **Econometrica**, 46, 33-50.

Koenker, R. and O. Geling (2001) "Reappraising Medly Longevity: A Quantile Regression Survival Analysis", **Journal of the American Statistical Association**, 96(454), 458-468.

Marinakis, A. (2008) "Evolución de los salarios en América Latina. 1995-2006", ILO.

Maurizio, R. (2009) "Políticas de transferencia monetarias en Argentina: Una evaluación de su impacto sobre la pobreza y la desigualdad", in **Una respuesta nacional a los desafíos sociales de la globalización**, OIT (forthcoming).

Orshansky, M. (1965) "Counting the Poor: Another Look at the Poverty Profile", **Social Security Bulletin**, Vol. 28, 1, pp. 3-29

Ribas, R., F. V. Soares and G. Hirata (2008) "The Impact of CCTs. What we know and what we are not sure about", in International Poverty Centre, Poverty in Focus "Cash Transfers. Lesson from Africa an Latin America", Brazil.

Rosenbaum and Rubin (1983) "The role of propensity score in observational studies for causal effects", Biometrika, 70.

Tannuri-Pianto and Pianto (2002) “Formal-informal differentials in Brazil. A semi-parametric approach”.
Villatoro, P. (2007) “Las transferencias condicionadas en América Latina: luces y sombras”, CEPAL, Chile.
Villatoro, P. (2008) “CCTs in Latin America: Human Capital Accumulation and Poverty Reduction”, in International Poverty Centre, Poverty in Focus “Cash Transfers. Lesson from Africa and Latin America”, Brazil.

