

Master's Programme in Economic Development and Growth

Deconstructing Informality: Evidence from South American Household Surveys

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The persistence and growth of the informal economy in South America is considered one of the most relevant problems in the region. However, studying informality across countries can be a complicated task due to the lack of homogeneous concepts and measurements. In this study, a database is constructed and harmonized with household survey data from 9 South American countries for 2019. This research's empirical strategy goes from the broadest to the most specific categorization of informality using probit and multi-logit models, to study how individual, household, and employment characteristics affect the probability of informality, based on the legalistic definition. First, it was found that the independent - informal salaried distinction is not appropriate for studying differences in types of informality. Instead, I consider that differentiating between informal employers, self-employed, salaried, unpaid family workers and formal employment is more accurate. In addition, evidence was found that supports the main theories established in the literature, but this research contributes with new specific findings thanks to the deconstructive analysis of informality across countries. The results support the life-cycle theory, as well as the human capital theory, although I find different effects of education on being an informal employer than on the other types of informality, and that higher education reduces the probability of informality more for women than for men. It was also found that being a woman increases the probability of informality, except for Ecuador, Paraguay, and Uruguay. But when deconstructing, the results show that being a woman has a negative relationship with the probability of being an informal employer and a positive one with being an informal salaried, informal self-employed, and unpaid family worker, and this effect increases in that order. Also, that the number of children is more significant in increasing the probabilities of informality for women than for men. Finally, that informals at the bottom of the distribution are more likely to be unpaid family workers or self-employed, women, young and with no education; while those at the top are more likely to be employers, men, old and with superior education, among other findings.

Keywords: labor informality, social security, socio-economic characteristics, household surveys, South America

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1 Introduction

The lack of sufficient economic opportunities for the economically active population is considered one of the most important contemporary problems. Employment is one of the fundamental requirements for improving the living conditions of the population and reducing poverty levels. Predominant development models in Latin America in recent decades, despite attaining high growth rates, among other social and economic achievements, have failed to provide formal employment opportunities to a vast portion of the population. Economic progress is not enough if it does not go hand in hand with distributing the fruits of this growth to all citizens, including them in the social system and providing them with the necessary security to face vulnerabilities, which is achieved through a full and protected labor insertion.

Through orthodox policies and processes, governments attempted to create the necessary conditions to replicate the characteristics of advanced societies in underdeveloped countries, leading to a perpetuation of the status quo, excluding regions, sectors, and individuals from the growth process, failing to allocate and redistribute resources and generating sufficient employment. Driving individuals to a search for income alternatives in order to meet their needs and those of their families, leading to what we know as informal work in the labor market.

According to the International Labor Organization (ILO), more than 2.000 million people in the world have an informal employment and in Latin America, there are at least 140 million people informally employed, which represents 50% of the region's workforce, whose jobs do not comply with basic government regulations and also do not have any kind of social protection or minimum working conditions.

Informality is a heterogeneous phenomenon and different theoretical schools propose alternative definitions and arguments related to its origin, determinants, and motives. In this case, I work in line with the research of Perry et al. (2007), which has a mixed perspective and combines two approaches adopted in the literature. These authors consider that there are two types of agents in the informal economy, those who work informally by choice and those who are there by exclusion, beyond their will. While the former could enter formality as soon as they decide to do so, the latter do not have this possibility. And these views are complementary rather than opposite.

Moreover, there are two visions regarding the measurement of informality: the "productive" related to the low productivity, low qualification, and small-scale operation of the informal sector, and the

legalistic definition based on the legal protection of workers in terms of social security. This study was performed following the legalistic definition since it is more convenient according to the empirical literature.

But why is it so important for researchers and policymakers to study the increasing size of informal employment? In the first place, informal workers lack all forms of social protection. Restricted access to health, unemployment benefits, and occupational accident protection, as well as lack of access to pension system protection, leaves informal workers overly exposed. In most cases, informal employments have lower productivity, lower wages, and it is usually just a survival strategy for the citizens. As informality increases, so does the poverty and inequality associated with it, making the goal of economic development even more distant (Freije, 2002). It also particularly affects vulnerable populations: workers with low levels of education, women, youth, indigenous people, among others. On the other hand, informality is related to non-compliance with tax collection and entails a fiscal cost because these workers congest the use of public services without contributing to them, it is also related to higher levels of corruption and acts as unfair competition for formal firms.

Studying the individual, household, and employment characteristics of the informal workers is relevant to be able to formulate and direct public policies correctly. However, being such a heterogeneous phenomenon in its origin and forms and the variety of groups it affects, makes the measurement process more complex. Household and employment surveys are very useful when performing this type of analysis, but it can be a complicated task to make a cross-country comparison because there is a problem of lack of homologation and comparability, especially among Latin American countries, in addition to the fact that there is no harmonized database containing this information. Previous work on the subject has focused on studying countries separately or studying 3 or 4 countries to make comparisons. In this research, to analyze the informal economy of the whole region, a database was constructed and harmonized based on household surveys of 9 South American countries, that represent approximately 94% of the total population of the region, for the year 2019¹.

This paper contributes to the wide literature on informality by studying empirically the South American region from an individual's perspective. A methodology that goes from the broadest

¹ Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru and Uruguay

categorization of informality to the most specific one was constructed, in order to analyze in depth the heterogeneity of the phenomenon, comparing across countries. For this, an important effort was made in harmonizing databases for 9 countries in the region. The model is based in 4 stages, starting with a probit model considering a dichotomous informality variable, and as the research progressed, informality was analyzed at a more disaggregated level using multi-logit models. These effects are also studied separately by gender, finding important differences in the results.

This research finds evidence in support of many of the theories established in previous studies, although there are particular country cases that do not comply with some of them. This raises new research questions that could be studied in the future.

In the following lines, the most important findings are described according to each variable and each stage of the model. Among others, it can be highlighted:

First, it was found that women have higher probabilities of belonging to the informal economy in most countries, excepting Ecuador, Paraguay, and Uruguay, where the effect is negative. And that depending on the country the magnitudes of this correlation vary significantly. Also, when dividing the samples by gender, variables like the number of children are more significant in increasing the probabilities of informality for women than for men. Moreover, having superior education decreases more for women than for men the likelihood of informality. Subsequently, in the third stage, results show that being a woman has a negative effect on the likelihood of being an informal employer, but a positive effect in the likelihood of being informal salaried, informal self-employed, and unpaid family worker, and the effect increases in that order. In this stage, opposite results were found for the three previously mentioned countries. Lastly, when studying only the informal sample and its probabilities of falling in the top or bottom of the income distribution, it was found that for informal women the likelihood of being at the bottom of the income distribution increases while at the top of the distribution decreases, compared to informal men, whose effect is the opposite. Throughout the study, when comparing across countries, Peru shows the highest coefficients of correlation between being a woman and the probability of informality for all stages.

Theory explains that the higher the human capital, the lower the probability of informality. It was found at all stages that more education decreases the probability of informality, but it can be seen how this effect differs across countries in magnitude. Also, when dividing the sample between men and women, the reduction effect is greater for women. Moreover, when comparing across countries and different types of informality in the 3rd stage, higher levels of education are related to lower probabilities of all types of informality except for informal employers. This effect on employers is

negative or not significant for some countries but strangely shows a positive correlation for Argentina and Brazil.

Also, the effects of ethnicity and Venezuelan immigration on the likelihood of informality were studied separately. Finding that compared to white individuals, the afro-descendant, indigenous, and mestizo population, are more likely to work informally and lack pension coverage, and this correlation is the highest when studying indigenous population. Moreover, being a Venezuelan immigrant significantly increases the likelihood of informality for the 5 countries in the sample and this effect shows higher coefficients for Colombia with a 33.6 percentage points increase in the probability of informality, and the lowest coefficient for Uruguay.

Regarding age, evidence is found that supports Cunningham's (2007) life-cycle theory, where informal salaried work is an entry point to the labor market and prevails among the youngest while self-employment predominates in older workers.

When studying the effects of economic sectors, important differences across countries were found that are summarized and reflected in table 6-6 of section 6. It can highlighted that working in Agriculture shows a positive relationship with the likelihood of informality, except for Ecuador and even more for Uruguay, where this effect is negative and significant, which could be related to the technification of the agricultural sector. Also, for countries like Brazil, Chile, and Peru, results show a positive relationship between working in public administration and the likelihood of informality, which could be related to rigid labor legislation and the need for outsourcing with different labor arrangements.

Subsequently, when analyzing exclusively the informal sample and the probability of falling at the top or the bottom of the income distribution, it was found that informal workers located at the bottom of the income distribution, relative to those at the middle, are more likely to be unpaid family workers and self-employed and less likely to be employers, compared to being salaried workers. Also, they are more likely to be women, younger more than old, more likely to have no education or only primary education, and less likely to have a superior education. On the other hand, informal workers at the top of the income distribution are more likely to be employers and self-employed, men and old with superior education, and head of households.

In summary, high levels of heterogeneity were found between different types of informality, between men and women, and across countries.

This research is structured as follows: Section 2 presents a literature review that starts with the origin of the concept of informality, summarizes the different schools of thought on the subject, explains the process of measuring informality, and culminates with a subsection on previous work related to how individual, household and employment characteristics affect the probability of informality. In Section 3, a brief background on informality in the Latin American region, its origins and current state is provided, as well as a brief summary of social security and the present situation in the region. Section 4 reports the process of constructing our database, the variables we used, and descriptive statistics. Section 5 explains the stages of our methodology. In Section 6 the results of the models are presented and discussed. Lastly, Section 7 shows the research's limitations as well as a compilation of possible future research questions, while in Section 8 our final remarks are presented.

2 Literature Review

2.1 Defining Informality

The first study that is indirectly related to the explanation of the emergence of the informal sector is Arthur Lewis's paper "Economic development with unlimited labor supply" (Lewis, 1954). His famous dual sector model explains the development of the modern and traditional sectors. According to this theory, if correct policies were implemented, the traditional sector with low productivity would be absorbed by the modern "capitalist" sector. Economic development would allow the generation of modern jobs to absorb the excess labor of the traditional economy, leading to a turning point (Lewis Turning point) where wages would start to rise above the subsistence level.

Throughout the next years, different authors criticized Lewis's theory and how it didn't apply to the case of developing countries. One of those authors was Hans Singer, who in 1970 showed how with economic development and growth, unemployment and casual employment grew in developing countries, assuring there was no such thing as the Turning Point. Instead, he explains how, due to advances in technology, there was a disequilibrium in developing labor markets: as the use of capital intensive technologies grows, there is limited creation of jobs and at the same time, the population grows significantly thanks to progress in health technologies. This generates an imbalance that leads to an employment crisis with high levels of casual, intermittent employment and unemployment (Singer, 1970).

But it wasn't till the 70s when the concept of informality emerged. The authorship of the term is attributed to Kevin Hart, who while doing research on urban activities in Ghana in 1971 came up with the concept related to occupations of the low-income population (Hart, 1971). Shortly after, the International Labor Organization (ILO) further developed this idea during a mission to Kenya in 1972. In this study, economic informality was defined considering characteristics such as ease of entry, small-scale operation, family ownership, process-adapted technology, reduced financial capital, labor intensity, unregulated but competitive markets, and informal training or skill acquisition processes (ILO, 1972).

It is known that during times of economic adjustment, when businesses are downsized or have to close, workers who are unable to find formal jobs, have to take alternatives in the informal sector and even more in countries with no unemployment compensation. In these cases, an increasing

number of the population starts relying on the informal economy to generate income for their households. This is why events like the 80s Latin American crisis are related to an expansion of the informal economy. Subsequently, during the 90s, although globalization brought market openness and new jobs, it also contributed to the increase of informality. These new markets and new jobs were unavailable for some workers and producers, while also, formal firms needed outsourcing and hiring workers under informal agreements (Chen, 2012).

The phenomenon of informality began to gain more and more importance in the literature due to its persistent growth, especially in underdeveloped countries, and in 1993, the ILO established one of the most solid definitions of the Informal Sector as a result of the academic debate since the concept was first introduced in the literature. This definition focused mainly on "the characteristics of non-agricultural economic units that are not constituted as companies and do not comply with the most basic records that legislation demands of suppliers of goods and services" (Hussmanns, 2004).

Also, for an economic unit, according to the ILO (1993) definition, to be considered as belonging to the informal sector, it had to be characterized by a lack of accounting records and a small scale of operation. Subsequently, it was determined that the number of workers in the economic unit should not exceed 5 to be considered as part of the informal sector (Hussmanns, 2004).

Ten years after the definition of the "informal sector" was established by ILO experts, the concept was reformed to include new forms of work within the traditionally defined informal sector that presented characteristics of social and labor unprotection. Thus, a new approach emerged for the modification of the concept. Now, the focus of the analysis of informality was not on the vulnerability characteristics of the economic units, but on the labor conditions of the workers. The new approach of the ILO (2003) intended to include not only people employed in the informal sector but also workers who delivered "their labor force for perfectly constituted companies and even for institutions, private or public, who are paid off-payroll, to evade employer contributions to social security".

The International Conference of Labor Statisticians (ICLS), has identified three terms associated with informality: The informal sector concept relates to the production and jobs carried in irregular, small, or not registered enterprises (ILO, 1993). Informal employment is linked to jobs that lack legal protection and social benefits, in the informal sector, as well as in the formal sector (ILO, 2003). Lastly, the diverse and increasingly large group of all the previous enterprises, activities, and workers and their output are known as the informal economy.

Given the complexity and heterogeneity of the phenomenon of informality, at least four theoretical schools of thought have dominated the literature: the dualist school, the structuralist school, the legalist school, and the voluntarist school. Each of them develops its definition of the informal economy and, in addition, proposes different arguments about its origin, nature, and growth. Chen (2012) makes a good compilation regarding schools of thought:

The dualist school argues that the formal sector and the informal sector are two sectors differentiated and unconnected from each other: while one has a certain degree of bureaucracy, the other one is a means of generating income for the poor or marginalized. Furthermore, it suggests that the informal sector operates outside the margins of the economy. (Hart, 1971; ILO, 1972, 1993; Tokman, 1978). According to this school of thought, due to imbalances in population growth rates, modern industrial employment, and asymmetric people skills compared to the modern economic opportunities, workers are excluded from the modern sector.

The structuralist school views the informal economy as a consequence of the advance of capitalism in industrialized societies. Thus, informal workers and microenterprises are instruments of large conglomerates to reduce the costs of labor and increase competitiveness. Thus, industrial progress and development generate economic informality (Moser, 1978; Castells & Portes, 1989; Portes, 1995). As Chen (2012) explains, structuralists consider that formal and informal economies are linked, and both companies and informal workers are subordinates to the interests of capitalist development.

The legalist school, on the other hand, argues that the informal economy is made up of brave microentrepreneurs who choose to work informally to avoid the costs, time, and effort required to join the formal registers (De Soto, 1989). They highlight that informal workers are free of legal and tax burdens but they are also unprotected and have no benefits from the State. Thus, this school of thought attributes the existence of informality to law: the decision to work informally or not is a rational exercise of weighing the advantages of integrating the current legal systems and carrying out economic activities within their regulatory framework (de Soto, 1989). The legalists consider that governments are the ones called upon to develop simplified procedures that allow the incorporation of informal enterprises into the formal system.

Finally, *the voluntarist school*, argues that the informal sector is made up of actors that, after conducting a cost-benefit analysis, decide to operate by evading legal and tax regulation. They don't blame the burdensome registration process but instead make individuals responsible for the choice

of sector (Levy, 2008; Maloney, 1999, 2004). This approach considers that informal businesses create unfair competition to those that are properly constituted and limit the countries' tax base.

On the other hand, there is an approach perceiving that the informal sector produces clandestinely and illegally. For Portes (1990), the informal economy should not be understood as a set of marginal economic activities associated with people's survival; on the contrary, it refers to activities that produce economic income that are not regulated by the State's supervisory bodies.

In summary, there are four main schools developed in the academic literature that seek to explain the phenomenon of informality: two that are highly related to individuals (dualist and voluntarist), one related to historical variables of the relationships between socioeconomic structures (structuralist), and one that is related to law and the tortuousness of the administrative process (legalist).

On top of the aforementioned, there are more recent visions that have mixed perspectives. Authors like Perry et al (2007), writing for the World Bank, combine two of the approaches in the existing literature: exclusion and exit. The exclusion approach can be related to different dynamics like labor segmentation that prevents informal workers from taking formal jobs, the complex regulations and burdensome registration processes that prevent small firms from formalizing, or large firms that protect themselves from high taxes and excessive regulations by working informally. While the exit approach considers the decision of informality as voluntary and relates it with a cost-benefit analysis of workers and firms (Perry et al. 2007). According to this research, workers who are in the informal economy by exit take this choice and could formalize whenever they decide to, while the other group of informal workers are excluded due to structural reasons and cannot formalize (Perry et al. 2007). The authors explain that these two perspectives are complementary and not opposed: one mechanism may be more relevant in one country than in another depending on each countries' legal and institutional characteristics, also both perspectives coexist in the same country across workers and economic sectors, just as there may be cases where both mechanisms are difficult to differentiate.

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2.2 Measuring Informality

Authors do not only differ in the definition and theories behind the informal economy but also when it comes to measuring the informal sector at the empirical level. Although there are methods to measure informal activity at the macro level such as labor statistics, indices constructed from national accounts (income vs. expenditure), tax auditing, electricity consumption, among others (Alderslade et al, 2006); to study the composition and drivers of informality, it is necessary to analyze at the micro-level through household or labor force surveys.

This is usually a complicated task, but household survey questions related to social security enrollment, worker's benefits, size of the firms, signed contracts, can help to evaluate informal employment. The issue comes when trying to find a standardized and comparable definition of informality. Generally, labor informality is considered as those workers or firms that are not regulated nor covered by the State. However, despite the efforts the ILO has made, the comparative analysis of informality across countries in Latin America is complex because it lacks a common measurement.

Ruiz, Tarafa, Martinez, and Benach (2014), study if the data on informality is comparable across South American countries. They find that there is an important disparity across countries in the used definitions and their published data on informality. They explain how a precise, adequate definition of informal employment is necessary for countries to collect data based on this definition to make comparisons, consider the nuances of the concept, and properly study the deprivations faced by the majority of informal workers.

This difference between official measures is mostly due to discrepancies in the health and pension systems of each country. Table 2-1 shows the main variations between the official or most used in the literature (when there are no official measures as in Uruguay and Chile or when there are no official measures for self-employed workers as in Argentina) measures of labor informality for our countries of study.

Table 2-1: Official / Generalized Measures of Informality

	Salaried workers	Self Employed	Employers	Unpaid family workers	Domestic workers	Source
Argentina	Does not contribute to pension system	Does not contribute to "mono-tributo" : single tax	Does not contribute to "mono-tributo" : single tax	All	Does not contribute to pension system	Literature
Bolivia	Working in establishments with less than 5 workers	All, exluding proffesionals.	Working in establishments with less than 5 workers	All	All	INE
Brasil	Without a signed formal contract	Without CNPJ (Cadastro Nacional da Pessoa Jurídica) registration	Without CNPJ (Cadastro Nacional da Pessoa Jurídica) registration	All	Without a signed formal contract	INE
Chile	Access to health (Fonasa or Isapre) and pension (AFP) contributions simultaneously	If the economic unit or activity of which they are owners belongs to the informal sector (Criteria for registration in the SII and accounting).	If the economic unit or activity of which they are owners belongs to the informal sector (Criteria for registration in the SII and accounting).	All	Access to health (Fonasa or Isapre) and pension (AFP) contributions simultaneously	INE
Colombia	Working in firms with less than 5 workers	Working in firms with less than 5 workers , who are not professionals or technicians	Working in firms with less than 5 workers, who are not professionals or technicians	All	All	DANE
Colombia*	Not covered by health and/ or pension contributions	Not covered by health and/ or pension contributions	Not covered by health and/ or pension contributions	Not covered by health and/ or pension contributions	Not covered by health and/ or pension contributions	Literature
Ecuador	Work in units with less than 100 workers that do not have a RUC (Registro Único de Contribuyentes)	Work in units with less than 100 workers that do not have a RUC (Registro Único de Contribuyentes)	Work in units with less than 100 workers that do not have a RUC (Registro Único de Contribuyentes)	All	-	INEC
Peru	Social security not financed by the employer	Working in the informal sector	Working in the informal sector	All	Social security not financed by the employer	INEI
Paraguay	Not contributing to a social security system	Whose company is not registered in the Registro Único de Contribuyentes (RUC) of the Ministry of Finance	Whose company is not registered in the Registro Único de Contribuyentes (RUC) of the Ministry of Finance	All	Not contributing to a social security system	DGEEC
Uruguay	Does not contribute to pension system	Does not contribute to pension system	Does not contribute to pension system	Does not contribute to pension system	Does not contribute to pension system	INE

Source: Author's elaboration with data from each country's household surveys.

Considering the diversity of official definitions, I took the task of estimating informality in the selected countries according to one common methodology. For this, the literature on the subject was studied.

There are two main branches in the literature when studying how to measure and define informality: the "productive" definition, which is related to the type of job, the productivity, and the skills, and the "legalistic" definition, which is based on the legal protection and benefits that workers have (Chong et. al, 2008)

The former is related to the concept of the Informal Sector, composed of small economic units with little to no resources, using primitive technology and unskilled labor, leading to low productivity (ILO,1993). In practice, the "productive" definition translates to an individual being considered informal if he/she is a salaried worker in a small private firm, an unskilled self-employed, or an unpaid worker. Using the productive concept could be misleading in developing countries, where assuming all unskilled self-employed and small firm workers belong to the informal sector may lead to an important measurement error (Lehmann, 2015).

On the other hand, the second approach is related to the Informal Employment concept, which mainly focuses on work conditions. The legalistic definition considers the compliance with labor regulations, social security affiliation, and employment benefits of workers (ILO,2003). Usually,

contributing to social security may be a good proxy of a worker having all the benefits of formality. The issue with this measurement is that labor legislation and social protection regulation vary across countries and also the household surveys differ in their coverage regarding social security systems. However, in most household and employment surveys, the most repeated question of labor protection is connected to work-related pension system contributions. This measure is commonly used to identify an informal worker according to the legalistic approach and it is the one that will be used in this paper.

For this, the databases of the different countries were studied to find which variables were most related to the legalistic definition of informality, that could also be comparable across countries; a process that will be explained in Section 4.

2.3 Previous Research

Several relevant studies compare countries across Latin America in the literature on Informality using household surveys. We could highlight the following publications:

In a mostly descriptive paper, Gasparini & Tornarolli (2009), use data of 16 years (1989-2005) for several countries in Latin America and the Caribbean, to study the main trends of the different definitions of informality in the region (productive vs. legalistic definitions). This data is obtained from the Socioeconomic Database for Latin America and the Caribbean (SEDLAC), and it is already processed and published by country. Their data is consistent with the idea of self-employment being voluntary, but with informal salaries being lower than formal wages. The authors conclude that the legalistic definition based on workers' social security coverage, is the one that seems more relevant to study and to compare across countries, but they explain there is a lack of social security data in Latin American household surveys.

At a more micro-level study, Fernandez, Villar, Gomez, and Vaca (2017), examine the taxonomy of informality in 7 Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay). They explain the importance of understanding the composition of informal employment so policy recommendations can be made for each country. Using 2015 household surveys for all the countries, they study the different definitions of informality to know which one best fits the Latin American reality, and find that the only measure that can be estimated for all countries is the one that takes into account pension contributions for all workers, and for this reason, it is the measure used in the rest of the paper. They aggregate the data of the 7 countries for all the working-age population (WAP) and develop a multi-logit model with 4 categories

composing the dependent variable in: formal worker, informal worker, unemployed and inactive. The explanatory variables being socio-demographic characteristics like education, age and woman marriage status. And a second model comparing across countries. The authors conclude that the main differences in the characterization of informality in the selected countries are explained by the types of informality that prevail in each of these countries. Dividing informality into 4 types with different motives and target populations: subsistence, voluntary, induced and mixed informality (Fernandez et al, 2017).

But who are the individuals with more likelihood of working informally? Many authors identify a similar group of workers: those belonging to the most vulnerable groups of the population. Since informality is associated with a high degree of labor precariousness, it is to be expected that groups considered vulnerable are the most likely to opt for labor informality, with vulnerable being understood as all those who, either because of their age, race, sex, economic condition, physical characteristics, cultural or political circumstances, are at greater risk of having their rights violated (Cuevas et al. 2016). But also, it is known that the informal economy is quite heterogeneous and is composed of different groups of people, with different motives and backgrounds. This is why it is relevant to study who this informal worker is and his/her characteristics, in order to be able to direct policies correctly towards this large and unattended group of the population.

Funkhouser (1996) was the first to use household data from five Central American economies to do a cross-country study of informal employment analyzing the characteristics of the workers. Using probit models, he finds that more educated workers have higher probabilities of belonging to the formal sector, and also that the youngest, the oldest and the female population are disproportionately represented in the informal sector. Returns to human capital and education are lower in the informal sector than in the formal sector, while returns to labor market experience are higher in the informal sector than in the formal sector. Finally, he also finds that the difference between men's and women's wages is larger for the informal sector.

In the same way, when studying the probabilities of belonging to the informal sector, Perry et al. (2007) divide informals into two groups: self-employed informals (micro-firm owners and self-employed) and informal employees (domestic employees, unpaid family workers, and micro-firm and large firms workers without labor protection). They find that independent workers mostly report being as well-off as informal employees as they would be being protected and registered, not looking for formal jobs and preferring to be self-employed, compared to informal employees. They also find that these individual, household and employment characteristics are highly correlated with informality: small firm size, education below secondary, working in construction,

agriculture, retail and transport sectors, having short job tenures, being of young age for informal salaried and old age for independent informals, and being married with children for women. They explain how these characteristics show a similar pattern among salaried and independent informals, but the magnitudes do differ.

Regarding the relationship between age and informality, Cunningham (2007), explains the life cycle theory of Latin American workers, where the younger population finds that working as informal salaried is a point of entry to the labor market. Then, these young workers start accumulating skills that allow them to transfer to the formal sector or to work on their own, this leads to a constant decline of informal employment in subsequent ages. On the contrary, own-account workers have almost no representation in the young population, and then increases significantly as workers gain age. The chances of entering self-employment are much higher for older than for younger workers (Perry et al 2007). Evans & Jovanovic (1989) explain that in order for entrepreneurs to enter informal self-employment, they need an accumulation of physical and working capital, but especially in developing countries, credit constraints, undeveloped credit markets and poor education systems make it complicated to accumulate human capital. Also, there is the case where workers enter salaried work to accumulate knowledge, skills, capital so they can later open their informal businesses. Contrarily, prime-age workers are mostly formal salaried workers and old-age workers have similar probabilities of working formally or independently.

Human capital theory (Becker, 1975) considers human capital to be the accumulation of previous investments in education, work training, health, and other factors that increase productivity. While, the selection hypothesis (Spence, 1973) suggests that education affects the labor outcome of individuals, not because it affects their productivity, but because it classifies and labels them, thus determining their labor market insertion. In any of these aspects, it seems reasonable to think that workers with more schooling could be the most likely to formally enter the labor market.

In addition, the composition of family units, migrations and ethnicity are factors that are known to affect the likelihood of informality. Marcouiller et al.(1997) find that marriage, the number of children and the number of inactive members of the family increase the likelihood of men's formal employment but decrease the likelihood for women. This could be related to the fact that the flexibility in working hours that informality provides allows women to attend their care responsibilities in the household. However, Funkhouser (1996), observes that the number of children does not show a significant effect on the likelihood of informal work in some Central American countries, so we can see it's not a rule and it can vary across countries.

Moreover, Telles (1992) identifies the effect of race and finds that non-whites show a higher probability of working in the informal sector than whites, using data from the 1980 Brazilian census. Contrarily, Perry et al (2007) find that there is no strong evidence of an independent correlation of informality with migration or ethnicity, explaining that these groups' higher incidence of informal work is a consequence of their personal characteristics and them choosing to work in sectors that have higher likelihood of informality, but is not a result of them being migrants or part of an ethnic group, per se.

Moreover, the likelihood of belonging to informality is also related to the sector of economic activity. Although it varies across countries, evidence shows that it is more likely to work informally in manufacturing and construction (ILO,2002; Losby et al, 2002). But for example, in the case of Colombia, as Garcia et al (2008) explain, it is working in commerce, restaurants, hotels and transportation that increases the likelihood of informality. This suggests that these correlations do not always maintain across countries and it could be interesting to do a more profound analysis of the effect.

Some authors like Gallaway & Bernasek (2002) for Indonesia and Malta et al (2019) for Senegal, among many others, divide the sample by women and men and apply their models to both groups to study the differences across gender. Gallaway & Bernasek (2002) find that education, household and family responsibilities play a significant role in the decision of informal/formal participation for women but not for men. And Malta et al (2019), find that education is significant only in women's sample and that having children reduces the probability of informality for men, but increases women's likelihood.

As shown by many authors, gender has an important relationship with the likelihood of belonging to the informal economy. The difficult access to economic independence leads many women to resort to informal work. Barquet (1991) argues that since the beginning of humanity, the persistence of sociocultural gender patterns assigned to a woman are the roles of caregiver/nurturer, centered on her biological reproductive function, making women bear the responsibility for the maintenance, reproduction and replenishment of the labor force, which are exacerbated in conditions of crisis. Historically, the occupations of maintaining, reproducing and sustaining households (domestic work), as well as other tasks related to care, are mostly performed by women and, although they are essential activities for the development of life and contribute to the economy, they are not recognized or remunerated. This means that a large part of the female population is forced to seek additional income through jobs that allow them to accommodate their time while continuing to perform care work and thus end up resorting to informality.

As Meagher (2010) explains, in the past decades there has been an important increase in women's participation in informality, a phenomenon known as the feminization of informal labor. Generally, women play a double role in taking care of the household's responsibilities but also having to provide income for their families, leading to women needing flexible schedules and working conditions. The formal sector, especially in Latin America, offers strict conditions, significant regulations and lack of flexibility, that tend to be incompatible with women's household and childcare demands, this is why they tend to lean for the informal sector. There are opposing views on if women's participation in the informal sector works as a source of economic opportunity and their empowerment or if on the contrary, it contributes to their impoverishment. The market-liberal perspective supports that women participating in the informal economy is a solution for the burdens women face and contributes to poverty alleviation (USAID, 2005). On the contrary, the feminist perspective argues that instead of diminishing the disadvantages women face in labor markets, belonging to the informal sector increases inequalities and maintains them over time, generating one more burden for women, adding to domestic work and generating income: seeking social security protection on their own (Elson, 1999).

Lastly, figure 2-1 shows the global network Women in Informal Employment: Globalizing and Organizing (WIEGO)'s model of the hierarchy of earnings and poverty risk by employment status and sex. Where informal employment status goes from unpaid family workers who are the most vulnerable, with more female presence, the higher risk of poverty, and lower earnings, to informal employers who have higher average earnings, lower risk of poverty and mostly male presence.

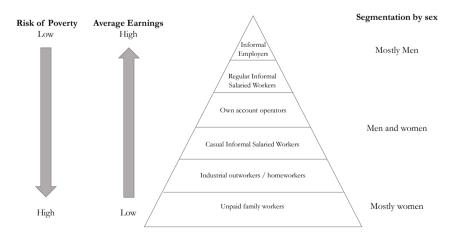


Figure 2-1: WIEGO Model Of Informal Employment

Source: WIEGO Model of Informal Employment: Hierarchy of Earnings & Poverty Risk by Employment Status & Sex

Based on these previous studies, we will consider the concepts and methods necessary to analyze the phenomenon of informality in South America.

3 The Case of Latin America

3.1 Background

Informality as a social and economic problem arises as a result of the accumulation of capital sought in the latest development models applied in Latin America. Historically, the world has been divided into two axes: one of domination and power, and the other of subjugation; this is easily identified in the three predominant development models in Latin America: the primary-export model, the import substitution model and the neoliberal model.

The export model began in the 19th century, characterized by the search for capital accumulation through manufacturing, which led to the division of countries into producers of commodities who were considered "backward", and the more developed manufacturers and exporters. This development model was also transferred to the interior of countries, creating a division of working classes, giving rise to social exclusion, reproducing the highly unequal distribution of wealth, human capital and political influence (De Ferranti et al, 2004). After World War II, due to the institutional fragility derived from the conflict between countries, the industry turned into the new axis of capital accumulation initiating the second wave of predominant Developmentalism in Latin America: Import substitution. In the 1950s the model sought the protection of national economies, decreasing imports and increasing national production. (De Ferranti et al, 2004).

In the sixties and seventies, due to the growing industrialization, multinational companies emerged that ended up capitalizing the market. During this time, there was an idea of creating the necessary conditions to reproduce throughout the world the characteristic features of the advanced societies of the time: high levels of industrialization and urbanization, technification of agriculture, growth of material production and living standards, and widespread adoption of modern education and cultural values. (Ortiz, 2019)

In the 1980s, the so-called debt crisis occurred, generating stagnation and imbalance in Latin America, and after this, the problem became more acute, as inequality and poverty gaps widened and, above all, demographic levels overwhelmed the capacity of the State to generate growth rates capable of providing and fostering economic development. This led to the rethinking of the axis of development, where capital accumulation would again be transferred to exports, giving way to the neoliberal development model which promoted the opening of economies and financial deregulation (De Ferranti et al, 2004).

Nevertheless, the model was not built on solid foundations, and as a consequence, the inequality in the economies of Latin America deepened, leaving several countries in crisis and foreign debt. In addition, the neoliberal model was characterized by generating public policies that reduced social spending on education, health, and public services (Sanchis, 2011). It is as a result of this change in public policies that a transformation of the socio-economic apparatus was generated in Latin America, bringing with it social problems that, to this day, have not been solved.

These multiple shortcomings in government public policies, hand in hand with the previously mentioned development models, have failed to effectively allocate and redistribute resources causing one of the biggest problems of recent decades for the governments: the inability to generate sufficient employment for its population, both public and private sector, causing workers to find income alternatives to meet their needs and those of their family groups (UNDP, 2017). This search for alternatives through the use of skills resulted in the generation of what is now known as informal work in the labor market.

Due to the instability that continues to emerge in Latin America, the informal economy keeps growing as a means of subsistence and survival, providing a way of life that the formal economy cannot provide, and above all, it has been an escape valve for the difficult years when social tension has been very strong.

This section presents an overview of labor informality in South America, as we chose 9 South American countries as our sample, which represent 94% of the total population of the region, to have a more defined and precise scope of study. Calculations may differ depending on the definition and measurements of informality used by the different entities.

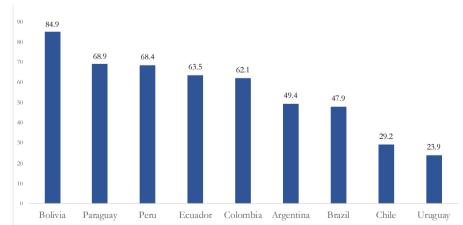


Figure 2-2: Informal Employment Rate (%) by country in South America according to ILOSTAT for 2019

Source: ILOSTAT (2019).

South America is characterized by high levels of poverty and inequality, precariousness of jobs, and low levels of social security coverage and although informality is a predominant characteristic of underdevelopment in the region, it is not constant and is not evenly distributed across countries; that is, not all countries have the same informality rates and these change over time. In general terms, the informal labor force represents, approximately, 40% of the region's GDP (OECD,2018) However, if analyzed particularly, according to the ILO (2019) and as it is shown in Figure 3-1, in Bolivia 84.9% of the population was employed in the informal sector; while, in Uruguay only 24% was characterized as informal.

Also in Table 3-1 some population, economic, sectoral, social and institutional characteristics of South American countries are presented, which may explain several of the trends observed in this paper.

Table 2-2: Characteristics of the selected countries

	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay
Population									
Population, total (millions)	44.94	11.51	211.1	18.95	50.34	17.37	7.1	32.51	3.46
Urban population (% of total population)	92.0	69.8	86.8	87.6	81.1	64.0	61.9	78.1	95.4
Unemployment, total (% of total labor force)	9.84	3.46	11.93	7.29	9.96	3.81	6.60	3.03	9.35
Income and income distribution									
GDP per capita, PPP (current international \$)	23040	9111	15300	27002	16012	11879	13246	13416	22515
Gini index (World Bank estimate)	42.9	41.6	53.4	44.4^{1}	51.3	45.7	45.7	41.5	39.7
Poverty headcount ratio at \$3.20 a day (% of population) ²	4.9	7.8	9.1	0.7^{1}	12.7	9.8	4.5	7.5	0.5
Economic Structure as % of GDP									
Agriculture, forestry, and fishing, value added (% of GDP)	6.1	12.2	4.4	3.5	6.7	9.0	10.1	7.0	5.9
Manufacturing, value added (% of GDP)	13.0	10.5	9.4	10.0	11.0	14.0	18.3	12.3	11.7
Services, value added (% of GDP)	54.3	50.7	63.3	58.7	57.6	51.9	50.4	54.9	60.9
Total natural resources rents (% of GDP)	2.1	3.9	3.5	2.3	4.5	7.0	1.2	1.7	1.6
Indexes									
Women Business and the Law Index Score (scale 1-100)	76.25	88.75	81.875	77.5	81.875	89.375	94.375	95	88.75
Heritage foundation (100= optimal score)									
Government Integrity	33.5	19.7	28.1	62.3	33.5	25.3	25.5	31.8	69.2
Judicial Effectiveness	44.5	12.3	51.7	56.3	34.3	20.2	30	34	58.9
Labor Freedom	46.9	52.9	51.9	65	78.5	48.2	29.2	63.5	71.9
Business Freedom	56.4	58.8	57.9	76.6	71.4	54.1	61.5	67.8	74.3
Property Rights	47.8	20.5	57.3	68.7	59.2	35.9	39.5	56.1	68.3

Source: Authors own elaboration based on World Development Indicators (World Bank, 2019) & Heritage Foundation Index of Economic Freedom (2019). Note: 1. Chile data is for 2017 in these categories. 2. (2011 PPP)

3.2 Social security

This study is focused on the legalistic definition of informality, which is based on the legal protection and benefits of workers. In practice, this concept is related to the worker's social security coverage, so we will briefly expand on this topic.

The Universal Declaration of Human Rights (1948) defines social security as the protection which society affords its members, through public measures, against the economic and social deprivation which would result from the disappearance or severe reduction of their income as a consequence of sickness, maternity, employment injury or occupational disease, unemployment, invalidity, old

age and death; and also protection in the form of medical care and assistance to families with children. The ILO's Social Security Convention No. 102, defines nine main specific social security benefits: medical care, cash benefits for sickness, unemployment, old age (retirement, pensions), occupational accidents and diseases, family, maternity, invalidity or disability, and survivors' benefits.

Social security is a fundamental human right, not just any right, and it forms an indispensable part of government social policy and is an important tool for preventing and alleviating poverty. (ILO, 2010)

Yet, the global labor market has been part of a constant social insecurity, because most countries cover only individuals who have a formal job, and in some cases their dependents. Worldwide, less than half of the working population has a formal or salaried job (ILO, 2010), a fact that illustrates somewhat the panorama of social security coverage, since salaried employment does not always enjoy this right.

Latin America is one of the places with greatest inequality in the world, that is not only manifested in terms of income and wealth but is also reflected in unequal access to land and essential public goods such as education, health, or social security, generating an inequity of opportunities that impedes the development of both individuals and countries. Currently, social security systems in Latin America cover only a fraction of the labor force in the region and most of the population is not prepared to face risks such as poverty at an advanced age, unemployment, or health difficulties (Inter-American Development Bank (IDB), 2015).

During the 20th century, one of the most significant socioeconomic advances in Latin America was in social security, given the initiatives that certain countries had on the establishment of social insurance systems. ² However, today, the countries of the region face great heterogeneity, derived from their economic and demographic features, making it infeasible to design uniform social security systems. Some countries still have very low social security coverage among their population, while others have been breaking their limitations. According to household data for South America, the countries with the best coverage are Uruguay, Chile, Argentina and Brazil while Colombia and Ecuador are at an intermediate level and those with the least coverage are Paraguay, Bolivia and Peru.

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² Among the pioneering countries were: Chile, Uruguay, Argentina and Brazil.

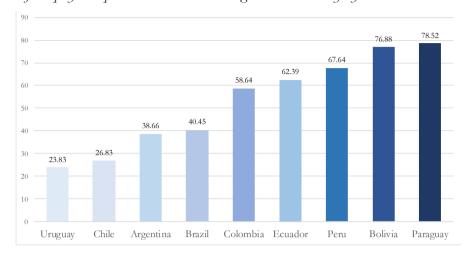


Figure 2-3: % of Employed Population Not Contributing to Social Security System

Source: Author's elaboration using data from household surveys for 2019.

Thus, it is observed that in Latin America social security coverage is minority and unfair since the only beneficiaries are workers in the formal sector. Minority, because the systems in the region do not even cover the entire economically active population. Unfair, because the bulk of the unprotected population in some way makes possible the existence of social security, to which, contradictorily, they do not have access because they are not salaried workers. This assertion is based on the consideration that jobs exist to the extent that the population consumes the goods and services produced by wage earners (Ruezga, 2007).

As Perry et al (2007) explain, Latin American countries are often ruled by a "Bismarck" social security model where the worker's coverage is based on the form of their contract, meaning that the workers acquire benefits and protection only through formal employment and not by just being citizens of a country (universal coverage).

Figure 3-3 shows the evolution throughout the past three decades of the share of salaried workers with a right to a pension when retired. Although it mostly shows an upward trend, we can see how the protection is relatively low for some countries and how the progress is rather limited for the period.

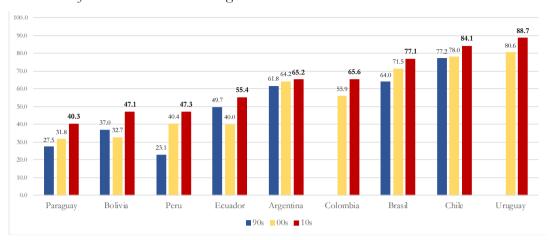


Figure 2-4: Share of Salaried Workers with Right to Pensions when retired.

Source: Author's own elaboration using data from the Socio-Economic Database for Latin America and the Caribbean (CEDLAS & The World Bank). Note: we used 1999- 2009 & 2019 when data was available. For Bolivia, Peru, Argentina, Brazil and Uruguay – 2018. For Ecuador, Colombia y Chile – 2017. And for Ecuador 1998 instead of 1999.

In this context, some may think that social security in the region is far from offering the welfare to which human beings are entitled, given that it has lacked an environment that would help to establish solid systems based on the needs and opportunities of each country. (Gonzalez, 2003)

4 Data

4.1 Database

As was previously explained, the process of measuring informality, a phenomenon that is so heterogeneous in its origin, in its forms and in the variety of groups affected, is complex. Perry et al (2007) explain how national accounts and statistics do not normally account for many of the informal economic activities. The method used for measurement usually depends on the interest of each researcher. In this case, I want to analyze at the micro-level, studying the relationship between a person's individual, household and work characteristics with the probability that they belong to the informal economy, comparing it across countries. Household survey questions can be very useful for this type of analysis.

Notwithstanding, it is often a complicated task to compare household surveys across countries, and as Gasparini & Tornarolli (2009), Perry et al (2007), and Ruiz et al (2014), explain, there is an important issue with the uniformity and comparability, specially across surveys of Latin America and therefore of South America. There is also no recent, processed, and harmonized database available containing comparable household and individual data for these countries. And this was the main challenge that was faced in this research.

When trying to construct this standardized database, many discrepancies between household surveys in these countries were found and this is the reason why I had to make my own methodological decisions, in order to make them comparable. To address these issues, I used definitions that could be adapted to all the surveys, went through every variable that the model needed and tried to harmonize one definition that could fit for the data of each country. It should be clarified that perfect comparability was not achieved, but I tried to explain all the decisions that were made concerning the data so that the reader can understand what was done³. Moreover, it is important to highlight that I was sometimes restricted by the availability of each database.

It should also be noted that for this work I want to analyze "individual by individual", that is why databases such as the *Socioeconomic Database for Latin America and the Caribbean (SEDLAC)* cannot be

³ In Appendix A, you can find step by step of our methodological decisions.

used, since this is a database based on household surveys but already processed and showing statistics at the country level.

After realizing the complexity involved in processing this data, it was decided to focus only on the South American region in order to have a more precise and defined scope for the study, with the highest possible level of detail. Therefore, a harmonized database was constructed using 9 South American countries⁴ household surveys. Venezuela, Suriname, Guyana and French Guiana were excluded due to lack of data. It must emphasized that an important effort was made to add as many countries as possible; most similar studies (Bargain & Kwenda, 2010; Fernandez, Lilenstein, Oosthuizen, & Villar, 2017; Maurizio, 2012) at a micro-level in the region choose one country or a smaller sample of countries to compare because of the complexity of analyzing individual by individual between countries with non-harmonized surveys.

Household surveys covering 2019 for each country were selected. The time frequency may vary across countries depending on the availability of data. These surveys collect data at an individual and household level and the samples are relatively large with a total of more than 780,000 households and around 2,400,000 individuals⁵. Also, the surveys are representative at a national level covering both rural and urban areas, except for Argentina which survey only covers the urban population.⁶ It will be studied as a pooled sample and also analyze countries separately to do a comparative analysis. Table 4-1 shows details of the used surveys.

Also, as it is explained in the table's legend, depending on the country, data was gathered differently. Quarterly, monthly or in different visits throughout the year.

⁴ Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru and Uruguay.

⁵ When conducting the models, observations decrease by country because first, I only use the occupied sample and also because the individuals with missing values for the used variables are automatically excluded.

⁶ This sample is still representative in the case of Argentina because the urban population represents more than 90% of the total population.

Table 4-1: Main characteristics of the South American Household surveys used

Country	Name	Conducted by	Time period	Households	Individuals
Argentina	Encuesta Permanente de Hogares (EPH)	Instituto Nacional de Estadística y Censos	2019	47,224	145,917
Bolivia	Encuesta de Hogares	Instituto Nacional de Estadística.	2019	11,869	39,605
Brasil	Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD)	Instituto Brasileiro de Geografia e Estatística.	2019	303,649	903,515
Chile	Encuesta Nacional de Empleo (ENE)	Instituto Nacional de Estadísticas	2019	60,180	188,692
Colombia	Gran Encuesta Integrada de Hogares (GEIH)	Departamento Administrativo Nacional de Estadística - DANE	2019	231,831	756,063
Ecuador	Encuesta de Empleo, Desempleo y Subempleo (ENEMDU),	Instituto Nacional de Estadística y Censos.	2019	42,760	154,664
Paraguay	Encuesta Permanente de Hogares Continua (EPHC)	Dirección General de Estadística, Encuestas y Censos.	2019	15,226	54,621
Peru	Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAHO)	Instituto Nacional de Estadística e Informática.	2019	34,565	121,623
Uruguay	Encuesta Continua de Hogares (ECH)	Instituto Nacional de Estadística	2019	42,507	107,871

Source: Author's elaboration. Notes: Databases were merged to obtain annual data for each country. For 2019: Argentina: data divided in 4 quarters. Bolivia: data published as a whole year, annually. Brazil: 1st and 4th quarter. Chile: Monthly data (12 months). Colombia Monthly data (12 months). Ecuador: 4 periods (March, June, September and December). Paraguay: 4 quarters. Peru: Annual, comprises monthly data (12 months). Uruguay: Annual, data of 12 months.

Other data and model specifications and limitations can be found in section 7 of this paper.

The focus of this research is analyzing the socio-demographic and employment characteristics of individuals as determinants of informal work. For this purpose, the variables from the household surveys that are relevant to our research were chosen and retrieved from the databases of each country, in order to analyze and harmonize them to make them comparable with each other. The variables are presented below.

4.2 Variables

4.2.1 Dependent Variable: *Informality*

As was previously mentioned, the productive definition is based, among other things, on firm size to determine informality and the legalistic one is related to social security protection, but according to several authors (Perry et al. (2007); Bosch and Maloney (2008); Henley et al. (2009)) these concepts overlap significantly. When studying this for our database, we found that on average for the countries in our sample more than 90% of those not covered by social security, work in small companies (with < 10 employees). Only in the case of Argentina and Chile, this value drops to 80%, where in the case of Argentina, there are 12% of unprotected workers in medium-sized

companies (10 to 50 employees) and in the case of Chile, 12% of informals work in large companies (with more than 50 employees).