ANNEX

Table A.1
Characteristics of informality

Variables	ARGENTINA			PERU			BRASIL			CHILE		
	Formal	Informal	Total	Formal	Informal	Total	Formal	Informal	Total	Formal	Informal	Total
Gender												
Men	57.8	56.4	57.1	62.8	50.3	54.5	56.7	56.0	56.4	61.2	55.4	59.0
Women	42.2	43.6	42.9	37.2	49.7	45.5	42.6	42.8	42.7	38.9	42.5	40.3
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Age												
Younger than 25	9.4	19.4	14.7	7.7	26.2	20.0	18.2	24.0	20.8	12.3	13.8	12.9
25-45	56.7	43.9	50.0	57.9	44.6	49.0	57.3	44.3	51.4	55.4	41.4	50.0
Older than 45	33.9	36.7	35.4	34.4	29.2	30.9	24.5	31.8	27.8	32.3	44.7	37.1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Educational level												
Less than complete secondary	29.27	61.4	46.1	10.6	43.9	33.2	38.5	69.2	52.6	28.2	53.8	38.0
Complete secondary / Incomp. Univers.	38.01	33.1	35.4	35.9	46.6	43.2	42.3	27.4	35.5	44.6	40.6	43.1
Complete university	32.72	5.6	18.5	53.5	9.4	23.6	19.1	3.3	11.9	27.2	5.6	18.9
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Industry												
Agriculture	-	-	-	-	-	-	-	-	-	7.9	7.2	7.6
Manufacture	15.0	12.2	13.5	15.8	14.1	14.7	21.5	12.8	17.7	14.0	13.7	13.9
Construction	3.9	13.5	8.9	4.6	6.4	5.8	3.9	12.3	7.6	8.7	9.6	9.0
Trade	16.4	32.0	24.6	17.1	37.0	30.0	21.0	30.1	25.0	17.0	27.9	21.2
Transport	6.2	6.5	6.4	6.8	11.6	9.9	5.9	5.6	5.8	7.3	8.2	7.6
Financiak services	12.4	7.4	9.8	12.5	4.1	7.1	11.8	5.5	9.1	9.8	4.1	7.6
Personal services	9.7	3.7	6.5	6.4	3.1	4.3	6.6	3.0	5.0	13.4	15.4	14.2
Domestic services	1.7	16.6	9.5	1.8	8.2	6.0	4.8	13.9	8.7	3.7	10.1	6.1
Public sector	27.6	2.0	14.1	26.3	3.2	11.4	19.0	2.9	12.1	16.6	3.0	11.4
Other	7.2	6.3	6.7	8.8	12.2	11.0	5.4	13.8	9.1	1.8	0.9	1.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Povert status												
Non poor	95.04	73.3	84.1	93.2	76.8	82.3	89.7	73.7	82.4	94.6	89.9	92.8
Poor	4.96	26.7	15.9	6.8	23.2	17.8	10.3	26.3	17.6	5.4	10.1	7.2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Variables	ARGENTINA			PERU			BRASIL			CHILE		
	FS	IS	Total	FS	IS	Total	FS	IS	Total	FS	IS	Total
Gender												
Men	59.7	54.1	57.1	60.9	49.4	54.5	59.4	52.8	56.4	63.6	50.6	59.0
Women	40.3	45.9	42.9	39.1	50.6	45.5	40.5	47.2	42.7	36.4	49.4	40.3
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Age												
Younger than 25	12.8	16.7	14.7	16.5	22.8	20.0	21.2	20.4	20.8	14.7	9.6	12.9
25-45	55.7	43.5	50.0	56.6	43.1	49.0	55.5	46.6	51.4	54.4	42.0	50.0
Older than 45	31.5	39.8	35.4	27.0	34.0	30.9	23.3	33.0	27.8	30.8	48.4	37.1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Educational level												
Less than complete secondary	31.2	63.2	46.1	14.1	47.6	33.2	36.8	70.9	52.6	27.5	57.0	38.0
Complete second/incom. Univers.	37.6	32.9	35.4	40.2	45.5	43.2	43.3	26.5	35.5	45.2	39.3	43.1
Complete university	31.2	3.9	18.5	45.7	6.9	23.6	19.9	2.7	11.9	27.3	3.7	18.9
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Industry												