As explained by Gasparini & Tornarolli (2009) and Fernandez et al. (2017), and mentioned above, in the case of the Latin American region, the legalistic definition based on social security coverage is the one that is usually the most relevant to study and on which there is data for all countries.

For this study, based on the availability of the data and the purpose of the research, the legalistic definition of informality was selected considering "all remunerative work (wage and self-employment) not registered, regulated or protected by the legal frameworks, and all non-remunerative work in an income producing enterprise" (ILO,2003)⁷:

- Salaried workers: a salaried worker is considered informal if he/she doesn't contribute to social security.
- Self-employed: a self-employed worker is considered informal if he/she doesn't contribute to social security. For Argentina, if the business/company/activity is not legally constituted⁸. And for Chile, if the business/company/activity is not legally registered⁹
- *Employer*: an employer is considered informal if he/she doesn't contribute to social security. For Argentina, if the business/company/activity is not legally constituted. And for Chile, if the business/company/activity is not legally registered.
- *Unpaid Family Workers:* an unpaid family worker is considered informal if he/she doesn't contribute to social security.

Informal: a **dummy** variable that takes the value 1 for a job in at least one of the past categories (non-registered jobs: didn't contribute to social security system) and the value of 0 otherwise (formal employment).

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⁷ The main measure is social security contributions, but in the cases where the pension data was not available, I took the survey questions related to legal regulations. This is the case for Argentina and Chile for the self-employed and employers.

⁸ es una sociedad jurídicamente constituida? (SA, SRL, Comandita por Acciones, etc.)u otra forma legal?

⁹ (Servicio de 2 Impuestos Internos (SII))

In Table 9-4 of Appendix A, you can find a comparative table by country showing the survey questions used to calculate the informality variable. These are based on the pension coverage of individuals.

4.2.2 Independent Variables

4.2.2.1 Individual Characteristics

Woman is a dummy variable that takes the value 1 if the individual is a female, and it takes the value 0 otherwise. Age is a categorical variable that divides in 3 groups: 15-25, 26-54 and 55-65 years of age. Ethnicity is a categorical variable based on survey questions where individuals are asked how they ethnically consider themselves according to their ancestors and customs and takes values: (1) white (2) afro-descendant (3) mestizo (4) indigenous (5) other. Also from this variable we construct an Indigenous dummy variable, which takes a value of 1 if they are self-identified as indigenous, and 0 otherwise. Completed Education¹⁰ is a categorical variable that takes the value of (1) if the individual has no education, (2) if it has completed primary education, (3) for secondary education and (4) superior education, including non-university and university higher education.

4.2.2.2 Household Characteristics

Adding the total number of children under 14 in the household, the continuous variable *Number of Children* is constructed. *Kinship* is a categorical variable that takes values: (1) for head of household (2) for the couple (3) children (4) other family (5) not family. Regarding marital status, we construct a dummy variable *Couple* that takes the value of 1 if the individual is identified as married or cohabitating and 0 if the individual is single, divorced or widowed. Regarding geography, *Urban* is a dummy variable that takes the value of 1 for urban areas and 2 for rural areas and *Region* is a categorical variable that controls for the geographical regions of each country.¹¹

4.2.2.3 Employment Characteristics

Economic sector is a categorical variable divided into 10 types of economic activities: (1) "Agriculture" (2) "Mining" (3) "Manufacturing" (4) "Electricity, Gas and Water" (5) "Construction" (6) "Retail

¹⁰ Unfinished educational levels are contemplated in the previously completed level.

¹¹ See all regions in Appendix B

and Wholesale Trade, Restaurants and Hotels" (7) "Transport and communications" (8) "Finance, Insurance and Services provided to Businesses" (9) "Public Administration" (10) "Communal, Social and Personal Services and Other". Firm size is a variable divided into 3 categories: (1) Small firms: less than 10 workers, (2) Medium firms: between 11 and 50 workers, ¹² and (3) Large firms: more than 50 workers. Work relationship is a categorical variable that takes the value of (1) for employees, (2) for employers, (3) for self-employed, (4) for unpaid family workers and (5) for domestic workers.

¹² For Argentina this category consists in firms that have between 11 and 40 workers.

Table 4-2: Descriptive Statistics of all the sample for 2019

		Info r mal			Formal	
Variable	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Individual Characteristics						
Woman	500,295	0.442	0.497	526,423	0.441	0.496
Age group						
15-25 years	500,295	0.212	0.409	526,423	0.125	0.33
26-54 years	500,295	0.626	0.484	526,423	0.736	0.441
55-65 years	500,295	0.161	0.368	526,423	0.139	0.346
Completed Education						
No Education	499,923	0.179	0.383	526,323	0.083	0.275
Primary	499,923	0.346	0.476	526,323	0.155	0.362
Secondary	499,923	0.34	0.474	526,323	0.375	0.484
Superior	499,923	0.135	0.342	526,323	0.387	0.487
Ethnicity						
White	240,599	0.246	0.431	297,916	0.462	0.499
Afro	240,599	0.081	0.273	297,916	0.077	0.266
Mestizo	240,599	0.569	0.495	297,916	0.431	0.495
Indigenous	240,599	0.086	0.28	297,916	0.022	0.145
Other	240,599	0.018	0.134	297,916	0.009	0.093
Household Characteristics						
Has a Couple	352,107	0.557	0.497	308,294	0.602	0.49
Number of Children under 14	500,295	0.658	1.003	526,423	0.551	0.837
Kinship						
Head of household	500,295	0.436	0.496	526,423	0.488	0.5
Partner	500,295	0.232	0.422	526,423	0.243	0.429
Children	500,295	0.235	0.424	526,423	0.196	0.397
Other Family	500,295	0.08	0.272	526,423	0.062	0.241
Not Family	500,295	0.017	0.128	526,423	0.011	0.104
Employment Characteristics						
Economic Sector						
Agriculture	500,060	0.207	0.405	526,004	0.071	0.256
Mining	500,060	0.003	0.056	526,004	0.01	0.1
Manufacturing	500,060	0.093	0.29	526,004	0.11	0.313
Electricity, Gas and Water	500,060	0.003	0.05	526,004	0.012	0.111
Construction	500,060	0.093	0.29	526,004	0.051	0.219
Retail and Wholesale Trade, Restaurants and Hotels	500,060	0.301	0.459	526,004	0.21	0.408
Transport and communications	500,060	0.072	0.259	526,004	0.069	0.253
Finance,Insurance and Services provided to Businesses	500,060	0.054	0.226	526,004	0.113	0.316
Public Administration	500,060	0.009	0.096	526,004	0.106	0.308
Communal, Social and Personal Services and Other	500,060	0.165	0.371	526,004	0.248	0.432
Size of Firm	ŕ					
< 10 employees	494,866	0.929	0.257	467,656	0.352	0.478
< 50 employees	494,866	0.043	0.202	467,656	0.168	0.374
> 50 employees	494,866	0.028	0.166	467,656	0.48	0.5
Work Relationship	,			,		
Employee	499,991	0.29	0.454	526,408	0.804	0.397
Employer	499,991	0.034	0.181	526,408	0.039	0.193
Self-employed	499,991	0.522	0.5	526,408	0.127	0.333
Unpaid Family Worker	499,991	0.086	0.281	526,408	0.004	0.063
Domestic Worker	499,991	0.068	0.251	526,408	0.026	0.16

Source : Author's elaboration. Table comparing statistics across countries is available in the Appendix C

5 Methodology

The objective of this study is to analyze in depth those who compose the informal sector in the different countries of South America. The empirical analysis that is conducted is based on studying how the individual, household, and employment characteristics affect the worker's likelihood of belonging to informality using micro-level data. To do so, a model with several stages is constructed, and these stages are applied to all the sample as well as for each country, in order to do a comparative analysis. The employed between 15 and 65 years old are considered as our target population. Also, the samples are separated in urban vs. rural sample and by gender to analyze the difference of the impacts in female and male workers.

The first empirical analysis consists of 3 stages:

- (1) Binary Probit: Informal vs. Formal
- (2) Multinomial Logit with 3 categories: Informal salaried, Formal salaried, Self-Employed
- (3) Multinomial Logit with 5 categories: Informal salaried, Informal Self-Employed, Informal Employer, Unpaid Family Worker, Formal Employment

We start with a discrete choice probit model:

$$Y_i = \beta_1 I_i + \beta_2 H H_i + \beta_3 E_i + \delta_i + \varepsilon_i \tag{1}$$

Where Y_i is a binary variable that measures whether the individual is informal or not. I_i represents individual characteristics, HH_i household characteristics, E_i and employment characteristics. Finally, δ_i represents country/region fixed effects¹³.

Knowing the heterogeneity that characterizes the informal sector, using only a binary probit, as many studies do, may be limited. As it is explained in the literature review, there are different members in this sector with different motives and characteristics, and it can be noted, in the first place, by dividing them into independent and salaried workers. Authors such as Perry et al (2007), Arias and Khamis(2008), Bargain and Kwenda (2010), among others, divide the data in informal salaried, formal salaried and self-employed to study the impact of workers' characteristics.

¹³ Country fixed effects when studying all the sample and Region fixed effects when analyzing by country.

To address this, a multinomial logit model was constructed taking into account that workers have 3 options:

$$ln(\frac{Y_{ni}}{Y_{hi}}) = \alpha_0 + \alpha_1 I_i + \alpha_2 HH_i + \alpha_3 E_i + \delta_i + \varepsilon_i$$
 (2)

Where $ln(\frac{\gamma_{ni}}{\gamma_{bi}})$ refers to the log of the odds of the n_{th} alternative compared to the base alternative. Y is a categorical variable that can take 3 values: (1) Independent workers, (2) Informal Salaried, (3) Formal Salaried. We consider the Formal Salaried as the base category, so the results are interpreted relative to that group. l_i represents individual characteristics, HH_i household characteristics, and E_i employment characteristics. Finally, δ_i represents country/region fixed effects.

For the following stages, to do a more specific analysis, the same multinomial logit model is considered but with different dependent variables.

The International Labour Organization (ILO) recommends dividing employed workers into three employment sectors: informal salaried, informal self-employed and formal sector workers. But in this research the first two are divided even further in order to study them in more depth. Based on WIEGO's model of informal employment, Stage 3 considers a 5 category dependent variable: (1) Informal salaried, (2) Informal Self-Employed, (3) Informal Employer, (4) Unpaid Family Worker, (5) Formal Employment. With formal workers as the base category. As was previously explained, all these categories are based on pension system contributions of the individuals.

And lastly, in the 4th stage, the sample is restricted to study only the informal workers and their probabilities of belonging to the bottom or the top of the income distribution, with middle income as the base category, based on the methodology used by Bargain and Kwenda (2010).

6 Results and Discussion

This model goes through several stages for a more in-depth analysis of informality across countries. Starting with a probit model with a dummy representing the probability of informality as a dependent variable. The relationship between every specific explanatory variable and the probability outcome is interpreted by the marginal effects, which account for the partial change in probability (predicted probabilities). The resulting marginal effects coefficients are calculated holding the other variables constant at their mean.

To avoid unstable and unreliable coefficients, multicollinearity was tested through correlation matrixes and variance inflation factor (VIF) for each model, and the results show values are within the accepted range.

6.1 1st Stage

6.1.1 All Sample

First, the sample was divided between rural and urban to analyze if these characteristics' effects vary across areas. Mostly, it was found that the effects go in the same direction but the magnitudes vary. Female shows a positive effect, but the effect in the urban sample is double than the rural effect. Same thing happens with age, where younger workers have higher chances of informality and older workers lower chances, but this effect is larger for the urban sample.

Table 6-1: Marginal Effects for Probit Estimation comparing Urban and Rural samples.

Probit Marginal Effects ref: formal worker

Probit Marginal Effects		ref: formal worker	
	all sample	urban	rural
Individual Characteristics			
Gender	0.02.10/2/2/	Ref. men	0.0005***
Female	0.0342*** (0.00151)	0.0366***	0.0225***
Λ	(0.00151)	(0.00163)	(0.00280)
Age 15-25 years	0.228***	Ref. 26-54 years 0.232***	0.142***
13-23 years	(0.00173)	(0.00199)	(0.00246)
55-65 years	-0.0488***	-0.0473***	-0.0324***
55-05 years	(0.00190)	(0.00203)	(0.00355)
Completed Education	(0.00130)	Ref. Secondary Education	(0.00000)
No Education	0.203***	0.200***	0.146***
	(0.00212)	(0.00266)	(0.00322)
Primary	0.130***	0.136***	0.0751***
	(0.00172)	(0.00194)	(0.00330)
Superior	-0.154***	-0.144***	-0.172***
	(0.00173)	(0.00173)	(0.00700)
Household Characteristics	0.000111	0.04=4111	0.04=0.111
Number of Children (<14 years)	0.0208***	0.0176***	0.0179***
V:1:-	(0.000759)	(0.000863)	(0.00111)
Kinship Head of Household	-0.0540***	Ref. not Head -0.0481***	-0.0588***
Head of Household	(0.00142)	(0.00153)	(0.00259)
Employment Characteristics	(0.00142)	(0.00133)	(0.00239)
Economic Sector		Ref. Manufacturing	
Agriculture	0.0269***	0.0889***	-0.0258***
- 9	(0.00281)	(0.00423)	(0.00441)
Mining	-0.00375	-0.0105	-0.0634***
O	(0.00951)	(0.0114)	(0.0138)
Electricity, Gas and Water	-0.0836***	-0.0755***	-Ò.103***
	(0.00955)	(0.00971)	(0.0254)
Construction	0.106***	0.102***	0.0789***
	(0.00310)	(0.00337)	(0.00526)
Retail and Wholesale Trade, Restaurants and Hotels	-0.0129***	-0.00703***	-0.0234***
	(0.00242)	(0.00254)	(0.00513)
Transport and communications	-0.0382***	-0.0385***	-0.0357***
E' I 1C ' '1 1, D '	(0.00321)	(0.00332)	(0.00776)
Finance, Insurance and Services provided to Businesses	-0.110*** (0.00303)	-0.104*** (0.00306)	-0.109***
Public Administration	-0.0752***	-0.0741***	(0.0102) -0.0832***
Tubile 1 Kirimis(tautori	(0.00488)	(0.00493)	(0.0136)
Communal, Social and Personal Services and Other	-0.00658**	-0.00505*	-0.0275***
Continuiting Coolin and Personal Services and Carer	(0.00281)	(0.00292)	(0.00704)
Work Relationship	(* * * * *)	Ref. Self- Employed	()
Employee	-0.301***	-0.336***	-0.138***
1 ,	(0.00154)	(0.00172)	(0.00300)
Employer	-0.284***	-0.313***	-0.133***
	(0.00293)	(0.00302)	(0.00756)
Unpaid family worker	0.152***	0.106***	0.147***
	(0.00321)	(0.00504)	(0.00250)
Domestic Worker	-0.177***	-0.202***	-0.0819***
С' € Г'	(0.00335)	(0.00359)	(0.00860)
Size of Firm	0.390***	Ref. >10 & <50 0.384***	U 220***
< 10 employees	(0.00198)	(0.00206)	0.338*** (0.00605)
> 50 employees	(0.00198)	(0.00206) -0.168***	(0.00605) -0.278***
2 30 employees	(0.00193)	(0.00192)	(0.00722)
Countries		Ref. Argentina	Ref. Bolivia
Bolivia	0.210***	0.215***	-
	(0.00532)	(0.00619)	_
Brasil	-0.244***	-0.246***	-0.308***
	(0.00316)	(0.00321)	(0.00474)
Chile	-0.146***	-0.147***	-0.264***
	(0.00374)	(0.00387)	(0.00663)
Colombia	0.0643***	0.0425***	-0.0161***
	(0.00315)	(0.00325)	(0.00439)
Ecuador	-0.0255***	0.00294	-0.166***
n.	(0.00396)	(0.00457)	(0.00514)
Paraguay	0.246***	0.260***	0.00112
Dom	(0.00432)	(0.00528)	(0.00473)
Peru	0.0406***	-0.00420 (0.00445)	-0.0359***
Пеномог	(0.00401) -0.356***	(0.00445) -0.333***	(0.00475) -0.640***
Uruguay	(0.00379)	(0.00374)	(0.0107)
	961,169	782,613	178,556

6.1.2 Across countries

Similar patterns across countries in South America can be observed in Table 6-2. When analyzing **gender**, being a woman significantly increases the probability of not being covered by social security in all countries except Ecuador, Paraguay and Uruguay where the effect is the opposite and also significant, all else equal. It was found that Peru shows the highest coefficient of positive correlation, where being a woman increases by 11.5 percentage points the probability of belonging to the informal sector, compared to men, ceteris paribus. As was previously explained, this results may be related to women having to play a double role in taking care of the households responsibilities but also having to provide income for their families, leading to the need for flexible schedules and working conditions, and therefore having to lean for informal employment.

It can be observed how the theory of **age** holds across countries that for the youngest group of the population, compared to the middle group, the probability of belonging to informality increases significantly. Concerning older people, the data shows that they are less likely to belong to the informal sector as a whole, except for Brazil and Uruguay, where being in this category increases the probability of informality, ceteris paribus.

For **education**, the expected results can be observed, where compared to having secondary education, having no education and having only primary education, increases the probability of informality in all countries, ceteris paribus. And having higher education decreases in all countries the probability of not being covered by social security. Peru shows the highest marginal effect coefficient in this case, where having completed higher education decreases the probability of informality by 24.4 percentage points. And Uruguay has the lowest coefficient with only a 1.7 percentage points decrease.

Not having a **partner** shows a positive correlation with the probability of informality for all the countries analyzed. For all the countries this effect has a value of between 2 and 6 percentage points, while in Argentina this value amounts to 11.2 percentage points increase in the probability of informality. On the other hand, **the number of children** also increases the probability of informality and being the household head always decreases the probability of informality for all countries, keeping everything else constant. For each extra children in the household, the probability of belonging to the informal sector increases on average by 2 percentage points, all else equal.

It can also be observed that the effects of the different **branches of activity** on the probability of informality vary between countries, although for many industries the same direction of the effect (positive or negative) maintains for all countries. In the 3rd stage, these effects are disaggregated in a more specific analysis (Table 6-6). It can highlighted that working in agriculture shows an increased likelihood of informality compared to working in manufacturing, except for Ecuador and Uruguay where the effect is negative. Construction, on the other hand, shows in all significant coefficients, a positive effect on the likelihood of informality. While Retail and Wholesale Trade, Restaurants and Hotels and Finance, Insurance and Services provided to Businesses, show negative significant correlation coefficients with the probability of informality across all countries.

Moreover, it is important to highlight the results for Public Administration. Recall that in this study I am evaluating the pension and social insurance coverage of workers as a proxy for informality. Results show that in some countries working in the public sector has a negative effect on the probability of informality compared to manufacturing, but for countries like Brazil, Chile and Peru, a significant and positive effect of public administration employment on the probability of being informal can be observed, in other words, not being covered or protected by the state as workers. It is to be expected that most public sector workers have social security coverage, but it is known that rigid labor laws regarding hiring and firing processes in the region, may lead to subcontracting – from low to high skilled workers with diverse labor arrangements that may not comply with labor protections for workers (Perry et al,2007; Bucheli & Ceni, 2010)

Regarding the **work relationship**, it can be seen that, compared to self-employed workers, being an employee or an employer decreases the probability of not being covered by social security, ceteris paribus. This means informal workers are more likely to be self-employed. While, being an unpaid family worker increases the probability of informality, except in the case of Chile, where it decreases. Lastly, being a domestic worker has a negative effect on the likelihood of informality, except in the case of Bolivia, where it is positive.

Finally, the **size of the firm** shows the expected pattern, where for firms with less than 10 employees the probability of workers being unprotected increases, while for those with more than 50 employees, this probability decreases, compared to medium-sized enterprises, all else equal.

Table 6-2: Marginal Effects for Probit Estimation comparing countries.

			•		eing an Informal				
	Argentina	Bolivia	Brasil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay
ndividual Characteristics					D. C				
Gender Female	0.0304***	0.0258***	0.0161***	0.0194***	Ref. men 0.0721***	0.0266888	-0.0104***	0.115***	0.00525*
remaie	(0.00658)	(0.00815)	(0.00256)	0.0184*** (0.00365)	(0.00290)	-0.0266*** (0.00454)	(0.00360)	(0.00544)	-0.00535* (0.00305)
Are	(0.00036)	(0.00613)	(0.00230)	(0.00303)	(0.00290) Ref. 26-54 years	,	(0.00360)	(0.00344)	(0.00303)
Age 15-25 years	0.225***	0.104***	0.215***	0.169***	0.223***	0.133***	0.0354***	0.176***	0.127***
13-23 years	(0.00862)	(0.00633)	(0.00302)	(0.00637)	(0.00299)	(0.00413)	(0.00332)	(0.00508)	(0.00716)
55-65 years	-0.0521***	-0.0708***	0.0103***	-0.00758*	-0.0886***	-0.106***	-0.00564	-0.0412***	0.0103***
55 05 years	(0.00818)	(0.0146)	(0.00324)	(0.00398)	(0.00397)	(0.00621)	(0.00688)	(0.00739)	(0.00339)
Completed Education	(0.00010)	(0.0110)	(0.00321)	` /	ef. Secondary Educe	, ,	(0.00000)	(0.00757)	(0.00557)
No Education	0.245***	0.0834***	0.166***	0.199***	0.264***	0.103***	0.0481***	0.196***	0.261***
	(0.0168)	(0.00856)	(0.00279)	(0.0300)	(0.00704)	(0.00751)	(0.00501)	(0.00584)	(0.0154)
Primary	0.136***	0.0429***	0.116***	0.115***	0.146***	0.0388***	0.0338***	0.135***	0.0871***
,	(0.00686)	(0.00848)	(0.00312)	(0.00551)	(0.00301)	(0.00415)	(0.00441)	(0.00539)	(0.00384)
Superior	-0.111***	-0.160***	-0.0793***	-0.0499***	-0.194***	-0.162***	-0.0643***	-0.244***	-0.0168***
1	(0.00686)	(0.0114)	(0.00344)	(0.00349)	(0.00316)	(0.00664)	(0.00662)	(0.00732)	(0.00283)
Household Characteristics	,	, ,	, ,	, ,	,	,	,	,	,
Marital Status					Ref: Has a Coup.	le			
Doesn't Have a Couple**	0.112***	0.0245***	-	0.0656***	0.0694***	0.0659***	0.0240***	0.0339***	0.0620***
-	(0.00610)	(0.00754)	-	(0.00350)	(0.00279)	(0.00398)	(0.00330)	(0.00524)	(0.00357)
Number of Children (<14 years)	0.0226***	0.00670**	0.0187***	0.00661***	0.0298***	0.0252***	0.00227	0.0146***	0.0174***
	(0.00314)	(0.00323)	(0.00127)	(0.00203)	(0.00171)	(0.00198)	(0.00160)	(0.00244)	(0.00164)
Kinship				Rej	not Head of Hou	sehold			
Head of Household	-0.0768***	-0.0329***	-0.0242***	-0.0427***	-0.0660***	-0.0773***	-0.0258***	-0.0821***	-0.0157***
	(0.00579)	(0.00790)	(0.00227)	(0.00345)	(0.00279)	(0.00462)	(0.00371)	(0.00564)	(0.00283)
Employment Characteristics									
Economic Sector					Ref:Manufacturin	g			
Agriculture	0.208***	0.0368***	0.0168***	0.0868***	0.130***	-0.0311***	0.0194***	0.0839***	-0.0966***
	(0.0286)	(0.0118)	(0.00457)	(0.00777)	(0.00562)	(0.00671)	(0.00716)	(0.0101)	(0.00595)
Mining	-0.205***	0.0364**	0.00767	-0.0716***	-0.0564***	-0.0323	=	0.0271	-0.0267
	(0.0348)	(0.0165)	(0.0179)	(0.0145)	(0.0191)	(0.0273)	-	(0.0230)	(0.0412)
Electricity, Gas and Water	-0.143***	-0.226***	0.0426***	-0.0733***	-0.215***	0.0213	0.0156	0.129***	-0.0543***
	(0.0274)	(0.0800)	(0.0144)	(0.0153)	(0.0239)	(0.0450)	(0.0330)	(0.0288)	(0.0189)
Construction	0.234***	0.0416***	0.159***	0.0664***	0.00755	0.119***	0.0575***	-0.00650	0.0971***
D - 7 - 1977 1 - 1777 1 D 117 - 1	(0.0138)	(0.0107)	(0.00520)	(0.00777)	(0.00568)	(0.00680)	(0.00578)	(0.0128)	(0.0108)
Retail and Wholesale Trade, Restaurants and Hotels	-0.00583	-0.00322	-0.0506***	-0.0205***	-0.0169***	-0.0164**	0.00217	0.00536	-0.0458***
m	(0.0108)	(0.0105)	(0.00410)	(0.00575)	(0.00424)	(0.00663)	(0.00583)	(0.0101)	(0.00613)
Transport and communications	0.0658***	-0.00458	0.00354	0.0349***	-0.145***	-0.0277***	0.0136*	-0.0300**	-0.0826***
Fig. 1. J.	(0.0144)	(0.0128)	(0.00568)	(0.00775)	(0.00576)	(0.00901)	(0.00820)	(0.0122)	(0.00669)
Finance,Insurance and Services provided to Businesses	-0.0266**	-0.125***	-0.0687***	-0.0600***	-0.216***	-0.108***	-0.0233***	-0.135***	-0.0729***
Public Administration	(0.0127)	(0.0181) -0.576***	(0.00515) 0.0828**	(0.00633) 0.130***	(0.00548) -0.417***	(0.0110) -0.232**	(0.00871) -0.108***	(0.0148) 0.190***	(0.00639)
1 upit Auminstration	(0.0121)	(0.0821)	(0.0828**	(0.00949)	(0.0115)	(0.0925)	(0.0119)	(0.0111)	(0.00951)
Communal, Social and Personal Services and Other	-0.0219*	-0.0786***	0.0132***	0.0521***	-0.0870***	-0.0276***	0.0332***	0.0224*	0.00931)
Communa, Social and 1 cisonal Services and Other	(0.0115)	(0.0146)	(0.00489)	(0.00698)	(0.00505)	(0.00921)	(0.00636)	(0.0117)	(0.00690)
Work Relationship	(0.0115)	(0.0110)	(0.00102)	(0.00070)	Ref: Self-employee	. ,	(0.00030)	(0.0117)	(0.00000)
Employee	-0.559***	-0.114***	-0.269***	-0.223***	-0.385***	-0.182***	-0.233***	-0.0717***	-0.256***
z.mp.o,ee	(0.0102)	(0.0104)	(0.00263)	(0.00599)	(0.00276)	(0.00495)	(0.00653)	(0.00655)	(0.00721)
Employer	-0.305***	-0.0568***	-0.287***	-0.338***	-0.245***	-0.190***	-0.00739**	-0.0455***	-0.286***
_F _F	(0.0205)	(0.0162)	(0.00437)	(0.00593)	(0.00591)	(0.0111)	(0.00287)	(0.0106)	(0.00768)
Unpaid family worker	0.0104	0.0156	0.430***	-0.277***	0.0352***	0.0482***	0.00148	0.0382***	0.0187
- r	(0.0345)	(0.0119)	(0.00222)	(0.00999)	(0.00769)	(0.00460)	(0.00222)	(0.00930)	(0.0272)
Domestic Worker	-0.381***	0.0435***	-0.126***	-0.216***	-0.219***	-0.237***	-0.130***	-0.0314*	-0.297***
	(0.0153)	(0.0143)	(0.00504)	(0.00877)	(0.00731)	(0.0156)	(0.0151)	(0.0185)	(0.0111)
Size of Firm	(/	()	()	()	Ref. >10 & <5	. ,	()	()	()
< 10 employees	0.354***	0.257***	0.320***	0.299***	0.436***	0.354***	0.115***	0.238***	0.243***
	(0.00686)	(0.0197)	(0.00346)	(0.00601)	(0.00374)	(0.00933)	(0.00821)	(0.0103)	(0.00574)
> 50 employees	-0.0950***	-0.357***	-0.147***	-0.0931***	-0.273***	-0.163***	-0.128***	-0.399***	-0.0405***
F-0,	(0.00605)	(0.0221)	(0.00341)	(0.00429)	(0.00382)	(0.0235)	(0.0125)	(0.0111)	(0.00323)
Controls for regions included	,)	` - /	()	, ,	()	()	/	` /	()
Sourous for regions included									

Standard errors in parentheses

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

6.1.3 By gender

To address the question of whether these characteristics have different effects on the likelihood of informality for men and women, the sample is divided by gender in Table 6-3. First, when studying all the sample it was found that being a young woman, compared to women from the middle age group, increases the probability of informality more than for young men. Also, that having superior education, compared to having secondary education, has a greater effect in reducing the likelihood of informality for women than for men of the sample. Completed Superior Education makes women 17.8 percentage points significantly less likely to work in the informal economy and men 12.9 percentage points less likely, compared to the base category. Also, the number of children under 14 in the household increases the probabilities of informality more for women than for men (for each extra children, 3.34 vs. 1.58 percentage points increase in the probability of informality for men and women), all else equal. Having children usually implies more financial burden and more responsibilities, leading to parents having to turn to informal jobs with more flexibility, but we can see women probably assume more of this weight. Regarding kinship, being head of the household significantly decreases the likelihood of informality for men, but increases the probabilities for women.

Also, the impact of the different characteristics on the probability of informality for **men and** women by country are compared. These results can be found in Table 9-6 Appendix D. In most of the cases, similar patterns can be observed across countries but in different magnitudes.

I find relevance in the fact that having superior education (compared to having secondary), for all countries except for Paraguay and Bolivia, reduces the likelihood of informality more for women than for men. Also, for all countries, having a couple reduces much more for men that for women the probabilities of informality, ceteris paribus.

For Argentina, Brazil, Colombia, Uruguay, the number of children has a greater effect on increasing the likelihood of informality for women than for men. While in the case of Chile, Ecuador and Peru, this effect is greater for men than for women. And for Paraguay and Bolivia, there is no significance.

Lastly, being head of household reduces the likelihood of informality more for men than for women, ceteris paribus, and in the case of Brazil, these effects are even opposite: being head increases probabilities of informality for women, and decreases for men, ceteris paribus.

Most of the results follow the dynamics described in the paper, but there are also some interesting trends. One exception to common behavior is the case of Ecuador, Paraguay and Uruguay where being a woman, decreases significantly the probability of informality, all else equal. As well as the positive relationship of Agriculture with formal employment for Ecuador and even more for Uruguay, which Fernandez et al (2017) relate to the technification of the agriculture sector in this country. Also, Public Administration being positively related to the likelihood of informality for some countries of the sample.

Table 6-3: Marginal Effects for Probit Estimation by gender

	female sample	male sample
Individual Characteristics	1 -	
Age	Ref. 26-5	4 years
15-25 years	0.237***	0.215***
15 25 years	(0.00259)	(0.00235)
55-65 years	-0.0410***	-0.0491***
,	(0.00306)	(0.00244)
Completed Education	Ref. Secondary	
No Education	0.177***	0.212***
	(0.00342)	(0.00275)
Primary	0.127***	0.129***
_y	(0.00271)	(0.00223)
Superior	-0.178***	-0.129***
	(0.00254)	(0.00240)
Household Characteristics	(****=****)	(0.00=10)
Number of Children (<14 years)	0.0334***	0.0158***
	(0.00122)	(0.000978)
Kinship	Ref. not	,
Head of Household	0.00823***	-0.0988***
	(0.00217)	(0.00190)
Employment Characteristics	(0.00217)	(0.00170)
Economic Sector	Ref. Manu	facturing
Agriculture	-0.0352***	0.0608***
	(0.00525)	(0.00344)
Mining	-0.0538*	0.0257**
	(0.0285)	(0.0102)
Electricity, Gas and Water	-0.0732***	-0.0748***
Electrony, our und Water	(0.0190)	(0.0110)
Construction	-0.131***	0.137***
	(0.0118)	(0.00356)
Retail and Wholesale Trade, Restaurants and Hotels	-0.0317***	-0.000305
,	(0.00373)	(0.00319)
Transport and communications	-0.0586***	-0.0107***
	(0.00762)	(0.00374)
Finance, Insurance and Services provided to Businesses	-0.124***	-0.102***
	(0.00466)	(0.00400)
Public Administration	-0.0792***	-0.0806***
	(0.00708)	(0.00676)
Communal, Social and Personal Services and Other	-0.0413***	0.0338***
Community Coolin and Teleconia cervices and Carer	(0.00402)	(0.00415)
Work Relationship	Ref. Self- E	` ,
Employee	-0.344***	-0.273***
	(0.00242)	(0.00202)
Employer	-0.307***	-0.264***
	(0.00520)	(0.00356)
Unpaid family worker	0.157***	0.158***
cripate many normal	(0.00373)	(0.00584)
Domestic Worker	-0.170***	-0.290***
Domeste Worker	(0.00394)	(0.00877)
Size of Firm	Ref. >10	'
< 10 employees	0.370***	0.398***
· To employees	(0.00328)	(0.00250)
> 50 employees	-0.191***	-0.188***
- 50 employees	(0.00318)	(0.00243)

Table continues in next page

Countries		Ref. Argeni	tina
	Bolivia	0.216***	0.211***
		(0.00833)	(0.00690)
	Brasil	-0.242***	-0.248***
		(0.00466)	(0.00433)
	Chile	-0.134***	-0.161***
		(0.00554)	(0.00511)
	Colombia	0.0841***	0.0485***
		(0.00465)	(0.00431)
	Ecuador	-0.0712***	0.00609
		(0.00604)	(0.00528)
	Paraguay	0.231***	0.258***
		(0.00683)	(0.00562)
	Peru	0.119***	-0.0115**
		(0.00593)	(0.00544)
	Uruguay	-0.350***	-0.361***
		(0.00567)	(0.00514)
Observations		418,456	542,713

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

6.1.4 Migration and Ethnicity

As was previously explained, migration and race are proved to affect the likelihood of informality. And although the data is not available for all the countries to introduce these variables in the initial model, I study these effects separately. Regarding **ethnicity**, the data is collected based on a survey question related to how the individuals ethnically consider themselves according to their ancestors and customs. This question is only available for surveys in Brazil, Ecuador, Peru and Uruguay. A model is ran for these countries' data to analyze the impact of ethnicity on the probability of informality and the results are shown in Table 9-7, Appendix D. I found that compared to white individuals, afro-descendant, indigenous, mestizo and other population, are more likely to lack of social security (pension) coverage, ceteris paribus. And this correlation is higher for the indigenous population, where being indigenous, compared to individuals self-identified as white, increases in 20.4 percentage points the probability of informality.

On the other hand, I thought it was relevant to study the impact of migrants in the likelihood of informality, but specifically **Venezuelan immigrants**. According to the ILO & UNDP (2021), more than 5 million Venezuelans have left their country due to the political tensions, socioeconomic instability, and humanitarian crisis which has led to the worst migrations crisis ever seen in Latin America's history. This massive arrival of migrants to South American countries, impacts their labor markets and a large part of this immigration is integrating into the informal economy of these countries. This is why, it would appropriate to add a dummy variable that represents the Venezuelan population into the model, the issue is that this information is not available for all countries. I proceeded to study the effect of being born in Venezuela in the likelihood of informality for Argentina, Chile, Colombia, Ecuador and Uruguay.

In Table 9-8 presented in Appendix D, for all the sample, it was found that being Venezuelan, increases the probability of informality in 33.5 percentage points, all else equal. This is one of the characteristics of the individual with greater impact on the likelihood of informality. This effect is positive for all the counties, but the magnitude varies, from Colombia and Argentina with the highest marginal effects coefficient (0.336 and 0.204, respectively), to Ecuador (0.159) and to Uruguay (0.091) and Chile (0.026) with the lowest correlations, all values being statistically significant. Meaning that, in Colombia being Venezuelan increases in 33.6 percentage points the probabilities of not having social security coverage, ceteris paribus.

6.2 2nd Stage

Some authors analyze the probabilities of informality based on the study of informal vs. formal employment, as was done in the first stage. I consider that in order to understand the heterogeneous phenomenon of informality, a more specific analysis must be conducted.

This is done through a multinomial logit model, with three possible options: (1) informal salaried, (2) formal salaried and (3) independent workers (which in this case, includes self-employed and employers). The coefficients shown correspond to the relative risk ratios¹⁴ (RRR), that should be read as relative to the probability of being formal salaried worker and with respect to the base categories of each socioeconomic group, as in any logit/probit model.

 $^{^{14}}$ "The relative risk ratio of a coefficient explains how the risk of the outcome falling in the comparison group compared to the risk of the outcome falling in the referent group changes with the variable in question. An RRR > 1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group increases as the variable increases. In other words, the comparison outcome is more likely. An RRR < 1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group decreases as the variable increases. Generally, if the RRR < 1, the outcome is more likely to be in the referent group" (UCLA Statistical Consulting Group, 2021)

Table 6-4: 2nd stage Multilogit Relative-Risk Ratios with base outcome: formal salaried

	Base outcome: F	Formal Salaried
	independent*	informal salaried
Individual Characteristics		
Gender	Ref.	
Female	0.892***	1.297***
	(0.00662)	(0.0102)
Age	Ref. 26-5	
15-25 years	0.748***	2.722***
55.45	(0.00740)	(0.0249)
55-65 years	1.668***	0.930***
	(0.0167)	(0.0107)
Completed Education No Education	Ref. Secondar 1.472***	2.360***
No Education		
Primary	(0.0170) 1.293***	(0.0287) 1.675***
rinnary	(0.0116)	(0.0155)
Superior	1.417***	0.669***
Superior	(0.0131)	(0.00682)
Household Characteristics	(0.0131)	(0.00002)
Number of Children (<14 years)	1.087***	1.090***
(1) }**********************************	(0.00416)	(0.00431)
Kinship	Ref. not	, ,
Head of household	1.164***	0.665***
	(0.00821)	(0.00507)
Employment Characteristics	. /	` /
Economic Sector	Ref. Manu	yfact uring
Agriculture	1.378***	2.390***
	(0.0202)	(0.0362)
Mining	0.502***	0.951
	(0.0266)	(0.0457)
Electricity, Gas and Water	0.719***	0.597***
	(0.0341)	(0.0334)
Construction	1.569***	1.963***
	(0.0255)	(0.0335)
Retail and Wholesale Trade, Restaurants and Hotels	0.902***	0.991
	(0.0109)	(0.0128)
Transport and communications	1.596***	0.830***
	(0.0264)	(0.0161)
Finance,Insurance and Services provided to Businesses	0.742***	0.537***
	(0.0113)	(0.00962)
Public Administration	1.593***	1.301***
	(0.0381)	(0.0325)
Communal, Social and Personal Services and Other	0.545***	1.370***
	(0.00714)	(0.0185)
Size of Firm	Ref. >10	
< 10 employees	44.93***	6.643***
5.50	(0.609)	(0.0671)
> 50 employees	0.388***	0.266***
Contin	(0.00664)	(0.00350)
Countries	Ref. An	,
Bolivia	3.787***	2.811***
Brasil	(0.125)	(0.0918) 0.478***
DIASH	1.000	
Chile	(0.0153) 0.963**	(0.00708) 0.607***
Cime	(0.0179)	(0.0112)
Colombia	3.490***	1.371***
Colonida	(0.0534)	(0.0202)
Ecuador	1.561***	1.466***
Dettador	(0.0313)	(0.0287)
Paraguay	2.770***	1.794***
1 ataguay	(0.0583)	(0.0367)
Peru	2.624***	2.457***
1 cru	(0.0718)	(0.0640)
Uruguay	0.626***	0.168***
Cauguay	(0.0125)	(0.00393)
Constant	0.0435***	0.186***
	(0.000956)	(0.00364)
	· · · · · · · · /	()

Note: independent* includes self-employed and employers

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

6.2.1 All Sample

In Table 6-4 the results of the model for all the sample can be observed. Regarding **gender**, the correlations show opposite effects where: for women, compared to men, the likelihood of independent work decreases and the probability of being an informal salaried worker increases, compared to working as formal salaried, ceteris paribus.

Also, the results corroborate the literature of life cycle, where informal salaried work is an entry point to the labor market while self-employment predominates in older workers (Cunningham, 2007). It can be observed that a worker in the **younger** category compared to the middle age group is less likely to be self-employed but significantly more likely to be an informal salaried, relative to workers in the formal sector. While being older increases the probability of being independent and decreases the probability of being an informal wage earner, all else equal.

In the case of **education**, having no education or having primary education, compared to having completed secondary education, increases the likelihood of belonging to both groups compared to formal wage earners, but both effects are larger for informal wage earners than for the self-employed, ceteris paribus. Meaning that for the informal salaried, compared to formal salaried, the effect of having less education is more relevant than for independent workers.

Being an individual with completed **higher education** compared to individuals with only high school education increases the probability of being self-employed rather than being formal salaried, and decreases the probability of being informal salaried, ceteris paribus. This effect seems to be contrary to the literature where workers with higher levels of education are more represented in formal employment and less in self-employment. In the following stages, it will analyzed if this effect persists.

On the other hand, being **head of household** would increase the probability of being selfemployed and decrease the probability of being an informal salaried worker, compared to being a formal salaried worker, all else equal.

Regarding countries' fixed effects, compared to Argentina, I find that Brazil, Chile and Uruguay decrease the likelihood of salaried informality and self-employment compared to formality. While the other countries increase the likelihood.

In this 2nd stage, many coefficients that are observed in the case of independent workers may be pushed by the group of independent entrepreneurs who have different characteristics, income and motives than the rest of the self-employed. I think that dividing the independent in protected with social security and unprotected is accurate, and also separating self-employed from employers. Moreover, in our previous analysis, unpaid family workers were included as salaried workers, which may be generating an alteration of the results. For all these reasons it was decided to take an even more specific division of employment: informal employer, informal self-employed, informal salaried, unpaid family workers and formal workers. Here, a multinomial logit model is also applied, with base outcome of being a formal worker.

Considering the sample as a whole does not help either because the particularities cannot be seen. This is why in the next stage, the study is also made at the country level to be able to make a comparative analysis.

6.3 3rd Stage

As it has been explained, within the group of the population with no social security coverage, different types of workers can be found. In the previous stage I analyzed the difference between informal salaried and independent workers compared to formal salaried workers. This stage studies how the characteristics correlate differently across four groups of informals, compared to formal workers.

6.3.1 All Sample

First, the entire sample was analyzed. Table 6-5 notes that:

A **woman** is more likely to work as an informal self-employed, as a salaried worker and much more likely to work as an unpaid family worker, relative to working within the formal sector. But being a woman has a significant negative correlation with the probability of being an employer without social security coverage, compared to a formal worker, all else equal.

It can be observed that a worker in the **younger** category compared to the middle age group is less likely to be an informal employer but significantly more likely to be an informal self-employed and twice as likely to be an informal salaried or an unpaid family worker, relative to workers in the formal sector. On the other hand, being a person between 55 and 65 years old, compared to a

middle-age worker, is very unlikely to be an informal salaried worker but more likely to be an informal self-employed or an informal employer, compared to working in the formal sector.

Regarding **education**, what was concluded in the previous phase changed. These previous results showed that the likelihood of being independent increased with the completion of higher education. Now it is understood that having superior education, compared to having only secondary, decreases the likelihood of being informally self-employed compared to being a formal worker. For employers this coefficient is not significant.

Individuals with no education compared to those with completed secondary education are more likely to be informal self-employed, unpaid family workers and salaried than to be formal workers, all else equal. But they are less likely to be informal employers. By this I mean that individuals with no education, compared with secondary education, are more likely to be formal salaried than informal employers, all else equal.

Results show that the **number of children** has a similar positive effect for all categories, but it is greater for unpaid family workers. Being a **household head**, decreases the likelihood of informal employment as self-employed, salaried and unpaid family worker, but increases the likelihood of being an informal employer, all compared to a formal worker.

Regarding the **sector of activity**, Retail and Wholesale Trade, Restaurants and Hotels continues to show a negative effect. While, Construction still shows a positive effect, except for unpaid family workers. It was found that informal employers are more likely to be working in construction, compared to manufacturing; informal self-employed have higher probabilities of working in transport and communications and construction; informal salaried are more likely to work in agriculture, mining, construction and communal, social and personal services.

Table 6-5: 3rd stage Multilogit RRR with base outcome: formal employment

Base outcome: Formal Workers

				Formal Workers	
		informal employer	informal self-employed	d informal salaried	unpaid family work
Individual Char	raderistics		75. /	` M - L	
Gender	Г. 1	0.747***		Male	4.046***
	Female	0.746*** (0.0145)	1.268*** (0.00960)	1.212*** (0.00935)	4.046*** (0.0577)
Age		(0.0143)	` /	(0.00933) 6-54 years	(0.0377)
rige	15-25 years	0.460***	1.317***	3.448***	4.536***
	13-23 years	(0.0172)	(0.0133)	(0.0309)	(0.0680)
	55-65 years	1.322***	1.127***	0.627***	1.183***
	55 05 years	(0.0282)	(0.0104)	(0.00689)	(0.0232)
Completed E	ducation	(0.0202)	, ,	ary Education	(0.0202)
33p	No completed Education	0.879***	2.425***	2.882***	2.514***
	1	(0.0272)	(0.0264)	(0.0329)	(0.0509)
	Primary Education	1.176***	1.686***	1.906***	1.769***
	•	(0.0249)	(0.0146)	(0.0168)	(0.0279)
	Superior Education	1.036	0.563***	0.424***	0.629***
		(0.0233)	(0.00543)	(0.00424)	(0.0131)
Household Chai	raderistics				
Number of Ch	nildren (<14 years)	1.076***	1.115***	1.081***	1.173***
		(0.00986)	(0.00417)	(0.00411)	(0.00725)
Kinship			Ref. n	ot Head	
	Head of Household	1.417***	0.877***	0.733***	0.0849***
		(0.0259)	(0.00614)	(0.00535)	(0.00174)
Employment Ch					
Economic Sec				nufacturing	
	Agriculture	0.674***	1.019	1.294***	5.500***
		(0.0216)	(0.0142)	(0.0189)	(0.130)
	Mining	0.501***	0.730***	1.145***	0.351***
		(0.0792)	(0.0435)	(0.0538)	(0.0738)
	Electricity, Gas and Water	0.417***	0.995	0.658***	0.560***
		(0.0825)	(0.0553)	(0.0372)	(0.0934)
	Construction	1.269***	1.479***	1.943***	0.269***
		(0.0422)	(0.0235)	(0.0312)	(0.0172)
Retail and V	Wholesale Trade, Restaurants and Hotels	0.820***	0.829***	0.971**	0.932***
7 7		(0.0212)	(0.0100)	(0.0124)	(0.0210)
1:	ransport and communications	0.221***	1.278***	0.707***	0.318***
г. т	10 ' '11 P'	(0.0112)	(0.0203)	(0.0131)	(0.0163)
rinance,Insu	rance and Services provided to Businesses	0.259***	0.639***	0.591***	0.138***
	Deblie Administration	(0.0110)	(0.00996)	(0.0104)	(0.00696)
	Public Administration	3.16e-09	0.116***	1.037	0.0240***
Communal	l, Social and Personal Services and Other	(2.45e-06) 0.242***	(0.0102) 0.500***	(0.0267) 1.820***	(0.0108) 0.0905***
Communa	i, social and Personal Services and Other	(0.00932)	(0.00679)	(0.0241)	(0.00362)
Size of Firm		(0.00932)	, ,	(0.0241) 10 & <50	(0.00302)
Size of I film	< 10 employees	11.75***	73.27***	3.830***	48.89***
	- To employees	(0.453)	(1.851)	(0.0387)	(2.616)
	> 50 employees	0.0436***	0.267***	0.286***	0.0965***
	- 50 cmployees	(0.00543)	(0.0105)	(0.00379)	(0.0133)
Countries		()	, ,	1rgentina	(***-50)
	Bolivia	5.871***	16.43***	2.238***	20.39***
	**	(0.399)	(0.625)	(0.0735)	(1.392)
	Brasil	0.606***	1.602***	0.285***	1.095
		(0.0289)	(0.0382)	(0.00421)	(0.0627)
	Chile	0.320***	2.172***	0.504***	0.916
		(0.0216)	(0.0575)	(0.00910)	(0.0616)
	Colombia	2.435***	9.647***	0.943***	3.858***
		(0.113)	(0.229)	(0.0138)	(0.221)
	Ecuador	1.134**	4.297***	0.926***	6.637***
		(0.0625)	(0.113)	(0.0176)	(0.388)
	Paraguay	12.61***	14.39***	2.812***	13.80***
		(0.715)	(0.489)	(0.0743)	(0.902)
	Peru	2.695***	6.199***	1.038*	5.805***
		(0.143)	(0.168)	(0.0205)	(0.344)
	Uruguay	0.113***	1.175***	0.125***	0.259***
		(0.0111)	(0.0325)	(0.00289)	(0.0205)
Constant		0.0101***	0.00517***	0.253***	0.000892***
		(0.000631)	(0.000185)	(0.00488)	(7.14e-05)
		(0.000031)	(0.000165)	(0.00+00)	(7.140-03)

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

6.3.2 Across countries

Subsequently, differences across countries are explained in Table 9-9, Appendix D. First, studying the impact of being a woman on the likelihood of informality. If the categories are arranged in the following order: (1) informal employer (2) informal salaried (3) informal self-employed and (4) unpaid family workers, it can be seen that there tends to be an upward effect in some of the countries. Where being a woman has a negative impact or lesser impact (in the case of Peru) on the probability of being an informal employer, and this effect increases in this order, where women have the highest probability of belonging to the group of unpaid family workers, relative to being formal workers, all else equal. All countries show a positive relationship between being a woman and belonging to the informal self-employed or salaried sector, except for Uruguay and Paraguay where there is no significant relationship between being a woman and belonging to either of these two informal groups, and Ecuador where being a woman is negatively related to the probability of being an informal salaried worker, compared to being a formal worker, ceteris paribus. I find the largest effects between countries in the likelihood of being informal salaried or self-employed, in the case of Peru, where the effect of being a woman on the probability of being informal selfemployed, compared to being a formal worker, is double the average of the other countries. This is followed by Bolivia, which also shows a high effect in this category.