Agriculture										8.96	5.16	7.61
Manufacture	16.0	10.6	13.5	18.2	11.6	14.7	23.5	10.4	17.7	14.4	13.0	13.9
Construction	5.4	13.0	8.9	4.4	6.9	5.8	4.7	11.3	7.6	9.6	8.0	9.0
Trade	16.1	34.2	24.6	17.6	40.9	30.0	21.2	29.8	25.0	17.0	28.8	21.2
Transport	7.1	5.5	6.4	6.1	13.2	9.9	6.3	5.1	5.8	7.7	7.5	7.6
Financiak services	11.9	7.4	9.8	11.3	3.4	7.1	11.9	5.5	9.1	9.5	4.0	7.6
Personal services	10.0	2.6	6.5	7.3	1.6	4.3	7.0	2.6	5.0	13.5	15.5	14.2
Domestic services		20.4	9.5		11.2	6.0		19.8	8.7		17.3	6.1
Public sector	26.5		14.1	24.3		11.4	21.6		12.1	17.6		11.4
Other	7.0	6.4	6.7	10.8	11.0	11.0	4.0	15.5	9.1	1.8		1.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Povert status												
Non poor	92.7	73.3	84.1	90.2	76.0	82.3	89.3	74.5	82.4	93.8	91.1	92.8
Poor	7.3	26.7	15.9	9.8	24.0	17.8	10.7	25.6	17.6	6.2	8.9	7.2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Variables	ARGENTINA			PERU			BRASIL			CHILE		
	Registered	Non-regist.	Total	Registered	Non-regist.	Total	Registered	Non-regist.	Total	Registered	Non-regist.	Total
Gender												
Men	58.2	48.3	54.2	64.6	52.0	58.1	56.4	49.8	54.5	61.0	48.3	58.2
Women	41.8	51.7	45.8	35.4	48.0	41.9	42.8	46.3	43.9	39.0	51.7	41.8
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Age												
Younger than 25	10.1	26.0	16.6	8.5	38.2	23.7	18.9	36.5	24.0	13.0	22.2	15.1
25-45	58.0	47.6	53.7	58.6	47.6	53.0	57.7	44.4	53.9	55.8	45.6	53.5
Older than 45	31.9	26.4	29.6	32.9	14.2	23.3	23.4	19.2	22.2	31.2	32.3	31.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Educational level												
Less than complete secondary	32.0	62.3	44.4	12.1	35.4	24.4	40.1	69.9	48.5	29.6	49.8	34.1
Complete second/incom. Univers.	41.3	30.3	36.8	42.4	49.5	46.1	43.7	26.5	38.8	46.7	40.6	45.3
Complete university	26.8	7.3	18.9	45.6	15.1	29.5	16.3	3.7	12.7	23.8	9.6	20.6
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Industry												
Agriculture										8.07	8.93	8.27
Manufacture	15.7	11.5	14.0	17.0	16.9	17.0	21.9	11.0	18.8	14.1	11.8	13.6
Construction	3.8	11.3	6.9	4.6	7.8	6.2	4.0	8.5	5.3	8.7	8.4	8.7
Trade	16.2	21.5	18.4	12.8	23.2	18.1	20.7	21.3	20.8	17.0	16.8	16.9
Transport	6.5	7.2	6.8	5.9	7.7	6.8	6.0	3.4	5.3	7.2	7.1	7.2
Financiak services	10.3	6.2	8.6	11.3	5.6	8.4	10.9	6.1	9.5	8.8	5.1	8.0
Personal services	8.1	4.0	6.4	6.2	4.8	5.5	6.2	3.6	5.4	12.8	11.4	12.5
Domestic services	1.9	29.2	13.0	2.1	16.2	9.3	5.0	27.9	11.6	3.9	23.0	8.2
Public sector	30.4	3.5	19.4	31.6	6.7	18.9	20.0	5.9	15.9	17.6	6.9	15.2
Other	7.3	5.7	6.6	8.6	11.1	9.9	5.4	12.5	7.4	1.7	0.6	1.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**			
Povert status												
Non poor	94.9	73.5	86.5	93.4	78.7	85.9	89.3	69.9	83.7	94.4	85.3	92.4
Poor	5.1	26.5	13.6	6.6	21.3	14.1	10.7	30.1	16.3	5.6	14.7	7.6
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table A.2
Mincer Equations. OLS