Concerning **age**, it is noted that the effects vary by country, but the already observed patterns tend to maintain. It should be noted that belonging to the 55-65 age group has a negative effect on the probability of being an informal wage earner, as has already been explained. But this value varies according to the retirement age in each country. In some countries, workers between 55 and 65 years of age show a low incidence of informality, which may be explained by the fact that in some countries this age group does not include pensioners, unlike in other countries where the retirement age is much lower than 65 (See Table 7-1 of retirement ages).

When considering the effect of having different levels of **education** on the likelihood of belonging to any of the different types of informality, relative to belonging to the formal sector, it is concluded that: The effect of having no education and having primary education, compared to having completed secondary education, shows the same patterns we have discussed previously and the effects do not differ much across countries. Something that I think is worth highlighting is how having higher education affects the probability of informality in different ways across groups and across countries.

For countries such as Argentina and Brazil, having higher education, compared to having only secondary education, increases the probability of being an informal employer and in the case of Argentina, it also increases the probability of being an informal self-employed, relative to being a worker covered by social security, while in other countries having higher education decreases this probability.

For all countries, having a **couple** (married or cohabitant) makes you less likely to be an informal wage earner, compared to being a formal worker, ceteris paribus. While in the case of self-employed informals, this effect is negative for some countries and positive for others. Being **head of household** for all countries makes you less likely to belong to the group of informal wage earners or unpaid family workers, relative to being a formal worker, ceteris paribus. With respect to employers, this effect is always positive and with respect to the self-employed, it varies by country.

Finally, we can see the breakdown of the effect of the different **sectors of activity.** Depending on the industry, the correlation varies according to the type of informality and the country. Many coefficients are not significant and fail to explain the relationship. But the results can be summarized in the following table:

Table 6-6: Signs of significant coefficients: economic sector—informality relationship

	informal employer	informal self-employed	informal salaried	unpaid family workers
Argentina	(+) 1 (-) 4, 7, 8, 10	(-) 4, 7, 8, 10	(+) 1, 5, 7, 10 (-) 2, 4,6, 9	(-) 5, 7,8,10
Bolivia	(+) 5 (-) 7, 8, 10	(+) 1, 7, (-) 4, 8, 10	(+) 2, 5, (-) 1, 4,7, 8,9,	(+) 1 (-) 2,5,6,7,8,9,10
Brasil	(+) 5 (-) 1 ,7,8,10	(+) 5,4,7, (-) 1 ,2,6, 8,10	(+) 1, 2,5,9,10 (-) 6,8	(+) 1 (-) 2,5,6,7,8,10
Chile	(+) 1,5 (-) 7,8,10	(+) 5 (-) 2,4,6,7,8,10	(+) 1,5,6,7,9,10 (-) 2,4,8	(+) 1,6 (-) 10,8,7,5
Colombia	(+) 1 (-) 10,8,7,6,5,4,2	(+) 1 (-) 10,8,6,5,4	(+) 1,5,10 (-) 2,4,7,8,9	(+) 1,6 (-) 10,9,8,7,5,2
Ecuador	(-) 1,2,6,7,8,10	(+) 6,7 (-) 1,2,8,10	(+) 5 (-) 6,7,8,9	(+) 1 (-) 2,4,5,7,8,10
Paraguay	(+) 5 (-) 7,8,10	(+) 1,6 (-) 8	(+) 5,7,10 (-) 8,9	(+) 1,6 (-) 5,7,8,10
Peru	(-) 5,7,8,10	(+) 1,4,6,7 (-) 2,5,8,10	(+) 1,2,4,5,9,10 (-) 6,7,8	(+) 1,4,6 (-) 5,7,8,10
Uruguay	(-) 1,6,7,8,10	(+) 5, (-) 1,6,7,8,10	(+) 5,10 (-) 1,4,6,7,8,9	(+) 1,2, (-) 7,8,10

Source: Author's elaboration. Results from Multinomial Logit with base outcome: formal workers. Reference group: Manufacturing Note: sector 1 = Agriculture, 2 = Mining, 3 = Manufacturing, 4 = Electricity, Gas and Water, 5 = Construction, 6 = Retail and Wholesale Trade, Restaurants and Hotels, 7 = Transport and communications, 8 = Finance, Insurance and Services provided to Businesses, 9 = Public Administration, 10 = Communal, Social and Personal Services and Other.

6.4 4th Stage - Income Distribution and Informality

After these 3 stages, I have analyzed how these individual, household and employment characteristics have different effects on the different types of informal workers compared to formal workers and across countries. It can be observed how it would be incorrect to take informal workers as a whole when they are such a heterogeneous group. As a last step the study sample is reduced to only informal workers and analyze how different types of informal workers have different probabilities of belonging to the top and the bottom of the income distribution.

Table 6-7: 4th stage Multilogit RRR with base outcome: Middle income distribution

	Bottom	Тор
Type of Employment		nal salaried
Informal employer	0.594***	12.24***
	(0.0176)	(0.315)
Informal self-employed	2.179***	2.305***
TT '10 '1 1	(0.0184)	(0.0454)
Unpaid family worker	114.5***	0.606
1 1:1 101	(12.54)	(0.311)
Individual Characteristics	D (
Gender Female	. Кеј. 2.747***	men 0.576***
remale		0.0.0
Ago	(0.0238)	(0.00977)
Age	1.933***	54 years
15-25 years	(0.0187)	0.434*** (0.0114)
55 65 voore	1.221***	1.173***
55-65 years	(0.0128)	(0.0232)
Completed Education	` '	ary Education
No Education	2.309***	0.405***
NO Education		
Primary	(0.0274) 1.349***	(0.0114) 0.638***
1 HHIGH Y	(0.0120)	(0.0121)
Superior	0.804***	2.631***
Superior	(0.00997)	(0.0474)
Household Characteristics	(0.00))1)	(0.0474)
Number of Children (<14 years)	1.046***	1.029***
rumoer of emiden (14 years)	(0.00397)	(0.00802)
Kinship		ot Head
Head of Household	0.727***	1.495***
Tiedd of Household	(0.00561)	(0.0229)
Employment Characteristics	(0.00501)	(0.022)
Economic Sector	Ref. Man	ufacturing
Agriculture	2.252***	0.879***
1 Activation	(0.0335)	(0.0294)
Mining	1.300***	1.996***
	(0.0810)	(0.214)
Electricity, Gas and Water	1.524***	0.775
Electricity, One and Water	(0.107)	(0.143)
Construction	0.663***	0.915***
Communication	(0.0113)	(0.0295)
Retail and Wholesale Trade, Restaurants and Hotels	0.869***	1.254***
	(0.0113)	(0.0331)
Transport and communications	0.582***	1.082**
•	(0.0108)	(0.0349)
Finance, Insurance and Services provided to Businesses	0.930***	2.323***
*	(0.0176)	(0.0740)
Public Administration	0.832***	2.005***
	(0.0477)	(0.148)
Communal, Social and Personal Services and Other	1.078***	1.229***
	(0.0155)	(0.0377)
Size of Firm		0 & <50
< 50 employees	0.522***	1.850***
	(0.0104)	(0.0572)
> 50 employees	0.594***	2.347***
· -	(0.0147)	(0.0866)
Control for countries added		
_	0.348***	0.0281***
Constant	0.346	0.0201
Constant	(0.00804)	(0.00156)

Standard errors in parentheses . Base Outcome : Middle Segment. *** p<0.01, ** p<0.05, * p<0.1

6.4.1 All Sample

Table 6-7 shows the multinomial logit relative risk ratios estimation for Top and Bottom informality. Through this model the top and bottom income distribution probabilities within the informal economy are analyzed. For this, country-by-country based on the income of the employed, the sample is divided into deciles and grouped into 3 categories: the bottom segment (deciles 1 and 2), the middle segment (deciles 3-8) and the top segment (9 and 10). The resulting coefficients show the probability of being at the bottom or the top of the income distribution, relative to the reference group, the middle segment.

In brief, it was found that informal workers located at the bottom of the income distribution, relative to those at the middle, are more likely to be unpaid family workers and self-employed and less likely to be employers, compared to being salaried workers. Also, they are more likely to be women, young more than old, more likely to have no education or only primary education, compared to those with secondary education, and less likely to have superior education, and are less likely to be heads of households, among other things.

On the other hand, it can be observed that informal workers at the top of the income distribution are more likely to be employers and self-employed, men and old with superior education, and head of households.

These findings closely illustrate the heterogeneity of the informals and how among this group there are different kinds of individuals with different characteristics depending on their level of income.

This may be to some extent related to the findings of WIEGO and their model of informal employment (Figure 2-1), where they categorize the types of informality and show how vulnerability, female presence, income level and poverty risk vary according to the type of informality. From unpaid family workers with mostly female presence, low average earnings and high risk of poverty, to casual informal salaried workers, to self-employed to regular informal salaried workers, to informal employers who are mostly men, with high average earnings and low risk of poverty. In this case it was found that unpaid family workers are most likely to be women, and more likely to be at the bottom of the distribution, compared to informal salaried workers. While informal employers, are most likely to be men and to be at the top of the income distribution, all else equal.

7 Limitations and Future Research

As was explained above, constructing a recent harmonized database to compare informality across 9 South American countries was challenging. I must be clear about some of the decisions that were made to achieve comparability across databases. First, as I am studying informal workers and the pension coverage provided by their jobs, only data from the employed individuals was kept, and the unemployed and inactive were excluded. Using the entire WAP, instead of just the employed, could have partially corrected the selection bias, but in this case, it was only needed to analyze the social security coverage of the occupied.

In table 7-1 it can observed that minimum age of the working age population and the retirement age for men and women varies across countries in South America. Our sample had to be limited to individuals between 15 and 65 years of age in order to make it comparable across countries (highest minimum WAP age and retirement age). But in this way, I left out those under 15 years of age who are part of the WAP in some countries, and also considered some retirees in countries where retirement age is less than 65.

Table 7-1: Specificities of the pension systems, valid in 2019

	Argentina	Bolivia	Brasil	Chile	Colombia	Ecuador	Peru	Paraguay	Uruguay
Minimum age (WAP)	15	14	14	15	12 1	15	14	15	14
Retirement age for women	60	58	60	60	57	60	65	60	60
Retirement age for men	65	58	65	65	62	60	65	60	60

Source: Author's elaboration. Notes: 12 years or urban population and 10 years for rural population

Also, for the countries and the variables used there are sometimes missing values, which make those individuals not considered in the models. For each variable, the missing values represent less than 1% of the whole sample, with the exception of the variable that defines informality status that has 1.06% of missing values and size of firm which has 6 % of missing values.

In some cases, there are individuals in the samples who were interviewed more than once during the year. This research focuses on a cross-sectional analysis, so the evolution of individuals is not analyzed but instead their situation at a specific moment in time, in this case the year 2019. For the panel individuals present in the surveys of Argentina, Brazil, Chile and Ecuador, I kept the first interview that was conducted, as I did not find studies mentioning what to do in these cases. In the other countries there was only one interview per individual. It is a limitation that these individuals had to be dropped from the sample.

Also, as was previously explained, data was downloaded for our year of interest (2019), but depending on the country, data was gathered differently. Quarterly, monthly or in different visits throughout the year.

Another limitation is that data on individuals' ethnicity was only available for Brazil, Ecuador, Peru and Uruguay, and a model was run separately with these countries to analyze the effect.

On the other hand, I am aware of the complex task of measuring informality. In this case the measurement is done through the pension coverage of individuals, but I know this may be leaving individuals out of the analysis. It cannot be sure that this definition covers the whole phenomenon, but the best data and methods available to us were used. Moreover, this study only consideres the individual, household and employment characteristics of individuals, but I acknowledge that the probability of belonging to the informal economy is determined by many other reasons. In this case, the scope of research is focused on how these characteristics relate to the probability of informality, across countries, across gender, and how it varies across different types of informality, but it is not assumed that what is studied are the sole determinants of informality.

It can be highlighted that the objective of this paper is to analyze in a descriptive and general way the situation of informality in the South American region, studying the characteristics of the individual that increase and decrease the probability of informality and how this varies between genders, different segments of the income distribution, different types of informal workers and across countries. It is not within the scope of this paper to analyze in depth each of the reasons behind its findings, but many questions emerge from this work that would be interesting to explore in the future.

Among them, the further study of women's participation in the South American informal economy can be relevant. What domestic policies affect the fact that for some countries being a woman, controlling for all the other characteristics, increases the likelihood of informality and for others is the contrary? Also how characteristics like being married, having children and the level of education have different effects for women and men. Added to that, in order to improve the quality of life of these countries, it is essential to improve the situation of its female population, and to this end it is important to improve labor market insertion, for which it is necessary to have a thorough diagnosis that takes into account their specifications and the barriers they face in accessing jobs that allow them to escape poverty. Studying gender and informality dynamics is essential, for example, it could be interesting to compare labor legislation of developed countries and the South

American region. It is important to understand how governments should formulate policies and adopt changes in laws to allow flexibility in working conditions in order to reduce the gender gap that perpetuates inequality and leads to a poverty trap for women.

Education and informality dynamics also seem interesting to study in more depth: how having higher education decreases the probability of informality much more in one country than in others and how this effect varies significantly between men and women. Also, studying why in Argentina and Brazil having higher education increases the probability of being an informal employer and self-employed, compared to being formal, while in other countries a negative effect is seen.

Moreover, the results showed how the probability of informality varied between sectors and between countries. I believe that this is relevant at the time of correctly directing public policies. In the case of the public sector's informality, although I have mentioned some reasons behind it, studying the determinants more in depth could be relevant. As well as the positive relationship that exists between working in agriculture and being formal worker in Ecuador and Uruguay that is not seen in other countries.

The results regarding Venezuelan migration and the probability of informality may also be relevant and it would be interesting to study why these coefficients vary across countries. For example, analyzing in depth how South American countries have managed the insertion of these workers into their labor force.

On the other hand, based on the available data, the difference between informal employers, self-employed, salaried, family workers has been analyzed but I understand that within these groups there are differences in motives. In this way, it could be interesting, following the line of Fernandez et al (2017), to connect these results with the theory that establishes 4 types of informality that are differentiated by the motives that individuals have for being informal: subsistence, voluntary, induced and mixed. For this, data on surveys of these workers and their preference for informality would be needed, which tend to be scarce and not representative, to know what keeps them working in this sector without any state protection.

I think that in future research, it would be worthwhile to consider constructing an index that not only reflects pension and social security coverage for workers but also all the benefits that a formal worker should have: a signed contract, vacations, health insurance, maternity and sick leave, assistance with children, among others. For this, it would be necessary to have more complete databases for all countries.

Lastly, it is known that the problem of informality is a long-standing one in the region, although it has recently begun to receive more attention due to the situation of informal workers during the COVID-19 pandemic. This paper shows the panorama of the South American region for the year 2019, prior to the pandemic where all these problems have been exacerbated. I believe it can be used as a point of comparison when analyzing the effects of the pandemic on the South American labor market.

8 Concluding Remarks

Despite the implementation of different models to promote economic development in Latin America, a large part of the population continues to increasingly participate in the informal economy, which in this study is measured as the lack of social security coverage. This research examined the phenomenon of informality in the South American labor market through the harmonization of household surveys for 9 countries in 2019 by profiling informality probabilities according to individual, household and employment characteristics for the employed population between 15 and 65 years old.

The empirical analysis consists of 4 stages, starting with a probit model considering the traditional approach which takes a binary variable to measure the likelihood of working in the informal economy given the individual, household and employment characteristics of the worker. Then, with the same explanatory variables, a multilogit model was conducted to analyze the methodology of some authors who differentiate between self-employed and informal salaried workers, compared with formal salaried workers. Subsequently, I examined more in depth the differences between informal workers, conducting a multilogit model with categories: informal employers, informal self-employed, informal salaried employees, and unpaid family workers, with all formal workers as the base group. Finally, only for the sample of informal workers, their position in the income distribution is studied through a multilogit model.

Below, the results excluding stage 2 will be highlighted, where I differentiate between independent and salaried work as the literature explains (Arias and Khamis, 2008); Bargain and Kwenda, 2010). In the 2nd stage, while the results show opposite effects of characteristics like being a woman, being young and old, and having superior education in the probabilities of informal salaried work vs. independent work; after running the 3rd stage model, I find that these effects are explained not by the independent nature of the work, per se, but through the employment relationships of these workers. For example, according to stage 2, being a woman has a positive effect on the probabilities of informal salaried work but a negative relationship with independent work. In stage 3 it was found that these negative effects are actually driven by the employers that belong to the independent category, because the effect for the self-employed is positive. I also believe that considering the sole fact of being an independent worker as proxy for informality, as has been seen in some previous work, is incorrect, at least for South American data. It is important to contemplate the different types of informals within independent work, and likewise their social security coverage.

In summary, this research's results support the main theories established in previous studies but some of the findings may further contribute to the literature in the case of South America.

First, evidence is found that supports the **life-cycle theory** proposed by Cunningham (2007) where informal salaried work prevails among the youngest while self-employment predominates in older workers. When analyzing the informal sample separately, results also show that young informals are more likely to be at the bottom of the income distribution and less likely to be at the top, while older workers prevail among both top and bottom.

On the other hand, the results support the **human capital** theory that links educational attainment with informality, since at all stages more education decreases the probability of informality. The theory holds for all the countries in the sample, although the effects vary in magnitude. Furthermore, it was found that higher education, decreases more for women that for men the likelihood of informality. In addition, when studying the different types of informality, results show that having no education decreases the likelihood of being an informal employer but increases the probabilities of all the other types of informality. While higher levels of education are related with a lower likelihood of informality, except for the case of Argentina and Brazil, where a positive correlation is observed. Finally, when analyzing the income distribution position for informal workers, informals at the bottom of the distribution are more likely to have no education or only primary education while those at the top are more likely to have superior education.

Regarding ethnicity and migration, there were opposing views on the literature regarding their impact on the probabilities of informality. The results explain that afro-descendant, indigenous and mestizo population, were more likely to work informally and lack of pension coverage in comparison to white individuals. Moreover, considering the Venezuelan migration crisis, I find that being a Venezuelan **immigrant** significantly increases the likelihood of working in informality, particularly in the case of Colombia.

When studying the effects of **economic sectors**, there are many differences across countries. It can be highlighted that working in Agriculture shows a positive relationship with the likelihood of informality, except for Ecuador and even more for Uruguay, where this effect is negative and significant. Also, for countries like Brazil, Chile and Peru, a positive relationship between working in public administration and the likelihood of informality is found, which could be related to rigid

labor legislation and the need for outsourcing with different labor arrangements that not necessarily protect the worker.

Lastly, I find evidence supporting the theory that usually women in developing countries have higher probabilities of working in the informal economy. Although Ecuador, Paraguay and Uruguay appear to be outliers to this theory, showing a negative effect in all the stages. Also, it is relevant to highlight that the positive effect of gender on the likelihood of informality varies significantly across countries, from Peru with the highest coefficients to Brazil a much lower correlation. However, when studying differences between informals, it was found that being a woman has a negative effect on the likelihood of being informal employer, but a positive effect in the likelihood of being informal salaried, informal self-employed and unpaid family worker, and the effect increases in that order. These results could be related with the WIEGO model of informal employment, where according to the type of informality there are differences in their vulnerability, female presence, income level and poverty risk. Lastly, when studying the informal sample exclusively, I find that being a woman increases the probabilities of belonging to the bottom of the income distribution and decreases the likelihood of being at the top.

Another relevant finding regarding gender is that when dividing the sample between women and men, is that the individual, employment, and household characteristics affect the probabilities of informality for men and women differently. I find that variables like the number of children, are more significant in increasing the probabilities of informality for women than for men.

It was beyond the scope of this research to analyze the results that did not follow the theories about the determinants of informality. However, I believe that these results may represent interesting research questions that could inspire future studies.

Although in this work I was able to unify and harmonize surveys for 9 South American countries, an effort should be made in the region to collect more data related to social security coverage and the motives of workers that can be comparable across countries.

I believe that these findings may be useful to better understand such a heterogeneous phenomenon as informality in the South American region. This research studies who the informal workers are according to their individual, employment and household characteristics, according to the different types of informality and relating it to their level of income. I think that in the process of formulating policies with the aim of reducing informality, it is very important that the policy makers understand

the composition of the sector and what factors affect the likelihood of being informal in each country.

It is not possible to compare the informality of a street vendor or a farmer with that of a mother who decides to be informal in order to have the flexibility that formal jobs do not offer, with that of a salaried worker who must accept an informal job, and with self-employed worker who decides to stay outside the law and not pay taxes. The policies to target each of these groups should differ significantly.

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Appendix A

In Table 9-2 you will find the variables of each survey that were used to fill in our variable of interest and in the other presented tables, the different methodological adjustments I had to make so the definitions could be comparable across countries. Some databases were presented on a cumulative basis, others by periods in the year, which were then merged into a single database.

First, I reviewed the survey dictionaries for each country to see how our variables of interest were constructed for each country. Then, established how the variables would be composed, their categories and their labels, and finally, proceeded to generate those variables for each country trying to adapt the methodology of each country into a single and comparable methodology.

For the categorical variables, checked each country's methodology and generally chose the most general categories within variables so we could make it comparable.

For the *education* variable, I studied in detail each education system and education levels to make the comparability as good as possible. Divided the variable in 4 categories consisting of different levels of completed education: *No education, Primary, Secondary and Superior Education.* This generalization was made because Bolivia's data for education only showed these 4 categories, and the other countries' more specific data could be included in those general categories. The uncompleted education levels were included in the previous level, for example: uncompleted primary, was included in the *no education* category, uncompleted secondary in *primary* category, and so on. The table shows how the levels were assigned in the categories, based on the Andres Bello Agreement (*Convenio Andres Bello*), which is an intergovernmental organization for educational, scientific, technological and cultural integration in Latin America.

Also, as can be seen in the table, there are variables for which I did not find related questions in the surveys of some countries, as is the case of *indigenous* for Argentina, Chile Colombia and Paraguay, *literacy* for Chile and *marital status* for Brazil.

In the case of the *marital status*, I decided to create a dummy variable that defines if an individual has a *couple* or doesn't have a couple. By couple, we mean married or cohabitating. And by "has no couple" we mean divorced, single or widowed.

Regarding the size of the firm variable, the categories chosen were under 10 employees, between 10 and 50 employees, and more than 50 employees. In the case of Argentina, the question regarding size of the firm was categorized using 40 instead of 50 employees.

The *economic sector* variable also meant some work because not all countries use the International Standard Industrial Classification (ISIC) of economic activities. This is why I must study the codes of the branches

of activity of each country and make them comparable. In this case, the main problem is generated by Paraguay because they claim to use the MERCOSUR classification but then make their own classification that summarizes a lot and does not allow us to see all the sectors. I had to use this more general categorization as a base and include the more specific ones in these general categories. Also, countries like Paraguay omit sectors like Mining and Public Administration in their categories. The table explains shows in detail the codes used.

Table 9-1: Comparability of Variables From Original Datasets

Variables	Argentina	Bolivia	Brasil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay
				Individual (Characteristics				
female	CH04	s02a_02	V2007	sexo	P6020	p02	P06	p207	e26
age	CH06	s02a_03	V2009	edad	P6040	p03	P02	p208a	e27
literacy	CH09	s05a_01	V3001	-	P6160	p11	ED02	p302	e48
indigenous	-	s03a_04	V2010	-	-	p15	-	p558c	e29_6
completed education	NIVEL_ED	niv_ed	VD3004	nivel	P6210	p10a	ED0504	p301a	
				Household (Characteristics				
region	REGION	depto	UF	region	DPTO	m	DPTO	dominio	dpto
area : urban/rural	urban sample	area	V1022	tipo	CLASE	area	AREA	estrato	region_4
marital status no couple- couple	CH07	s02a_10	-	est_conyugal	P6070	p06	P09	p209	e36
kinship	CH03	s02a_05	V2005	parentesco	P6050	p04	P03	p203	e30
				Employment	Characteristics				
work status	ESTADO	condact	VD4002	activ	_ocupados / _desocupados/ _inactivos	empleo / desempleo/ p36	PEAA	ocu500	pobpcoac
income	P21	yprilab	VD4017	ing_t_t	INGLABO	ingrl	e01aimde	d524a1	PT2
economic sector	PP04B_COD	caeb_op	VD4010	r_p_rev4cl_caenes	RAMA2D	rama1	RAMA_PEA	p506r4	f72_2
work relationship	CAT_OCUP	s06b_14	VD4008	categoria_ocupacion	P6430	p42	CATE_PEA	p507	f73
size of firm	PP04C	s06b_21b	V4018	b15_1	P6870	p47b	B08	p512b	f77
hours	PP3E_TOT	phrs	V4039	habituales	P6800	p51a	HORAB	i513t	f85

Table 9-2: Construction of Variable: Education

	Argentina	Bolivia	Brasil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay
No education	Sin instruccion / Primaria Incompleta	Ninguno / Primaria Incompleta	Sem instrução e menos de 1 ano de estudo/ Fundamental incompleto ou equivalente	Sin Educacion Formal/ Basica Incompleta	Ninguno / Preescolar	Ninguno / Centro de alfabetización/ Jardín de infantes	Sin instrucción/ Educación especial/ Educación Inicial/ Programa de Alfabetización/Grado especial/Programas especiales	Sin Nivel / Inicial / Primaria Incompleta / basical especial	Educacion inicial / Educacion Preescolar
Primary	Primaria Completa / Secundaria Incompleta	Primaria Completa / Secundaria Incompleta	Fundamental completo ou equivalente / Médio incompleto ou equivalente	Basica Completa / M. Hum. Incompleta / M. Téc. Prof. Incompleta	Basica Primaria y Secundaria	Primaria / Educacion Basica	EEB 1" al 6" (Primaria)/ EEB 7" al 9"/Secundario Básico / Educ: Básica Bilingile para personas Jóvenes y Adultas/ Educ: Básica Alternativa de Jóvenes y Adultos	Primaria Completa Secundaria Incompleta	Educacion Primaria
Secondary	Secundaria Completa/ / Superior Universitaria Incompleta	Secundaria Completa	Médio completo ou equivalente / Superior incompleto ou equivalente	M. Hum. Completa / M. Téc Completa / Técnico Nivel Superior Incompleta / Profesional Incompleto	Media	Secundaria / Educacion Media	Bachiller Humanistico, Científico, Tecnico, Comercial, A distancia / Educacion Media Científica, Tecnica, Abierta, A distancia y alternativa para Jovenes y Adultos / Formación profesional no Bachillerato de la Media	Secundaria Completa	Educacion Media
Superior	Superior Universitaria Completa	Superior	Superior completo	Técnico Nivel Superior Completo / Profesional Completo / Postgrado Incompleto / Postgrado Completo	Superior / Universitaria	Superior no universitaria / Superior universitaria/ Postgrado	Tecnica Superior / Formación Docente/ Profesionalizacion Docente / Formación Militar/ Policial / Universitario	Superior no Universitaria Incompleta / Superior no Universitaria Completa / Superior Universitaria Incompleta / Superior Universitaria Completa / Post- Grado Universitario	Educacion Tecnica/ Magisterio o Profesorado / Universidad o Similar / Postgrado

Table 9-3: Construction of Variable: Economic Sector

	Argentina	Bolivia	Brasil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay
Agriculture	replace sector=1 if PP04B_COD>=100 & PP04B_COD<=300 PP04B_COD>=1 & PP04B_COD<=3	replace sector=1 if caeb_op==0	replace sector=1 if V4013>=1101 & V4013<=3002	replace sector=1 if r_p_rev4cl_caenes==1	replace sector=1 if RAMA2D>=1 & RAMA2D<=5	replace sector=1 if rama1==1	replace sector=1 if RAMA_PEA==1	replace sector=1 if p506r4>=100 & p506r4<=322	replace sector=1 if f72_2>=100 & f72_2<=322
Mining	replace sector=2 if PP04B_COD>=500 & PP04B_COD<=900 PP04B_COD>=5 & PP04B_COD<=9	replace sector=2 if caeb_op==1	replace sector=2 if V4013>=5000 & V4013<=9000	replace sector=2 if r_p_rev4cl_caenes==2	replace sector=2 if RAMA2D>=10 & RAMA2D<=14	replace sector=2 if rama1==2	-	replace sector=2 if p506r4>=500 & p506r4<=990	replace sector=2 if f72_2>=500 & f72_2<=990
Manufactuing	replace sector=3 if PP04B_COD>=1000 & PP04B_COD<=3300 PP04B_COD>=10 & PP04B_COD<=33	replace sector=3 if caeb_op==2	replace sector=3 if V4013>=10010 & V4013<=33002	replace sector=3 if r_p_rev4cl_caenes==3	replace sector=3 if RAMA2D>=15 & RAMA2D<=37	replace sector=3 if rama1==3	replace sector=3 if RAMA_PEA==2	replace sector=3 if p506r4>=10	replace sector=3 if f72_2>=1000 & f72_2<=3320
Electricity, Gas and Water	replace sector=4 if PP04B_COD>=3500 & PP04B_COD<=3900 PP04B_COD>=35 & PP04B_COD<=39	replace sector=4 if caeb_op==3 caeb_op==4	replace sector=4 if V4013>=35010 & V4013<=39000	replace sector=4 if r_p_rev4cl_caenes==4 r_p_rev4cl_caenes==5	replace sector=4 if RAMA2D>=40 & RAMA2D<= 41	replace sector=4 if rama1==4 rama1==5	replace sector=4 if RAMA_PEA==3	replace sector=4 if p506r4>=3500 & p506r4<=3900	replace sector=4 if f72_2>=3500 & f72_2<=3900
Construction	replace sector=5 if PP04B_COD==4000 PP04B_COD==40	replace sector=5 if caeb_op==5	replace sector=5 if V4013>=41000 & V4013<=43000	replace sector=5 if r_p_rev4cl_caenes==6	replace sector=5 if RAMA2D==45	replace sector=5 if rama1==6	replace sector=5 if RAMA_PEA==4	replace sector=5 if p506r4>=4000 & p506r4<=4390	replace sector=5 if f72_2>=4000 & f72_2<=4390
Retail and Wholesale Trade, Restaurants and Hotels	replace sector=6 if PP04B_COD>=4500 & PP04B_COD>=4500 & PP04B_COD>=5500 & PP04B_COD==5602 PP04B_COD==45 PP04B_COD==48 PP04B_COD==56 PP04B_COD==56	replace sector=6 if caeb_op==6 caeb_op==8	replace sector=6 if V4013>=45010 & V4013<=48100 V4013>=55000 & V4013<=56020	replace sector=6 if r_p_rev4cl_caenes==7 r_p_rev4cl_caenes==9	replace sector=6 if RAMA2D>=50 & RAMA2D<=55	replace sector=6 if rama1==7 rama1==9	replace sector=6 if RAMA_PEA==5	replace sector=6 if p506r4>=4500 & p506r4<=4799 p506r4>=5500 & p506r4<=5630	replace sector=6 if f72_2>=4500 & f72_2<=4799 f72_2>=5500 & f72_2<=5630
Transport and communications	replace sector=7 if PP04B_COD>=4900 & PP04B_COD>=5300 PP04B_COD>=5800 & PP04B_COD>=6300 PP04B_COD>=49 & PP04B_COD>=53 PP04B_COD>=58 & PP04B_COD>=63	replace sector=7 if caeb_op==7 caeb_op==9	replace sector=7 if V4013>=49010 & V4013<=53002 V4013>=58000 & V4013<=63000	replace sector=7 if r_p_rev4cl_caenes==8 r_p_rev4cl_caenes==10	replace sector=7 if RAMA2D>=60 & RAMA2D<=64	replace sector=7 if rama1==8 rama1==10	replace sector=7 if RAMA_PEA==6	replace sector=7 if p506r4>=4900 & p506r4<=5320 p506r4<=5800 & p506r4<=6399	replace sector=7 if f72_2>=4900 & f72_2<=5320 f72_2>=5800 & f72_2<=6399
Finance,Insurance and Services provided to Businesses	replace sector=8 if PP04B_COD>=6400 & PP04B_COD<=8200 PP04B_COD==73 PP04B_COD>=64 & PP04B_COD<=82	replace sector=8 if caeb_op>=10 & caeb_op<=13	replace sector=8 if V4013>=64000 & V4013<=82009	replace sector=8 if r_p_rev4cl_caenes>=11 & r_p_rev4cl_caenes<=14	replace sector=8 if RAMA2D>=65 & RAMA2D<=74	replace sector=8 if rama1==11 rama1==12 rama1==13 rama1==14	replace sector=8 if RAMA_PEA==7	replace sector=8 if p506r4>=6411 & p506r4<=8299	replace sector=8 if f72_2>=6411 & f72_2<=8299
Public Administration	replace sector=9 if PP04B_COD>=8400 & PP04B_COD<=8403 PP04B_COD==84	replace sector=9 if caeb_op==14	replace sector=9 if V4013>=84011 & V4013<=84020	replace sector=9 if r_p_rev4cl_caenes==15	replace sector=9 if RAMA2D==75	replace sector=9 if rama1==15	replace sector=9 if CATE_PEA==1	replace sector=9 if p506r4>=8411 & p506r4<=8430	replace sector=9 if f72_2>=8411 & f72_2<=8430
Communal, Social and Personal Services and Other	replace sector=10 if PP04B_COD>=8500 & PP04B_COD<=9900 PP04B_COD>=85 & PP04B_COD<=99	replace sector=10 if caeb_op>=15	replace sector=10 if V4013>=85011 & V4013<=99000	replace sector=10 if r_p_rev4cl_caenes>=16	replace sector=10 if RAMA2D>=80	replace sector=10 if rama1>=16	replace sector=10 if RAMA_PEA==8	replace sector=10 if p506r4>=8510 & p506r4<=9900	replace sector=10 if f72_2>=8510 & f72_2<=9900

Table 9-4 : Construction of Variable: Informality - Pension Coverage

Country	Variable	Question	(in bold the one corresponding to infomality)	Covers
Argentina	PP07H	Do you have a pension discount for this job?	1=yes 2=no	Salaried
	PP06E	That business / company / activity	1 =is it a legally incorporated company? (SA, SRL, Comandita por Acciones, etc.) 2 =is it a company registered in another legal form? 3 =or is it a company agreed by word of mouth?	Self -employed & Employers
Bolivia	s06g_54	Are you affiliated with the AFP (Administradora de Fondos de Pensiones)?	1=yes 2=no	All occupied
Brasil	VD4012	Contribution to social security institute (Instituto de Previdência) in any work of the reference week for persons aged 14 and over.	1= Contributor 2=Non-contributor	All occupied
Chile	b7a_1	Does your employer contribute for you in the pension system?	1=yes 2=no	Salaried
	i4	Is the company, business or activity in which you work registered with the "Servicio de Impuestos Internos" (SII) or do you have "iniciación de actividades"?	1=yes 2=no	Self -employed & Employers
Colombia	P6920	Are you Currently contributing to a pension fund?	1=yes 2=no 3=already pensioned	All occupied
Ecuador	p61b1	To which of the following forms of social security do you currently contribute?	1= IESS General, 2= IESS Voluntario, 3= Seguro Campesino, 4=Seguro del ISSFA o ISSPOL, 5=Non contributor	All occupied
Peru	p558a	The pension system to which you are a member is:	1-Sistema Privado de Pensiones (AFP) 2-Sistema Nacional de Pensiones – Ley 19990 3-Sistema Nacional de Pensiones – Ley 20530 (Cédula viva) 4-Other 5- Not affiliated	All occupied
Paraguay	B10 / C07	Do you contribute to a retirement fund for this occupation?	1=yes 2=no	All occupied
Uruguay	f82	Do you contribute to a pension fund?	1=yes 2=no	All occupied

Appendix B

Regions

Argentina: 1 Gran Buenos Aires, NOA, NEA, Cuyo, Pampeana, Patagonia

Bolivia: Chuquisaca, La Paz, Cochabamba, Oruro, Potosi, Tarija, Santa Cruz, Beni, Pando.

Brazil: Rondônia, Acre, Amazonas, Roraima, Pará, Amapá, Tocantins, Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso do Sul, Mato Grosso, Goiás, Distrito Federal.

Chile: Arica y Parinacota, Tarapacá, Antofagasta, Atacama, Coquimbo, Valparaíso, Metropolitana de Santiago, Libertador General Bernardo O'Higgins, Maule, Ñuble, Biobío, La Araucanía, Los Ríos, Los Lagos, Aysén del General Carlos Ibáñez del Campo, Magallanes y la Antártica Chilena.

Colombia: Antioquia, Atlántico, Bogotá, D.C., Bolívar, Caldas, Córdoba, Meta, Nariño, Norte de Santander, Risaralda, Santander, Tolima, Valle del Cauca

Ecuador: Sierra, Costa, Amazonia, Insular

Paraguay: Asuncion, Concepcion , San Pedro , Cordillera, Guairá, Caaguazu, Caazapa, Itapúa, Misiones, Paraguarí, Alto Paraná, Central, Ñeembucú, Amambay, Canindeyú, Presidente Hayes

Perú: Costa Norte, Costa Centro, Costa Sur, Sierra Norte, Sierra Centro, Sierra Sur, Selva, Lima Metropolitana

Uruguay: Montevideo, Artigas, Canelones, Cerro Largo, Colonia, Durazno, Flores, Florida, Lavalleja, Maldonado, Paysandu, Rio Negro, Rivera, Rocha, Salto, San Jose, Soriano, Tacuarembo, Treinta Y Tres

Appendix C

Table 9-5: Descriptive Statistics by country for 2019

	Arge	ntina	Boli	via	Bra	sil	Ch	ile	Cole	ombia	Ecu	ador	Para	guay	Pe	ru	Uru	guay
	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal	Forma
Individual Characteristics																		
Woman	0.469	0.439	0.456	0.398	0.402	0.438	0.470	0.438	0.453	0.453	0.447	0.411	0.409	0.433	0.516	0.367	0.445	0.482
Age																		
15-25_years	0.250	0.081	0.227	0.079	0.215	0.141	0.161	0.102	0.199	0.131	0.253	0.098	0.236	0.154	0.221	0.102	0.198	0.108
26-54_years	0.639	0.781	0.625	0.792	0.640	0.739	0.596	0.704	0.635	0.744	0.595	0.724	0.603	0.769	0.597	0.716	0.594	0.716
55-65_years	0.111	0.139	0.148	0.129	0.145	0.120	0.242	0.194	0.166	0.125	0.152	0.178	0.161	0.078	0.182	0.182	0.208	0.176
Completed Education																		
No Education	0.051	0.016	0.210	0.029	0.432	0.186	0.010	0.003	0.035	0.003	0.036	0.012	0.204	0.032	0.224	0.033	0.079	0.018
Primary	0.414	0.201	0.350	0.105	0.191	0.127	0.275	0.116	0.428	0.122	0.417	0.224	0.400	0.153	0.341	0.110	0.715	0.456
Secondary	0.430	0.452	0.259	0.158	0.312	0.426	0.479	0.449	0.345	0.302	0.432	0.354	0.226	0.231	0.354	0.386	0.094	0.205
Superior	0.105	0.331	0.181	0.707	0.066	0.261	0.236	0.433	0.192	0.573	0.116	0.410	0.170	0.584	0.081	0.471	0.112	0.322
Ethnicity	0.100	0.551	0.101	0.707	0.000	0.201	0.250	0.155	0.172	0.575	0.110	0.110	0.170	0.501	0.001	0.171	0.112	0.022
White		_	_	_	0.316	0.471	_	_		_	0.013	0.014	_	_	0.040	0.037	0.908	0.947
	-	-	-	-			-	-	-				-	-				
Afro	-	-	-	-	0.100	0.091	-	-	-	-	0.032	0.026	-	-	0.067	0.051	0.069	0.037
Mestizo	-	-	-	-	0.572	0.428	-	-	-	-	0.822	0.914	-	-	0.442	0.634		
Indigenous	-	-	-	-	0.006	0.004	-	-	-	-	0.132	0.046	-	-	0.358	0.213	0.023	0.014
Other	-	-	-	-	0.005	0.006	-	-	-	-	0.001	0.000	-	-	0.093	0.065	0.000	0.001
Household Characteristics																		
Couple	0.490	0.633	0.631	0.661	-	-	0.494	0.582	0.555	0.579	0.559	0.642	0.595	0.650	0.597	0.610	0.527	0.644
Number of children under 14	0.656	0.636	1.083	0.869	0.619	0.537	0.484	0.542	0.581	0.508	0.790	0.642	0.785	0.719	0.936	0.666	0.603	0.546
Kinship																		
Head_of_household	0.380	0.534	0.518	0.619	0.448	0.468	0.437	0.494	0.448	0.491	0.379	0.523	0.424	0.438	0.388	0.498	0.482	0.520
Partner	0.212	0.244	0.250	0.206	0.259	0.290	0.212	0.208	0.204	0.188	0.231	0.196	0.227	0.227	0.284	0.166	0.244	0.292
Children	0.314	0.170	0.198	0.147	0.219	0.178	0.252	0.211	0.219	0.226	0.294	0.209	0.262	0.242	0.259	0.253	0.219	0.148
Other_Family	0.087	0.047	0.031	0.027	0.066	0.057	0.086	0.072	0.099	0.076	0.086	0.064	0.073	0.079	0.060	0.075	0.046	0.033
Not_Family	0.007	0.005	0.003	0.002	0.007	0.007	0.013	0.015	0.030	0.019	0.009	0.008	0.015	0.013	0.008	0.007	0.008	0.007
Employment Characteristics																		
Economic Sector																		
Agriculture	0.016	0.006	0.254	0.020	0.247	0.088	0.146	0.077	0.106	0.023	0.389	0.185	0.293	0.034	0.437	0.121	0.100	0.086
Mining	0.001	0.014	0.009	0.030	0.002	0.007	0.003	0.022	0.004	0.009	0.003	0.014			0.006	0.027	0.001	0.002
Manufacturing	0.091	0.096	0.109	0.101	0.074	0.118	0.090	0.094	0.113	0.111	0.093	0.114	0.088	0.125	0.061	0.086	0.107	0.097
Electricity, Gas and Water	0.003	0.015	0.001	0.015	0.005	0.010	0.003	0.010	0.001	0.017	0.001	0.012	0.001	0.001	0.003	0.006	0.004	0.014
Construction	0.143	0.042	0.112	0.044	0.111	0.041	0.113	0.086	0.082	0.059	0.070	0.026	0.083	0.019	0.045	0.067	0.148	0.045
Retail and Wholesale Trade, Restaurants and Hotels	0.282	0.156	0.301	0.120	0.246	0.231	0.264	0.218	0.373	0.204	0.263	0.182	0.270	0.215	0.269	0.174	0.259	0.192
Transport and communications	0.051	0.065	0.093	0.060	0.051	0.061	0.080	0.075	0.100	0.079	0.065	0.057	0.027	0.044	0.063	0.079	0.033	0.082
Finance,Insurance and Services provided to Businesses	0.071	0.093	0.034	0.115	0.044	0.108	0.067	0.131	0.069	0.126	0.035	0.090	0.043	0.096	0.022	0.100	0.104	0.105
Public Administration	0.050	0.209	0.000	0.158	0.012	0.088	0.035	0.118	0.001	0.099	0.000	0.104	0.023	0.388	0.014	0.105	0.001	0.088
Communal, Social and Personal Services and Other	0.292	0.305	0.086	0.337	0.207	0.247	0.199	0.168	0.152	0.273	0.081	0.216	0.172	0.078	0.079	0.234	0.242	0.288
Size of Firm	**	0.000	0.000		0.20					0.2.0	0.00	0.2-0	0.21					
< 10 employees	0.797	0.226	0.949	0.207	0.938	0.482	0.809	0.253	0.939	0.216	0.964	0.749	0.902	0.247	0.926	0.386	0.963	0.344
< 50 employees	0.118	0.281	0.029	0.115	0.034	0.160	0.075	0.149	0.040	0.160	0.033	0.215	0.071	0.372	0.040	0.103	0.027	0.167
>50 employees	0.085	0.492	0.022	0.678	0.027	0.358	0.116	0.598	0.021	0.624	0.003	0.037	0.027	0.381	0.034	0.511	0.010	0.489
>50 employees	0.065	0.492	0.022	0.076	0.027	0.556	0.110	0.576	0.021	0.024	0.003	0.037	0.027	0.561	0.034	0.511	0.010	0.402
Work Relationship																		
Employee	0.634	0.945	0.247	0.868	0.307	0.772	0.406	0.838	0.225	0.812	0.304	0.749	0.327	0.968	0.278	0.739	0.329	0.844
Employer	0.030	0.013	0.042	0.025	0.029	0.050	0.019	0.043	0.037	0.025	0.026	0.036	0.071	0.006	0.040	0.039	0.012	0.044
Self-employed	0.138	0.006	0.515	0.095	0.476	0.137	0.493	0.089	0.639	0.148	0.422	0.161	0.395	0.007	0.478	0.196	0.637	0.108
Unpaid Family Worker	0.019	0.000	0.167	0.010	0.083	0.000	0.015	0.009	0.048	0.002	0.224	0.028	0.116	0.001	0.178	0.018	0.021	0.004
Domestic Worker	0.178	0.036	0.030	0.003	0.105	0.041	0.067	0.021	0.050	0.012	0.024	0.025	0.091	0.018	0.025	0.008	0.000	0.000
	*****	~~~~		*****	*****	******	*****	···-		····-		···-	*****	*****		*****		
Observations	18,487	29,330	13,145	3,954	148,187	218,127	21,144	57,675	187,171	132,173	41,999	13,884	19,521	5,339	38,691	18,544	11,153	35,648