	ARGENTINA				PERU			
	Informal Employment		Informal Sector		Informal Employment		Informal Sector	
Covariates	Monthly	Hourly	Monthly	Hourly	Monthly	Hourly	Monthly	Hourly
INFORMALITY	-0.655***	-0.517***	-0.486***	-0.387***	-0.324***	-0.258***	-0.390***	-0.298***
	[-0.00733]	[-0.00676]	[-0.00798]	[-0.00725]	[-0.0181]	[-0.0177]	[-0.0175]	[-0.0171]
Men	0.185***	0.126***	0.177***	0.117***	0.403***	0.356***	0.399***	0.354***
	[0.00937]	[0.00871]	[0.00981]	[0.00902]	[0.0208]	[0.0205]	[0.0207]	[0.0205]
Household' head	0.0425***	0.0295***	0.0457***	0.0315***	0.147***	0.0995***	0.137***	0.0911***
	[0.0103]	[0.00955]	[0.0108]	[0.00989]	[0.0297]	[0.0293]	[0.0296]	[0.0293]
Age	0.0434***	0.0367***	0.0548***	0.0453***	0.0629***	0.0605***	0.0688***	0.0652***
	[0.00144]	[0.00132]	[0.00150]	[0.00136]	[0.00270]	[0.00262]	[0.00267]	[0.00260]
Age*Age	-0.000408***	-0.000320***	-0.000521***	-0.000405***	-0.000733***	-0.000700***	-0.000774***	-0.000732***
	[-1.69e-05]	[-1.56e-05]	[-1.76e-05]	[-1.60e-05]	[-3.18e-05]	[-3.09e-05]	[-3.15e-05]	[-3.07e-05]
Worked hours	0.00741***	-0.0135***	0.00781***	-0.0126***	-0.404***	-0.393***	-0.390***	-0.384***
	[0.000130]	[0.000171]	[0.000136]	[0.000176]	[-0.0252]	[-0.0247]	[-0.0251]	[-0.0247]
Incom. primary or less	-0.206***	-0.181***	-0.236***	-0.203***	-0.147***	-0.150***	-0.160***	-0.160***
	[-0.0133]	[-0.0123]	[-0.0139]	[-0.0127]	[-0.0299]	[-0.0290]	[-0.0297]	[-0.0289]
Incomplete secondary	0.0906***	0.0909***	0.0941***	0.0929***	0.0989***	0.111***	0.101***	0.113***
	[0.0101]	[0.00930]	[0.0106]	[0.00962]	[0.0284]	[0.0276]	[0.0282]	[0.0275]
Complete secondary	0.272***	0.249***	0.318***	0.284***	0.208***	0.205***	0.203***	0.203***
	[0.00975]	[0.00895]	[0.0102]	[0.00923]	[0.0271]	[0.0263]	[0.0270]	[0.0263]
Incomplete univ.	0.317***	0.342***	0.338***	0.360***	0.349***	0.362***	0.343***	0.359***
	[0.0119]	[0.0109]	[0.0125]	[0.0113]	[0.0315]	[0.0307]	[0.0314]	[0.0306]
Complete university	0.538***	0.568***	0.595***	0.614***	0.560***	0.526***	0.541***	0.516***
	[0.0119]	[0.0110]	[0.0124]	[0.0113]	[0.0328]	[0.0318]	[0.0325]	[0.0316]
Construction	0.0159	-0.0193	-0.0365***	-0.0572***	0.184***	0.147***	0.219***	0.174***
	[0.0135]	[0.0123]	[0.0141]	[0.0127]	[0.0333]	[0.0324]	[0.0332]	[0.0324]
Trade	-0.0662***	-0.0733***	-0.0640***	-0.0714***	-0.121***	-0.0771***	-0.0697***	-0.0386*
	[-0.0111]	[-0.0102]	[-0.0117]	[-0.0106]	[-0.0226]	[-0.0219]	[-0.0227]	[-0.0221]
Financiak services	0.0487***	0.0685***	0.0647***	0.0825***	-0.00635	0.0628**	0.0616**	0.113***
	[0.0142]	[0.0131]	[0.0149]	[0.0135]	[-0.0283]	[0.0275]	[0.0285]	[0.0278]
Transport	0.103***	0.108***	0.0756***	0.0838***	0.166***	0.199***	0.179***	0.210***
	[0.0154]	[0.0142]	[0.0161]	[0.0146]	[0.0332]	[0.0324]	[0.0330]	[0.0323]
Personal services	-0.116***	0.00332	-0.111***	0.00969	0.0507	0.127***	0.00536	0.0935**
	[-0.0165]	[0.0153]	[0.0173]	[0.0159]	[0.0427]	[0.0417]	[0.0426]	[0.0417]
Domestic services	-0.405***	-0.199***	-0.368***	-0.160***	-0.287***	-0.223***	-0.154***	-0.122***
	[-0.0151]	[-0.0139]	[-0.0162]	[-0.0147]	[-0.0361]	[-0.0349]	[-0.0366]	[-0.0355]
Public sector	0.0221*	0.0738***	0.0663***	0.111***	0.321***	0.210***	0.272***	0.173***
	[0.0122]	[0.0113]	[0.0128]	[0.0117]	[0.0286]	[0.0282]	[0.0287]	[0.0284]
Other	0.0419***	0.0905***	0.0391***	0.0905***	-0.129***	-0.0671**	-0.133***	-0.0709***
	[0.0143]	[0.0132]	[0.0150]	[0.0136]	[0.0267]	[0.0261]	[0.0266]	[0.0260]
Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lambda	-0.273***	-0.249***	-0.305***	-0.272***	-0.127*	-0.213***	-0.164**	-0.243***
	[-0.0184]	[-0.0170]	[-0.0192]	[-0.0176]	[-0.0666]	[-0.0652]	[-0.0664]	[-0.0651]
Constant	5.564***	2.895***	5.174***	2.572***	4.137***	1.849***	3.995***	1.729***
	[0.0409]	[0.0379]	[0.0424]	[0.0388]	[0.0936]	[0.0913]	[0.0915]	[0.0894]
Observations	92492	91172	92492	91172	31753	31311	31753	31311