Appendix D

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

Table 9-6: Probit Marginal Effects by gender by country

Probit Marginal Effects	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Dependent variable : 1= Being an Informal worker.	Argentina		Bolivia		Brasil		C	hile	Colo	mbia	Ecu	ador	Para	onav	Pe	en i	Uni	iguay
0= Formal worker	Aligo		Doi	ivia.	151	asii	C.	inc	Colo	iiibia	1.00	acioi	1 araș	guay	10	.iu	Cit	guay
15-25 years	0.255***	0.199***	0.0719***	0.134***	0.237***	0.198***	0.208***	0.141***	0.245***	0.209***	0.143***	0.125***	0.0428***	0.0273***	0.117***	0.235***	0.739***	0.552***
55-65 years	(0.0130)	(0.0115)	(0.00730)	(0.0106) -0.0851***	(0.00469)	(0.00397) 0.00274	(0.00989) 0.00119	(0.00823)	(0.00419)	(0.00422) -0.0832***	(0.00543)	(0.00602)	(0.00557) -0.0184	(0.00415) 0.00118	(0.00537)	(0.00825)	(0.0423) 0.103***	(0.0363)
55-05 years	(0.0120)	(0.0113)	(0.0208)	(0.0204)	(0.00548)	(0.00403)	(0.00635)	(0.00506)	(0.00637)	(0.00513)	(0.00951)	(0.00823)	(0.0135)	(0.00729)	(0.00975)	(0.0103)	(0.0352)	(0.0327)
Completed Education	(0.0120)	(0.0113)	(0.0200)	(0.0201)	(0.00510)	(0.00105)	(0.00033)	(0.00500)	(0.00037)	(0.00313)	(0.00751)	(0.00025)	(0.0133)	(0.00727)	(0.00773)	(0.0103)	(0.0332)	(0.0327)
No Education	0.173***	0.285***	0.0656***	0.0971***	0.149***	0.171***	0.216***	0.181***	0.255***	0.274***	0.115***	0.0853***	0.0449***	0.0465***	0.139***	0.230***	1.027***	1.269***
	(0.0267)	(0.0220)	(0.0113)	(0.0135)	(0.00468)	(0.00351)	(0.0517)	(0.0362)	(0.0111)	(0.00938)	(0.00943)	(0.0120)	(0.00873)	(0.00599)	(0.00673)	(0.00975)	(0.0817)	(0.0629)
Primary	0.118***	0.143***	0.0443***	0.0429***	0.110***	0.114***	0.115***	0.113***	0.142***	0.149***	0.0490***	0.0295***	0.0290***	0.0344***	0.109***	0.146***	0.513***	0.632**
	(0.0110)	(0.00875)	(0.0117)	(0.0124)	(0.00506)	(0.00397)	(0.00881)	(0.00698)	(0.00458)	(0.00401)	(0.00615)	(0.00563)	(0.00753)	(0.00526)	(0.00664)	(0.00804)	(0.0378)	(0.0391)
Superior	-0.138***	-0.0846***	-0.143***	-0.166***	-0.0914***	-0.0650***	-0.0512***	-0.0457***	-0.230***	-0.151***	-0.160***	-0.147***	-0.0592***	-0.0636***	-0.267***	-0.199***	-0.307***	-0.0969*
	(0.00987)	(0.00976)	(0.0167)	(0.0160)	(0.00497)	(0.00491)	(0.00554)	(0.00446)	(0.00449)	(0.00451)	(0.00972)	(0.00914)	(0.00987)	(0.00871)	(0.0102)	(0.0101)	(0.0452)	(0.0476)
Household Characteristics																		
Has a couple	-0.0759***	-0.125***	-0.00815	-0.0325**			-0.0420***	-0.0692***	-0.0145***	-0.0938***	-0.0371***	-0.0688***	-0.0203***	-0.0230***	0.0192***	-0.0966***	-0.304***	-0.431**
N. 1. (CIN /414)	(0.00913)	(0.00905)	(0.00970)	(0.0132)	0.0251	0.00=00==	(0.00551)	(0.00514)	(0.00426)	(0.00415)	(0.00674)	(0.00626)	(0.00528)	(0.00431)	(0.00677)	(0.00874)	(0.0294)	(0.0285)
Number of Children (<14 years)	0.0287***	0.0192***	0.00597	0.00743	0.0371***	0.00790***	0.00637**	0.00763***	0.0411***	0.0232***	0.0249***	0.0256***	0.00113	0.00269	0.0129***	0.0141***	0.155***	0.0832**
Head of Household	(0.00478)	(0.00420) -0.103***	(0.00412) -0.0143	(0.00484)	(0.00214) 0.0301***	(0.00159)	(0.00308)	(0.00270) -0.0597***	(0.00262) -0.0108**	(0.00226)	(0.00295)	(0.00267)	(0.00269) -0.0123*	(0.00188)	(0.00309)	(0.00351)	(0.0158) -0.0458	(0.0149) -0.140***
riead of riousehold	(0.00908)	(0.00831)	(0.0106)	(0.0132)	(0.00361)	(0.00296)	(0.00571)	(0.00492)	(0.00443)	(0.00400)	(0.00820)	(0.00675)	(0.00645)	(0.00438)	(0.00801)	(0.00913)	(0.0291)	(0.0264)
Employment Characteristics	(0.00308)	(0.00031)	(0.0100)	(0.0132)	(0.00301)	(0.00290)	(0.00371)	(0.00432)	(0.00443)	(0.00400)	(0.00620)	(0.00073)	(0.00043)	(0.00436)	(0.00001)	(0.00713)	(0.0291)	(0.0204)
Economic Sector																		
Agriculture	0.00207	0.242***	0.0273*	0.0508***	-0.0823***	0.0563***	0.0563***	0.105***	0.104***	0.149***	-0.0178*	-0.0382***	0.0397***	0.0158*	0.0494***	0.123***	-1.067***	-0.639***
	(0.0759)	(0.0313)	(0.0165)	(0.0173)	(0.00894)	(0.00554)	(0.0160)	(0.00842)	(0.0126)	(0.00676)	(0.0103)	(0.00888)	(0.0140)	(0.00808)	(0.0131)	(0.0146)	(0.0723)	(0.0454)
Mining	-0.311**	-0.154***	-0.0202	0.0559***	-0.0711	0.0377**	-0.112**	-0.0286*	-0.102**	-0.0383*	0.000192	-0.0608*	, ,	` ′	-0.00381	0.0503*	, ,	-0.0560
	(0.128)	(0.0350)	(0.0770)	(0.0216)	(0.0595)	(0.0189)	(0.0499)	(0.0147)	(0.0488)	(0.0208)	(0.0743)	(0.0315)			(0.0609)	(0.0284)		(0.242)
Electricity, Gas and Water	-0.191**	-0.113***	-0.0858	-0.294***	0.0880***	0.0406**	-0.132***	-0.0365**	-0.280***	-0.185***	0.0380	-0.00226	0.0383	1.09e-05	0.146***	0.113**	-0.426	-0.282*
	(0.0766)	(0.0278)	(0.140)	(0.0947)	(0.0279)	(0.0168)	(0.0365)	(0.0158)	(0.0467)	(0.0279)	(0.0827)	(0.0574)	(0.0361)	(0.0478)	(0.0222)	(0.0458)	(0.315)	(0.152)
Construction	-0.0234	0.258***	0.0143	0.0524***	-0.0124	0.191***	-0.116***	0.105***	-0.245***	0.0343***	-0.0739	0.121***	-0.000419	0.0572***	0.0180	-0.000323	-0.0858	0.439***
	(0.0543)	(0.0147)	(0.0279)	(0.0151)	(0.0237)	(0.00595)	(0.0221)	(0.00787)	(0.0200)	(0.00663)	(0.0457)	(0.00858)	(0.0344)	(0.00680)	(0.0331)	(0.0165)	(0.201)	(0.0459)
Retail and Wholesale Trade, Restaurants and Hotels	-0.0853***	0.0137	0.0128	-0.0298*	-0.0676***	-0.0312***	-0.101***	0.0232***	-0.0192***	-0.0173***	0.00922	-0.0491***	-0.00743	0.00405	0.00847	-0.00227	-0.290***	-0.255***
	(0.0213)	(0.0121)	(0.0128)	(0.0173)	(0.00653)	(0.00527)	(0.0108)	(0.00666)	(0.00626)	(0.00579)	(0.00941)	(0.00945)	(0.0109)	(0.00678)	(0.0118)	(0.0155)	(0.0511)	(0.0420)
Transport and communications	-0.100***	0.104***	0.0132	-0.00688	-0.0542***	0.0365***	-0.0975***	0.0806***	-0.0406***	-0.152***	-0.0483**	-0.0244**	-0.00311	0.0148*	-0.0534*	-0.0166	-0.742***	-0.522***
E. 1 16 : :11 p :	(0.0342)	(0.0156) 0.00743	(0.0219)	(0.0178) -0.150***	(0.0144)	(0.00651)	(0.0169)	(0.00823)	(0.0123)	(0.00693)	(0.0224) -0.0915***	(0.0106) -0.123***	(0.0220)	(0.00887) -0.0282**	(0.0274)	(0.0162) -0.151***	(0.115)	(0.0542)
Finance,Insurance and Services provided to Businesses	(0.0232)	(0.0152)	(0.0237)	(0.0262)	(0.00825)	(0.00660)	-0.124*** (0.0119)	(0.00703)	(0.00805)	(0.00751)	(0.0159)	(0.0151)	-0.0219 (0.0141)	(0.0113)	(0.0193)	(0.0203)	(0.0591)	(0.0526)
Public Administration	-0.130***	-0.0413***	-0.410***	-0.734***	0.109**	0.0310	0.0246	0.200***	-0.433***	-0.401***	-0.0593	-0.631***	-0.130***	-0.0951***	0.140***	0.220***	-0.741***	-1.144***
Tubic Palifillistration	(0.0224)	(0.0142)	(0.109)	(0.107)	(0.0485)	(0.0594)	(0.0150)	(0.0133)	(0.0162)	(0.0166)	(0.0915)	(0.138)	(0.0197)	(0.0149)	(0.0120)	(0.0190)	(0.216)	(0.255)
Communal, Social and Personal Services and Other	-0.141***	0.0484***	-0.0588***	-0.0684***	-0.0231***	0.0527***	-0.0351***	0.113***	-0.102***	-0.0577***	-0.0351***	0.000691	0.0278**	0.0337***	0.0327**	0.0168	-0.00224	-0.00716
,	(0.0209)	(0.0149)	(0.0178)	(0.0227)	(0.00707)	(0.00714)	(0.0119)	(0.00983)	(0.00688)	(0.00767)	(0.0125)	(0.0134)	(0.0110)	(0.00790)	(0.0131)	(0.0188)	(0.0494)	(0.0520)
	, ,		, ,	, ,	, ,	, ,		, ,	, ,	, ,	, ,	, ,		, ,		, ,		, ,
workrelationship = 1, Employee	-0.600***	-0.532***	-0.115***	-0.109***	-0.352***	-0.227***	-0.215***	-0.217***	-0.393***	-0.372***	-0.242***	-0.138***	-0.266***	-0.203***	-0.0567***	-0.0712***	-1.233***	-1.090***
	(0.0145)	(0.0143)	(0.0154)	(0.0149)	(0.00436)	(0.00333)	(0.00942)	(0.00777)	(0.00417)	(0.00377)	(0.00897)	(0.00607)	(0.0150)	(0.00708)	(0.00876)	(0.00939)	(0.0319)	(0.0288)
workrelationship = 2, Employer	-0.305***	-0.304***	-0.0256	-0.0716***	-0.346***	-0.255***	-0.356***	-0.317***	-0.255***	-0.240***	-0.187***	-0.180***	-0.00881	-0.00576**	-0.0553***	-0.0403***	-1.569***	-1.560***
	(0.0332)	(0.0264)	(0.0237)	(0.0221)	(0.00739)	(0.00544)	(0.00948)	(0.00758)	(0.0105)	(0.00719)	(0.0205)	(0.0132)	(0.00584)	(0.00283)	(0.0162)	(0.0144)	(0.0959)	(0.0615)
workrelationship = 4, Unpaid family worker	0.0273	-0.0854	0.00955	0.0136	0.400***	0.445***	-0.288***	-0.254***	0.0434***	0.00463	0.0316***	0.0787***	0.00328	-0.00229	0.0423***	-0.00348	0.00283	0.385**
	(0.0366)	(0.0739)	(0.0118)	(0.0257)	(0.00348)	(0.00316)	(0.0130)	(0.0166)	(0.00906)	(0.0147)	(0.00605)	(0.00759)	(0.00309)	(0.00461)	(0.00905)	(0.0184)	(0.0918)	(0.155)
workrelationship = 5, Domestic Worker	-0.360*** (0.0190)	-0.375*** (0.0627)	(0.0102)	-0.190 (0.145)	-0.132*** (0.00619)	-0.231*** (0.0106)	-0.188*** (0.0114)	-0.269*** (0.0261)	-0.195*** (0.00802)	-0.464*** (0.0228)	-0.227*** (0.0174)	-0.520*** (0.0581)	-0.125*** (0.0178)	-0.251*** (0.0531)	-0.0324* (0.0166)	-0.0307 (0.0855)	-1.887*** (0.389)	
	()	` ′	()	(/	(0.000.7)	(~~~~~)		(/	()	()	()	()	(******)	()	, ,	()	()	
sizefirm = 1, < 10 employees	0.331***	0.362***	0.164***	0.321***	0.258***	0.348***	0.307***	0.291***	0.422***	0.442***	0.368***	0.346***	0.115***	0.107***	0.185***	0.266***	1.084***	1.131**
	(0.0111)	(0.00885)	(0.0277)	(0.0266)	(0.00597)	(0.00428)	(0.00987)	(0.00758)	(0.00580)	(0.00493)	(0.0177)	(0.0110)	(0.0145)	(0.00977)	(0.0149)	(0.0137)	(0.0528)	(0.0422)
sizefirm = 3, > 50 employees	-0.0570***	-0.124***	-0.377***	-0.335***	-0.145***	-0.147***	-0.0838***	-0.0988***	-0.276***	-0.278***	-0.124***	-0.178***	-0.0850***	-0.148***	-0.418***	-0.366***	-0.747***	-0.754**
	(0.00978)	(0.00784)	(0.0342)	(0.0281)	(0.00610)	(0.00415)	(0.00717)	(0.00530)	(0.00587)	(0.00507)	(0.0455)	(0.0276)	(0.0190)	(0.0161)	(0.0170)	(0.0141)	(0.0753)	(0.0619)
Observations	20,585	24,370	7,487	9,448	127,371	190,678	35,151	43,571	144,546	174,764	24,614	31,269	9,914	13,936	26,654	30,010	22,126	24,666

Table 9-7: Probit Marginal Effects considering Ethnicity

Dependent variable: Informality dummy. Sample includes Brazil, Ecuador, Peru and Uruguay

	(1) All Sample
Individual Characteristics	7 III Sample
Gender	
Female	0.0554***
Ethnicity	(0.00195)
Afro	0.123***
	(0.00335)
Mestizo	0.134***
To discourant	(0.00205) 0.204***
Indigenous	(0.00490)
Other	0.148***
	(0.00798)
Age Group	
15-25 years	0.192***
55-65 years	(0.00237) 0.00247
55 05 years	(0.00249)
Completed Education	
No Education	0.180***
n :	(0.00238)
Primary	0.0972*** (0.00233)
Superior	-0.112***
ouperior	(0.00255)
Household Characteristics	,
Number of Children (<14 years)	0.0222***
	(0.000963)
Head of Household	-0.0531***
Employment Characteristics	(0.00183)
Economic Sector	
Agriculture	0.0348***
	(0.00372)
Mining	-0.00254
Electricity, Gas and Water	(0.0133) 0.0331***
Electrony, one and water	(0.0125)
Construction	0.161***
	(0.00418)
etail and Wholesale Trade, Restaurants and Hot	
T	(0.00324)
Transport and communications	0.0139*** (0.00443)
ance,Insurance and Services provided to Busine	
,	(0.00415)
Public Administration	0.0907***
10 11 12 10 10	(0.0109)
ommunal, Social and Personal Services and Ott	
Size of Firm	(0.00351)
< 10 employees	0.455***
1 ,	(0.00220)
	-0.122***
> 50 employees	(0.00222)
Countries	. ,
1 /	0.182***
Countries Ecuador	0.182*** (0.00293)
Countries	0.182*** (0.00293) 0.218***
Countries Ecuador	0.182*** (0.00293) 0.218*** (0.00319)
Countries Ecuador Peru	0.182*** (0.00293) 0.218*** (0.00319) -0.0719*** (0.00331)
Countries Ecuador Peru	0.182*** (0.00293) 0.218*** (0.00319) -0.0719*** (0.00331) 0.0458***
Countries Ecuador Peru Uruguay	0.182*** (0.00293) 0.218*** (0.00319) -0.0719*** (0.00331)

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

Table 9-8: Probit Marginal Effects considering Venezuelan dummy

Dependent variable: Informality dummy. Sample includes Argentina, Chile, Colombia, Ecuador and Uruguay.

Probit Marginal Effects	All Sample	Argentina	Chile	Colombia	Ecuador	Uruguay
Female	0.0346***	0.0305***	0.0183***	0.0771***	-0.0262***	-0.00363
	(0.00211)	(0.00657)	(0.00364)	(0.00292)	(0.00453)	(0.00304)
15-25 years	0.219***	0.213***	0.169***	0.217***	0.134***	0.127***
	(0.00256)	(0.00823)	(0.00638)	(0.00303)	(0.00411)	(0.00717)
55-65 years	-0.0636***	-0.0550***	-0.00787**	-0.0783***	-0.107***	0.0104***
	(0.00260)	(0.00898)	(0.00398)	(0.00399)	(0.00623)	(0.00338)
No Education	0.292***	0.233***	0.201***	0.261***	0.108***	0.260***
	(0.00560)	(0.0161)	(0.0300)	(0.00691)	(0.00732)	(0.0154)
Primary	0.147***	0.132***	0.117***	0.146***	0.0450***	0.0881***
	(0.00232)	(0.00660)	(0.00556)	(0.00301)	(0.00416)	(0.00385)
Superior	-0.162***	-0.126***	-0.0507***	-0.196***	-0.172***	-0.0173***
	(0.00223)	(0.00795)	(0.00350)	(0.00320)	(0.00675)	(0.00279)
Venezuelan	0.335***	0.204***	0.0255*	0.336***	0.159***	0.0908**
	(0.00496)	(0.0417)	(0.0148)	(0.00345)	(0.00722)	(0.0355)
Has a couple	-0.0855***	-0.112***	-0.0655***	-0.0756***	-0.0666***	-0.0605***
	(0.00202)	(0.00606)	(0.00351)	(0.00281)	(0.00397)	(0.00354)
Number of Children	0.0309***	0.0228***	0.00658***	0.0269***	0.0257***	0.0165***
	(0.00115)	(0.00314)	(0.00204)	(0.00173)	(0.00198)	(0.00163)
Head of Household	-0.0692***	-0.0774***	-0.0427***	-0.0666***	-0.0793***	-0.0163***
	(0.00201)	(0.00584)	(0.00345)	(0.00281)	(0.00463)	(0.00282)
Agriculture	0.0457***	0.198***	0.0942***	0.0916***	-0.0103	-0.0800***
	(0.00463)	(0.0270)	(0.00824)	(0.00665)	(0.00708)	(0.00617)
Mining	-0.0543***	-0.249***	-0.0706***	-0.0788***	-0.0175	-0.0188
	(0.0138)	(0.0552)	(0.0145)	(0.0197)	(0.0266)	(0.0428)
Electricity, Gas and Water	-0.177***	-0.159***	-0.0718***	-0.208***	0.0270	-0.0558***
	(0.0142)	(0.0348)	(0.0154)	(0.0242)	(0.0449)	(0.0183)
Construction	0.0813***	0.222***	0.0663***	0.00491	0.123***	0.0918***
	(0.00436)	(0.0134)	(0.00776)	(0.00568)	(0.00690)	(0.0106)
Retail and Wholesale Trade, Restaurants and Hotels	-0.0149***	-0.00642	-0.0209***	-0.0213***	-0.0236***	-0.0469***
	(0.00332)	(0.0108)	(0.00573)	(0.00425)	(0.00679)	(0.00602)
Transport and communications	-0.0644***	0.0641***	0.0346***	-0.137***	-0.0296***	-0.0817***
	(0.00430)	(0.0140)	(0.00774)	(0.00576)	(0.00917)	(0.00656)
Finance,Insurance and Services provided to Businesses	-0.154***	-0.0262**	-0.0600***	-0.207***	-0.115***	-0.0737***
	(0.00402)	(0.0129)	(0.00631)	(0.00552)	(0.0112)	(0.00626)
Public Administration	-0.0582***	-0.0496***	0.131***	-0.417***	-0.244***	-0.105***
Tuble Humingtation	(0.00605)	(0.0124)	(0.00949)	(0.0118)	(0.0938)	(0.00913)
Communal, Social and Personal Services and Other	-0.0253***	-0.0208*	0.0520***	-0.0836***	-0.0337***	-4.35e-05
Communa, Social and 1 cisonal services and other	(0.00381)	(0.0117)	(0.00697)	(0.00505)	(0.00945)	(0.00679)
Employee	-0.351***	-0.591***	-0.223***	-0.390***	-0.188***	-0.262***
Employee	(0.00209)	(0.0162)	(0.00601)	(0.00277)	(0.00497)	(0.00732)
Employer	-0.306***	-0.342***	-0.339***	-0.229***	-0.191***	-0.290***
Employer	(0.00422)	(0.0228)	(0.00594)	(0.00589)	(0.0111)	(0.00777)
Unpaid family worker	-0.00774	0.0172	-0.277***	0.0362***	0.0478***	0.0379
Cripad farmy worker	(0.00530)	(0.0576)	(0.0100)	(0.00747)	(0.00454)	(0.0282)
Domestic Worker	-0.268***	-0.416***	-0.217***	-0.227***	-0.238***	-0.302***
Domestic Worker	(0.00500)	(0.0192)	(0.00878)	(0.00737)	(0.0156)	(0.0109)
< 10 employees	0.429***	0.349***	0.300***	0.435***	0.357***	0.243***
10 employees	(0.00258)	(0.00747)	(0.00601)	(0.00380)	(0.00938)	(0.00572)
> 50 employees	-0.193***	-0.128***	-0.0928***	-0.270***	-0.161***	-0.0391***
- 50 employees	(0.00248)	(0.00807)	(0.00429)	(0.00391)	(0.0235)	
Rural	-0.0150***	(0.00007)	-0.0138***	0.0900***	-0.0418***	(0.00317) -0.0542***
IXIIII		-				
Controls by country I recion added	(0.00359)	-	(0.00494)	(0.00600)	(0.00477)	(0.00311)
Controls by country / region added	E4F ((0	44.055	70 722	210 210	EE 002	46 700
Observations Standard errors in parentheses	545,668	44,955	78,722	319,310	55,883	46,798

Standard errors in parentheses

^{***} p<0.01, ** p<0.05, * p<0.1

Table 9-9: 3rd Stage Multi Logit RRR across countries

Multi Logit Relative Risk Ratios		Argen	tina		Bolivia					Brasil				Chile	e			Colon	bia	
	informal employer	informal self-employed		unpaid family workers	informal employer	informal self-employed		unpaid family workers	informal employer	informal self-employed	salaried f	inpaid amily orkers	informal employer	informal self-employed		unpaid family workers	informal employer	informal self-employed		unpaid family workers
Individual Characteristics		Base outcome: Fo	rmal Workers		В	ase outcome: For	mal Workers		Ва	ise outcome: Form	nal Workers		В	Base outcome: For	mal Workers			Base outcome: Fo	rmal Workers	
Gender		Ref. N	1ale			Ref. Ma	le			Ref. Mal	l _e			Ref. Me	ale			Ref. A	lale.	
Female	0.981	1.170***	1.277***	3.060***	0.992	1.691***	1.221**	2.420***	0.594***	1.151***	1.184*** 6.	512***	0.877	1.335***	1.107***	2.065***	0.909***	1.352***	1.521***	3.827***
	(0.102)	(0.0645)	(0.0395)	(0.384)	(0.144)	(0.149)	(0.102)	(0.270)	(0.0228)	(0.0150)	(0.0157) (0.0157)	0.168)	(0.120)	(0.0412)	(0.0296)	(0.178)	(0.0286)	(0.0195)	(0.0235)	(0.114)
Age		Ref. 26-5	4 years			Ref. 26-54	years			Ref. 26-54	years			Ref. 26-54	years			Ref. 26-5	4 years	
15-25 years	0.819	1.372***	2.696***	3.755***	0.751	1.514***	4.388***	5.803***	0.402***	1.131***	3.271*** 4.	369***	0.919	1.502***	2.846***	2.186***	0.668***	1.856***	3.554***	4.822***
	(0.154)	(0.104)	(0.104)	(0.505)	(0.165)	(0.171)	(0.448)	(0.753)	(0.0297)	(0.0193)	. , .	0.118)	(0.210)	(0.0716)	(0.0963)	(0.238)	(0.0391)	(0.0363)	(0.0676)	(0.152)
55-65 years	2.250***	1.504***	0.747***	2.359***	0.722**	0.816*	0.369***	0.779*	1.939***	1.408***		405***	0.781*	1.071**	0.931**	1.412***	1.072**	0.987	0.551***	1.112***
	(0.268)	(0.106)	(0.0326)	(0.458)	(0.115)	(0.0904)	(0.0453)	(0.116)	(0.0790)	(0.0221)	, , ,	.0512)	(0.102)	(0.0348)	(0.0307)	(0.133)	(0.0375)	(0.0182)	(0.0123)	(0.0437)
Completed Education No completed Education	0.746	Ref. Secondary 2.255***	Education 3.196***	2.728***	1.978***	Ref. Secondary 1 3.923***	ducation 3.344***	4.152***	0.805***	Ref. Secondary E 1.674***	2.780*** 1.	830***	1.527	Ref. Secondary . 3.161***	Education 2.672***	2.188**	1.516***	Ref. Secondary 5.647***	Education 5.572***	5.399***
No completed Education	(0.239)	(0.283)	(0.241)	(0.870)	(0.428)	(0.621)	(0.526)	(0.765)	(0.0339)	(0.0233)		0.0547)	(1.108)	(0.495)	(0.417)	(0.795)	(0.185)	(0.373)	(0.381)	(0.509)
Primary Education	0.808*	1.422***	1.949***	1.837***	1.241	1.729***	1.642***	2.210***	0.936	1.425***	. , .	968***	1.844***	1.894***	1.900***	1.291***	1.558***	2.197***	2.242***	2.485***
,	(0.0927)	(0.0791)	(0.0595)	(0.231)	(0.193)	(0.184)	(0.170)	(0.288)	(0.0462)	(0.0230)		.0616)	(0.229)	(0.0642)	(0.0638)	(0.124)	(0.0520)	(0.0363)	(0.0399)	(0.0766)
Superior Education	1.920***	1.252***	0.453***	0.998	0.601***	0.304***	0.296***	0.434***	1.735***	0.831***		829***	0.809	0.547***	0.719***	0.696***	0.903***	0.466***	0.384***	0.517***
•	(0.219)	(0.0900)	(0.0178)	(0.202)	(0.0861)	(0.0281)	(0.0261)	(0.0559)	(0.0813)	(0.0170)	(0.0107) (0	.0452)	(0.110)	(0.0185)	(0.0201)	(0.0676)	(0.0310)	(0.00730)	(0.00663)	(0.0174)
Household Characteristics																				
Marital Status		Ref. Doesn't Ha	2			Ref. Doesn't Ha	4		I	Ref. Doesn't Hav	e a Couple			Ref. Doesn't Ha	4			Ref. Doesn't H		
Has a couple	1.726***	1.601***	0.572***	0.665***	1.260*	1.289***	0.619***	0.699***	-	-	-	-	0.944	0.683***	0.644***	1.693***	1.321***	0.831***	0.625***	0.918***
	(0.189)	(0.0884)	(0.0164)	(0.0854)	(0.166)	(0.105)	(0.0486)	(0.0774)	-	-	-	-	(0.108)	(0.0192)	(0.0165)	(0.152)	(0.0408)	(0.0115)	(0.00930)	(0.0256)
Number of Children (<14 years)	1.081	1.056**	1.117***	1.331***	0.940	1.067*	1.075**	1.029	1.077***	1.058***		133***	1.124*	1.053***	1.034**	0.973	1.057***	1.118***	1.159***	1.166***
Kinship	(0.0554) (0.0280) (0.0167) (0.07 Ref. not Head		(0.0733)	(0.0492)	(0.0368) Ref. not F	(0.0360)	(0.0423)	(0.0199)	(0.00673) Ref. not H	(0.00695) (0	.0133)	(0.0673)	(0.0175) Ref. not I	(0.0160)	(0.0456)	(0.0177)	(0.00937) Ref. not	(0.0103)	(0.0172)	
Head of Household	0.956	0.718***	0.701***	0.153***	1.771***	0.966		0.0190***	1.406***	1.035***	0.819*** 0.	150***	1.242*	0.868***	0.672***	0.116***	1.369***	0.776***	0.700***	0.0887***
Treat of Trouverous	(0.0921)	(0.0369)	(0.0196)	(0.0288)	(0.253)	(0.0805)	(0.0534)	(0.00286)	(0.0476)	(0.0119)	(0.00979) (0.		(0.140)	(0.0244)	(0.0177)	(0.0138)	(0.0410)	(0.0106)	(0.0105)	(0.00365)
Employment Characteristics	(()	(/	(/	()	(/	(,	((,	(/	() (,,,,	(/	()	()	(/	(/	(,	()	(/
Economic Sector		Ref. Manu	facturing			Ref. Manufa	cturing			Ref. Manufac	turing			Ref. Manufa	cturing			Ref. Manug	acturing	
Agriculture	1.811*	1.405	2.701***	1.260	0.877	2.393***	0.713*	10.31***	0.683***	0.892***	1.470*** 5.	987***	1.461*	1.069	2.049***	3.513***	1.332***	1.463***	2.205***	5.418***
	(0.620)	(0.306)	(0.346)	(0.683)	(0.202)	(0.409)	(0.127)	(1.980)	(0.0476)	(0.0205)	, , ,	0.263)	(0.321)	(0.0615)	(0.121)	(0.508)	(0.0754)	(0.0512)	(0.0798)	(0.287)
Mining	5.70e-09	9.08e-09	0.309***	1.11e-08	0.860	0.712	2.094***	0.230*	0.573	0.448***		.371**	0.569	0.325***	0.710**	6.63e-08	0.350***	0.943	0.605***	0.125***
FI	(4.83e-05)	(3.43e-05)	(0.0938)	(8.64e-05)	(0.498)	(0.245)	(0.466)	(0.181)	(0.197)	(0.0580)	. , .	0.171)	(0.586)	(0.0969)	(0.123)	(0.000169)	(0.0961)	(0.0935)	(0.0665)	(0.0736)
Electricity, Gas and Water	0.175* (0.179)	0.248*** (0.110)	0.482*** (0.0859)	5.97e-09 (4.31e-05)	2.17e-09 (1.58e-05)	0.0166*** (0.0179)	0.268*** (0.109)	4.44e-09 (1.45e-05)	1.189 (0.274)	1.782*** (0.139)		1.206	0.326 (0.332)	0.407*** (0.0823)	0.536*** (0.112)	0.751 (0.402)	0.128*** (0.0923)	(0.0403)	0.491*** (0.0706)	1.28e-07 (0.000122)
Construction	0.977	1.038	2.844***	0.426***	1.405*	0.947	2.100***	0.186***	1.818***	2.233***	. , .	507***	3,630***	1.376***	1.532***	0.210***	0.742***	0.909***	1.149***	0.139***
CONSTRUCTION	(0.197)	(0.106)	(0.182)	(0.133)	(0.278)	(0.143)	(0.296)	(0.0534)	(0.131)	(0.0590)		0.0526)	(0.714)	(0.0796)	(0.0958)	(0.0753)	(0.0399)	(0.0275)	(0.0366)	(0.0184)
Retail and Wholesale Trade, Restaurants and Hotels	0.961	0.917	0.897**	0.929	0.930	1.215	0.839	0.732**	1.096	0.582***	, , ,	587***	0.780	0.580***	1.224***	1.306**	0.703***	0.816***	1.010	1.194***
	(0.134)	(0.0689)	(0.0471)	(0.146)	(0.161)	(0.149)	(0.100)	(0.107)	(0.0649)	(0.0124)	(0.0199) (0	.0263)	(0.151)	(0.0271)	(0.0648)	(0.165)	(0.0276)	(0.0182)	(0.0241)	(0.0465)
Transport and communications	0.344***	0.326***	1.489***	0.314***	0.252***	2.515***	0.562***	0.161***	0.409***	1.293***	0.988 0.	328***	0.550**	0.879**	1.823***	0.442***	0.113***	0.963	0.347***	0.274***
	(0.0916)	(0.0470)	(0.101)	(0.137)	(0.0749)	(0.390)	(0.0881)	(0.0533)	(0.0433)	(0.0374)	, , ,	.0394)	(0.156)	(0.0533)	(0.115)	(0.112)	(0.00939)	(0.0273)	(0.0125)	(0.0215)
Finance,Insurance and Services provided to Businesses	0.477***	0.496***	0.916	0.162***	0.121***	0.470***	0.447***	0.126***	0.460***	0.500***		135***	0.290***	0.545***	0.773***	0.220***	0.120***	0.532***	0.291***	0.103***
	(0.0876)	(0.0503)	(0.0581)	(0.0555)	(0.0394)	(0.0712)	(0.0636)	(0.0333)	(0.0380)	(0.0145)	. , .	.0135)	(0.0924)	(0.0325)	(0.0506)	(0.0551)	(0.00876)	(0.0143)	(0.00976)	(0.00880)
Public Administration	3.34e-09	5.22e-09	0.853***	7.89e-09	1.45e-08	9.06e-08	0.0293***		2.54e-08	3.33e-08		99e-08	1.33e-07	1.64e-07	3.142***	3.68e-07	7.00e-08	0.314***	0.160***	0.171***
Communal, Social and Personal Services and Other	(6.32e-06) 0.167***	(4.67e-06) 0.130***	(0.0523) 1.284***	(1.53e-05) 0.0392***	(8.49e-05) 0.187***	(0.000121) 0.372***	(0.0175)	(0.0907) 0.0681***	(9.27e-05) 0.351***	(3.07e-05) 0.398***	, , ,	000110) 110***	(0.000335)	(7.53e-05) 0.382***	(0.206) 2.476***	(0.000419)	(4.26e-05) 0.213***	(0.0317) 0.516***	(0.0189) 1.296***	(0.0880)
Communa, Social and Personal Services and Other	(0.0314)	(0.0130)	(0.0675)	(0.0120)	(0.0480)	(0.0505)	(0.108)	(0.0157)	(0.0271)	(0.00940)	(0.0612) (0.		(0.0642)	(0.0203)	(0.133)	(0.0209)	(0.0127)	(0.0130)	(0.0332)	(0.00526)
Size of Firm	(0.0311)	Ref. <10 e		(0.0120)	(0.0100)	Ref. <10 em	, ,	(0.0137)	(0.0271)	Ref. <10 emt	. , .	00/10)	(0.0012)	Ref. <10 en	, ,	(0.0207)	(0.0127)	Ref. <10 e		(0.00520)
> 10 employees & < 50 employees	0.0519***	0.00390***	0.187***	0.0203***	0.0371***	8.43e-10		0.00750***	0.237***	0.00158***	0.344*** 0.0	0490***	0.00338***	0.00198***	0.399***	0.0205***	0.0554***	0.0198***	0.162***	0.0150***
	(0.0100)	(0.00124)	(0.00625)	(0.00842)	(0.0128)	(5.59e-07)	(0.0255)	(0.00398)	(0.0142)	(0.000271)	(0.00647) (0.	00418)	(0.00339)	(0.000531)	(0.0135)	(0.00627)	(0.00348)	(0.000552)	(0.00311)	(0.00150)
> 50 employees	0.00403***	6.57e-10	0.0967***	0.00368***	0.00111***	2.76e-10	0.0456***		0.0163***	7.28e-05***	0.131***).0	0506**	0.00246***	0.000496***	0.151***	0.000710***	* 0.000777***	0.00430***	0.0271***	0.00119***
	(0.00234)	(4.55e-07)	(0.00352)	(0.00369)	(0.00112)	(1.81e-07)	(0.00428)	(0.00192)	(0.00237)	(3.64e-05)	(0.00254) (0.0	000917	(0.00175)	(0.000157)	(0.00467)	(0.000711)	(0.000246)	(0.000142)	(0.000629)	(0.000262)
Controls by geographical regions included																				
Constant	0.0608***	0.435***	1.297***	0.0429***	1.405	5.479***	6.082***	2.409***	0.0344***	0.557***	0.140*** 0.0		0.0234***	1.963***	0.320***	0.0488***	0.186***	1.707***	0.965	0.0589***
OL 3	(0.0123)	(0.0443)	(0.0794)	(0.0105)	(0.418)	(1.134)	(1.214)	(0.602)	(0.00495)	(0.0238)	(0.00000) (0.	00335)	(0.00933)	(0.166)	(0.0282)	(0.0132)	(0.0129)	(0.0569)	(0.0340)	(0.00486)
Observations Standard errors in parentheres	44,955	44,955	44,955	44,955	16,935	16,935	16,935	16,935	318,049	318,049	318,049 3	18,049	78,723	78,723	78,723	78,723	319,314	319,314	319,314	319,314

Standard errors in parentheses

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

It have a couple : single, divorced, widow (leaves without a couple)

Multi Logit Relative Risk Ratios						Paragu	ıay			Pen	1		Uruguay				
	informal	informal	informal	unpaid	informal	informal	informal	unpaid	informal	informal	informal	unpaid	informal	informal	informal	unpaid	
	employer	self-employed		family	employer	self-employed		family	employer	self-employed		family	employer	self-employed		family	
	* *	* *		workers		Base outcome: For		workers		Base outcome: Fo		workers		Base outcome: Fo		workers	
Individual Characteristics					I	oase outcome: 1°01	mai w orkers			Dase ошсоте: 1°0	rmai w orkers			Dase outcome: 10	rmai w orkers		
Gender						Ref. Me	ale			Ref. M	ale			Ref. M	[ale		
Female	0.694***	1.342***	0.638***	2.008***	0.659***	1.106	0.980	4.210***	1.422***	2.175***	1.629***	4.942***	0.732	0.999	0.975	3.721***	
	(0.0572)	(0.0413)	(0.0213)	(0.0818)	(0.0600)	(0.0696)	(0.0533)	(0.367)	(0.105)	(0.0811)	(0.0573)	(0.256)	(0.163)	(0.0377)	(0.0469)	(0.478)	
Age						Ref. 26-54	-			Ref. 26-5-				Ref. 26-54	-		
15-25 years	0.595***	0.962	3.304***	4.647***	0.223***	0.676***	1.953***	2.037***	0.789*	1.416***	4.130***	5.950***	0.301**	1.327***	3.545***	2.833***	
55 (5	(0.0924) 0.789***	(0.0466) 0.820***	(0.144) 0.401***	(0.231) 1.034	(0.0368) 2.636***	(0.0540) 2.662***	(0.129) 0.892	(0.202) 2.260***	(0.104) 0.902	(0.0740) 1.015	(0.182) 0.537***	(0.370) 1.017	(0.181) 1.367	(0.0729) 1.345***	(0.194) 1.007	(0.438) 1.524***	
55-65 years	(0.0664)	(0.0273)	(0.0172)	(0.0535)	(0.318)	(0.275)	(0.0873)	(0.301)	(0.0666)	(0.0424)	(0.0262)	(0.0635)	(0.286)	(0.0571)	(0.0594)	(0.236)	
Completed Education	(0.0004)	(0.0273)	(0.0172)	(0.0555)	(0.510)	Ref. Secondary	,	(0.501)	(0.0000)	Ref. Secondary		(0.0055)	(0.200)	Ref. Secondary	,	(0.250)	
No completed Education	0.398**	2.252***	2.617***	2.352***	0.950	3.022***	2.996***	2.639***	1.740***	4.635***	3.390***	5.041***	4.241***	7.305***	7.850***	2.458***	
·	(0.146)	(0.189)	(0.242)	(0.240)	(0.145)	(0.355)	(0.331)	(0.378)	(0.176)	(0.272)	(0.207)	(0.367)	(1.791)	(0.655)	(0.849)	(0.807)	
Primary Education	0.743***	1.254***	1.461***	1.265***	1.088	1.942***	1.868***	1.638***	1.435***	2.479***	2.094***	2.242***	1.838**	2.470***	2.801***	1.733***	
	(0.0602)	(0.0389)	(0.0484)	(0.0512)	(0.111)	(0.151)	(0.128)	(0.168)	(0.103)	(0.0980)	(0.0852)	(0.122)	(0.556)	(0.128)	(0.181)	(0.281)	
Superior Education	1.034	0.539***	0.331***	0.592***	1.113	0.711***	0.505***	0.675***	0.552***	0.335***	0.301***	0.455***	0.637	0.942	0.796***	0.842	
Household Characteristics	(0.0858)	(0.0196)	(0.0142)	(0.0314)	(0.116)	(0.0566)	(0.0324)	(0.0787)	(0.0467)	(0.0148)	(0.0123)	(0.0348)	(0.253)	(0.0584)	(0.0680)	(0.185)	
Marital Status						Ref. Doesn't Ha	we a Coutsle			Ref. Doesn't H.	ave a Couple			Ref. Doesn't H	ave a Couple		
Has a couple	1.123	0.901***	0.570***	0.641***	1.500***	0.939	0.666***	0.668***	1.304***	1.145***	0.616***	0.867***	1.191	0.615***	0.447***	1.114	
•	(0.0861)	(0.0260)	(0.0177)	(0.0257)	(0.139)	(0.0601)	(0.0369)	(0.0607)	(0.0884)	(0.0397)	(0.0211)	(0.0450)	(0.255)	(0.0222)	(0.0198)	(0.158)	
Number of Children (<14 years)	1.013	1.181***	1.182***	1.271***	1.003	1.061**	1.036	1.039	0.859***	1.077***	1.122***	1.098***	0.942	1.178***	1.276***	1.157**	
	(0.0378)	(0.0169)	(0.0177)	(0.0221)	(0.0397)	(0.0312)	(0.0270)	(0.0395)	(0.0269)	(0.0169)	(0.0176)	(0.0216)	(0.109)	(0.0233)	(0.0298)	(0.0772)	
Kinship						Ref. not I				Ref. not				Ref. not			
Head of Household	1.291***	0.774***	0.533***		1.396***	0.871**	0.696***	0.0542***	1.444***	0.901***	0.475***	0.0373***	1.652**	1.013	0.711***	0.179***	
Employment Characteristics	(0.104)	(0.0235)	(0.01/6)	(0.00184)	(0.119)	(0.0545)	(0.0381)	(0.00624)	(0.102)	(0.0322)	(0.0170)	(0.00259)	(0.326)	(0.0348)	(0.0310)	(0.0295)	
Economic Sector						Ref. Manufa	acturino			Ref. Manuf	acturing			Ref. Manufe	acturino		
Agriculture	0.362***	0.807***	1.010	3.129***	0.920	3.489***	1.108	15.42***	0.930	1.540***	1.531***	13.96***	0.201***	0.199***	0.409***	2.148***	
Ų.	(0.0394)	(0.0387)	(0.0512)	(0.191)	(0.145)	(0.441)	(0.131)	(2.487)	(0.104)	(0.0979)	(0.0968)	(1.361)	(0.0609)	(0.0145)	(0.0350)	(0.443)	
Mining	0.412*	0.259***	0.969	0.251***	-	-	-	-	0.720	0.390***	1.798***	1.056	3.05e-10	0.553	1.024	7.967*	
	(0.218)	(0.0735)	(0.161)	(0.126)	-	-	-	-	(0.244)	(0.0828)	(0.232)	(0.408)	(2.18e-05)	(0.271)	(0.477)	(8.672)	
Electricity, Gas and Water	0.875	1.069	1.163	0.134*	5.81e-10	1.06e-09	1.237	1.61e-09	1.16e-08	4.108***	2.187***	4.006***	1.66e-09	1.078	0.312***	1.791	
Construction	(0.670) 0.988	(0.401) 1.003	(0.396) 4.285***	(0.142) 0.233***	(1.19e-05) 3.819***	(1.05e-05) 1.105	(0.666) 5.145***	(2.21e-05) 0.424**	(6.45e-05) 0.750**	(1.152) 0.187***	(0.546) 1.822***	(2.015) 0.254***	(3.65e-05) 1.416	(0.277) 2.857***	(0.128) 1.807***	(1.374) 0.672	
Construction	(0.139)	(0.0761)	(0.300)	(0.0447)	(0.649)	(0.179)	(0.706)	(0.178)	(0.0996)	(0.0179)	(0.130)	(0.0674)	(0.411)	(0.214)	(0.170)	(0.305)	
Retail and Wholesale Trade, Restaurants and Hotels	0.716***	1.125**	0.795***	0.946	0.867	1.465***	0.944	1.280*	1.046	1.319***	0.849***	1.701***	0.448***	0.669***	0.624***	1.089	
,	(0.0677)	(0.0527)	(0.0410)	(0.0588)	(0.103)	(0.139)	(0.0751)	(0.177)	(0.111)	(0.0795)	(0.0514)	(0.164)	(0.113)	(0.0395)	(0.0470)	(0.212)	
Transport and communications	0.184***	1.490***	0.619***	0.202***	0.402***	0.928	1.270*	0.477*	0.272***	1.480***	0.429***	0.290***	0.173***	0.301***	0.453***	0.175***	
	(0.0334)	(0.0878)	(0.0430)	(0.0262)	(0.0914)	(0.149)	(0.159)	(0.182)	(0.0445)	(0.103)	(0.0339)	(0.0564)	(0.0849)	(0.0280)	(0.0513)	(0.0933)	
Finance,Insurance and Services provided to Businesses	0.253***	0.877**	0.342***	0.129***	0.486***	0.732**	0.832*	0.159***	0.284***	0.627***	0.530***	0.210***	0.207***	0.861**	0.203***	0.204***	
D. I.F. A. I	(0.0425)	(0.0560)	(0.0282)	(0.0174)	(0.0803)	(0.0949)	(0.0855)	(0.0460)	(0.0572)	(0.0549)	(0.0440)	(0.0454)	(0.0891)	(0.0573)	(0.0245)	(0.0676)	
Public Administration	2.20e-09 (2.88e-05)	0.702 (0.278)	0.0987** (0.105)	3.62e-09 (1.27e-05)	1.69e-10 (4.76e-07)	4.68e-10 (6.42e-07)	0.362*** (0.0347)	8.80e-10 (1.93e-06)	3.99e-07 (0.000997)	1.353 (1,187)	5.212*** (0.451)	9.73e-06 (0.00935)	9.63e-09 (0.000103)	4.58e-08 (6.89e-05)	0.174*** (0.0700)	6.18e-08 (0.000264)	
Communal, Social and Personal Services and Other	0.216***	0.565***	1.057	0.101***	0.291***	0.988	2.512***	0.0458***	0.399***	0.678***	1.789***	0.120***	0.0702***	0.486***	1.410***	0.0464***	
community over the resonant pervices and other	(0.0337)	(0.0316)	(0.0619)	(0.0104)	(0.0492)	(0.109)	(0.237)	(0.0135)	(0.0626)	(0.0498)	(0.117)	(0.0243)	(0.0351)	(0.0308)	(0.105)	(0.0184)	
Size of Firm	/		/		/	Ref. <10 en	. ,	/		Ref. <10 e	. ,	/	/	Ref. < 10 e	. ,		
> 10 employees & < 50 employees	0.0390***	0.000589***	0.326***	0.0219***	0.0312***	2.18e-10		0.00350***	0.147***	0.000295***	0.584***	0.0147***	0.0733***	1.22e-10	0.172***	0.0158***	
	(0.0106)	(0.000341)	(0.0137)	(0.00291)	(0.00490)	(1.91e-07)	(0.0143)	(0.00161)	(0.0227)	(0.000295)	(0.0276)	(0.00297)	(0.0337)	(1.73e-07)	(0.0116)	(0.00918)	
> 50 employees	7.76e-10	6.50e-10	0.144***		0.00288***	0.000426***	0.110***	3.25e-10	0.00102***	4.98e-10		0.000255***	0.00776***	1.75e-10	0.0283***	9.13e-10	
	(3.61e-06)	(8.80e-07)	(0.0172)	(1.34e-06)	(0.00146)	(0.000302)	(0.00761)	(6.35e-07)	(0.00102)	(2.21e-07)	(0.00410)	(0.000256)	(0.00781)	(1.46e-07)	(0.00289)	(1.80e-06)	
Controls by geographical regions included	0.189***	1 (0.4%)	1.872***	0.877*	1 207	2.785***	3.484***	0.496***	0.185***	1.057	1.259***	0.0634***	0.00982***	0.386***	0.154***	0.0172***	
Constant	(0.0239)	1.694*** (0.0942)	(0.107)	(0.0617)	1.206 (0.230)	(0.413)	(0.428)	(0.118)	(0.0257)	1.057 (0.0778)	(0.0886)	(0.00771)	(0.00982***	(0.0308)	0.154*** (0.0154)	(0.00477)	
Observations	55,887	55,887	55,887	55,887	23,850	23,850	23,850	23,850	56,675	56,675	56,675	56,675	46,798	46,798	46,798	46,798	

Standard errors in parentheses

^{***} p<0.01, ** p<0.05, * p<0.1