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A.2
Mincer Equations. OLS
(cont.)

	BRAZIL				CHILE			
	Informal Employment		Informal Sector		Informal Employment		Informal Sector	
Covariates	Monthly	Hourly	Monthly	Hourly	Monthly	Hourly	Monthly	Hourly
INFORMALITY	-0.245***	-0.200***	-0.179***	-0.135***	-0.103***	-0.0140***	-0.0109**	0.0724***
	[0.00374]	[0.00382]	[0.00405]	[0.00413]	[0.00465]	[0.00468]	[0.00479]	[0.00480]
Men	0.278***	0.278***	0.274***	0.275***	0.254***	0.240***	0.252***	0.241***
	[0.00612]	[0.00624]	[0.00617]	[0.00628]	[0.00958]	[0.00964]	[0.00961]	[0.00963]
Household' head	0.111***	0.121***	0.116***	0.126***	0.144***	0.164***	0.142***	0.159***
	[0.00663]	[0.00677]	[0.00668]	[0.00680]	[0.00996]	[0.0100]	[0.00999]	[0.0100]
Age	0.0545***	0.0548***	0.0581***	0.0576***	0.0324***	0.0312***	0.0333***	0.0312***
	[0.000720]	[0.000735]	[0.000724]	[0.000737]	[0.000909]	[0.000915]	[0.000911]	[0.000913]
Age*Age	-0.000539***	-0.000538***	-0.000578***	-0.000570***	-0.000271***	-0.000254***	-0.000286***	-0.000259***
	[8.78e-06]	[8.96e-06]	[8.81e-06]	[8.98e-06]	[1.03e-05]	[1.03e-05]	[1.03e-05]	[1.03e-05]
Worked hours	0.0149***	-0.0166***	0.0156***	-0.0160***	0.0711***	0.0640***	0.0816***	0.0695***
	[0.000133]	[0.000135]	[0.000133]	[0.000135]	[0.0141]	[0.0142]	[0.0141]	[0.0142]
Incom. primary or less	-0.191***	-0.190***	-0.203***	-0.199***	-0.182***	-0.186***	-0.187***	-0.187***
	[0.00575]	[0.00587]	[0.00579]	[0.00590]	[0.00706]	[0.00710]	[0.00708]	[0.00709]
Incomplete secondary	0.0769***	0.0795***	0.0743***	0.0774***	0.117***	0.122***	0.118***	0.126***
	[0.00732]	[0.00747]	[0.00737]	[0.00751]	[0.00762]	[0.00766]	[0.00764]	[0.00766]
Complete secondary	0.286***	0.285***	0.303***	0.300***	0.314***	0.319***	0.324***	0.327***
	[0.00692]	[0.00706]	[0.00696]	[0.00709]	[0.00826]	[0.00831]	[0.00828]	[0.00830]
Incomplete univ.	0.618***	0.608***	0.621***	0.612***	0.560***	0.581***	0.568***	0.593***
	[0.00896]	[0.00915]	[0.00903]	[0.00920]	[0.0123]	[0.0124]	[0.0123]	[0.0124]
Complete university	1.135***	1.139***	1.158***	1.160***	1.086***	1.087***	1.111***	1.116***
	[0.0100]	[0.0102]	[0.0101]	[0.0103]	[0.0123]	[0.0124]	[0.0124]	[0.0124]
Construction	0.0176**	-0.00590	0.00380	-0.0211***	0.142***	0.137***	0.140***	0.136***
	[0.00762]	[0.00778]	[0.00771]	[0.00786]	[0.00810]	[0.00815]	[0.00812]	[0.00814]
Trade	-0.0121**	0.0188***	-0.0132**	0.0151***	0.0782***	0.128***	0.0673***	0.112***
	[0.00545]	[0.00557]	[0.00554]	[0.00564]	[0.00682]	[0.00686]	[0.00687]	[0.00689]
Financiak services	0.0825***	0.0746***	0.0920***	0.0820***	0.170***	0.218***	0.162***	0.211***
	[0.00721]	[0.00736]	[0.00727]	[0.00740]	[0.00946]	[0.00951]	[0.00948]	[0.00950]
Transport	0.123***	0.162***	0.118***	0.156***	0.198***	0.213***	0.208***	0.215***
	[0.00833]	[0.00850]	[0.00840]	[0.00855]	[0.0114]	[0.0115]	[0.0114]	[0.0115]
Personal services	-0.0311***	-0.0178*	-0.0328***	-0.0188**	0.0127**	0.0374***	0.0195***	0.0335***
	[0.00909]	[0.00928]	[0.00916]	[0.00933]	[0.00614]	[0.00618]	[0.00616]	[0.00617]
Domestic services	-0.228***	-0.197***	-0.182***	-0.166***	0.247***	0.300***	0.264***	0.316***
	[0.00762]	[0.00778]	[0.00800]	[0.00816]	[0.0177]	[0.0178]	[0.0178]	[0.0178]
Public sector	0.115***	0.0853***	0.0930***	0.0706***	0.152***	0.170***	0.171***	0.186***
	[0.00674]	[0.00688]	[0.00687]	[0.00700]	[0.0181]	[0.0182]	[0.0181]	[0.0181]
Other	-0.219***	-0.203***	-0.267***	-0.245***	0.0558***	0.0414**	0.0675***	0.0534***
	[0.00626]	[0.00639]	[0.00623]	[0.00635]	[0.0164]	[0.0165]	[0.0164]	[0.0164]
Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lambda	-0.0687***	-0.0487***	-0.0644***	-0.0458***	-0.0132	0.00790	-0.0262	-0.00527
	[0.0159]	[0.0162]	[0.0160]	[0.0163]	[0.0186]	[0.0187]	[0.0187]	[0.0187]
Constant	4.288***	1.873***	4.134***	1.743***	10.14***	7.619***	10.06***	7.581***
	[0.0217]	[0.0222]	[0.0217]	[0.0221]	[0.0323]	[0.0325]	[0.0323]	[0.0323]
Observations	274130	274130	274130	274130	193395	193395	193395	193395

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A.3
Mincer Equations. Quantile Regression

Argentina

	Taus				
	q10	q25	q50	q75	q90
IE Monthly	-0.977***	-0.757***	-0.602***	-0.475***	-0.364***
	[0.00795]	[0.000253]	[0.0141]	[0.00864]	[0.0170]
IE Hourly	-0.795***	-0.635***	-0.495***	-0.393***	-0.292***
	[0.000147]	[0.0116]	[0.00370]	[0.00539]	[0.0107]
IS Monthly	-0.651***	-0.563***	-0.468***	-0.386***	-0.293***
	[0.0426]	[0.00303]	[0.0103]	[0.00287]	[0.000241]
IS Hourly	-0.560***	-0.476***	-0.388***	-0.316***	-0.239***
	[0.00677]	[0.0111]	[0.00375]	[0.0200]	[0.000349]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Peru

	Taus				
	q10	q25	q50	q75	q90
IE Monthly	-0.494***	-0.433***	-0.403***	-0.403***	-0.440***
	[0.00863]	[0.000660]	[0.0135]	[0.000915]	[0.0176]
IE Hourly	-0.445***	-0.390***	-0.343***	-0.334***	-0.352***
	[0.0389]	[0.0149]	[0.0228]	[0.0143]	[0.00583]
IS Monthly	-0.724***	-0.568***	-0.424***	-0.326***	-0.272***
	[0.0147]	[0.0195]	[0.00751]	[0.0210]	[0.0259]
IS Hourly	-0.644***	-0.452***	-0.337***	-0.231***	-0.162***
	[0.0550]	[0.0424]	[0.00853]	[0.00374]	[0.00811]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A.3
Mincer Equations. Quantile Regression
(cont.)

Brazil

	Taus				
	q10	q25	q50	q75	q90
IE Monthly	-0.555***	-0.354***	-0.211***	-0.107***	-0.0241***
	[0.00314]	[0.00417]	[0.00957]	[0.00766]	[0.00211]
IE Hourly	-0.489***	-0.300***	-0.168***	-0.0632***	0.0215***
	[0.00457]	[0.00410]	[0.00224]	[0.000970]	[0.00663]
IS Monthly	-0.453***	-0.276***	-0.145***	-0.0411***	0.0569***
	[0.00300]	[0.00140]	[0.00381]	[0.0123]	[0.0145]
IS Hourly	-0.395***	-0.228***	-0.108***	0.0100	0.117***
	[0.00374]	[0.00698]	[0.00745]	[0.0158]	[0.0139]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Chile

	Taus				
	q10	q25	q50	q75	q90
IE Monthly	-0.584***	-0.318***	-0.0880***	0.121***	0.263***
	[0.00899]	[0.000870]	[0.000634]	[0.00359]	[0.00572]
IE Hourly	-0.477***	-0.230***	-0.0132	0.207***	0.368***
	[0.00934]	[0.0113]	[0.0114]	[0.00798]	[0.0128]
IS Monthly	-0.363***	-0.195***	-0.0244***	0.181***	0.318***
	[0.00314]	[0.00939]	[0.00426]	[0.0128]	[0.0173]
IS Hourly	-0.273***	-0.125***	0.0430***	0.268***	0.418***
	[0.0102]	[0.00115]	[0.00390]	[0.0101]	[0.0192]

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Graph A. 1
Estimated coefficient from Quantile Regression
Wage Equations

Argentina

Peru

Graph A. 1
Estimated coefficient from Quantile Regression
Wage Equations (cont.)

Brazil

Chile