Social protection and Informal Sector:Case Study of Uruguay.

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Esta ingestigacion utilizo información de la Encuesta Longitudinal de Protección Social (ELPS). El autor agradece al Banco de Prevision Social, propietario intelectual de la Encuesta,la autorización para usar la Base de Datos Innominada. Todos los resultados del estudio son de responsabilidad del autor y en nada comprometen a dicho organismo.

Muchissimas gracias a todo el equipo de ELPS por ser tan amable conmigo y por haber dado me acceso al encuesta ELPS para mi estudio.

Afrika Ndongozi-Nsabimana.

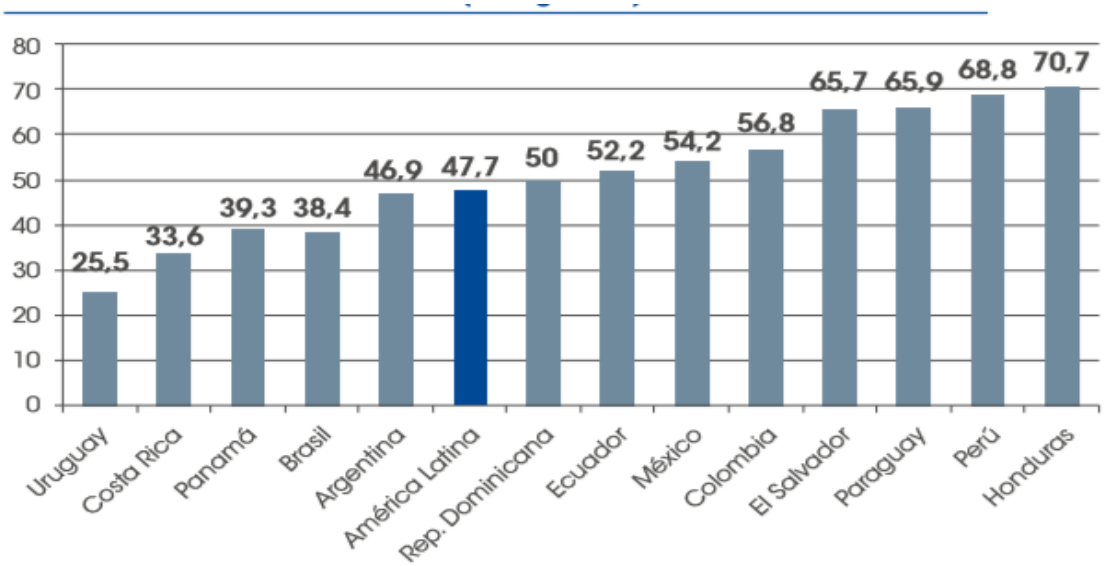
Introduction:

Social protection can be defined as all measures enabling universal access to social security, healthcare and income security and that ensure dignity and rights for all. (ILO,2014). It plays an important role in the improvement of individual living conditions and contributes to development. (Bachelet,2011; WB,2012; ILO,2014; ILO,2017). In fact, social protection enables income smoothing overtime, domestic consumption, human capital and productivity support. It thus reduces poverty and insecurity risks. Hence, it is highlighted in the Sustainable Development Goals (SDGS) as it plays a transversal role in the achievement of SDG1,3,5,8 and 10[1].However, currently only 49.5% of the world's population has access to some form of social protection. (ILO, 2014) [2].It is therefore important to extend social protection coverage to a larger number of people and achieve universal coverage in social protection in the long term.

One possible explanation for the low coverage of social protection in developing countries is a strong presence of the informal sector to the detriment of the formal sector (Canagarajah et al. 2001; Maes,2003; Pelissery et al.,2007;Chen 2008; Mathauer et al.2008; Sojo,2015). Indeed, it varies between 20% and over 80% in non-agricultural employment in developing countries [3].

The following graphs show a more precise situation in Latin America on the informal sector. Globally, Latin American registered in 2011 an informality rate of 47.7% which is huge. And some Latin American countries informality rate were even higher as it is the case of Honduras (70,7%).

Graph n°5: Informality rate (Non agriculture employment) in Latin American,2011.



Source: Monotributo en America Latina.

[1]See Box 1 in appendix 1.

[2] Conf appendices 2,3,4,5 for more details on the current state of social protection in the world.

[3] https://www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page33.jspx?locale=EN&MBI_ID=540&_adf.ctrl-state=bet6wbagn_4&_afrLoop=1367674393530154&_afrWindowMode=0&_afrWindowId=bet6wbagn_1#!%40%40%3F_afrWindowId%3Dbet6wbagn_1%26locale%3DEN%26_afrLoop%3D1367674393530154%26MBI_ID%3D540%26_afrWindowMode%3D0%26_adf.ctrl-state%3D6absvekp0_4

Informal sector can be defined as “all economic activities that remain outside the official framework”(Canagarajah et al.2001; Pellissery et al,2007;Mathauer et al.2008).It is usually characterized by a lack of regulation and written contracts, insecure employment, low income, weak access to formal social protection systems(contributory pension systems, health insurance, unemployment insurance, disability benefits).(Canagarajah et al. 2001; Maes,2003; Pelissery et al.,2007; Mathauer et al.2008;).Hence a low coverage in social protection for developing countries as they register highest level of informal workers.

There are main categories of informal workers that can slightly differ according to authors treating the informal sector issue. For example, Ilo[4] defines Informal sector workers as « persons who in their main or secondary jobs were: Own-account workers, employers and members of producers’ cooperatives employed in their own informal sector enterprises; Own-account workers engaged in the production of goods exclusively for own final use by their household (e.g. subsistence farming or do-it-yourself construction of own dwellings); Contributing family workers, irrespective of whether they work in formal or informal sector enterprises; Employees holding informal jobs, whether employed by formal sector enterprises, informal sector enterprises, or as paid domestic workers by households”. As for MAES,2003; she highlighted the existence of 7 criteria mentioned in the ILO Kenya report 1972 which are: “small scale of operation, unregulated and competitive markets, family ownership of resources, skills acquired outside the formal school system, labour intensive and adapted technology, ease of entry and reliance on indigenous resources”. She also indicated the reformulation of the Seven criteria by Canagarajah and Sethuraman : “employment of no more than ten persons, no application of legal and administrative regulations, employment of family members, less than six years of schooling for workers, semi permanent character of the activity, no fixed working hours in a day ect…”

Although there are more and more measures to include informal sector workers in the social protection system, such as monotax for the most part in Latin American countries, more efforts needs to be done to achieve universal coverage in social protection.

Our article aims to highlight the link between the share of the population working in the informal sector and the coverage rate in social protection. This is a microeconomic study using Uruguay data from the "Encuesta Longitudinal de Proteccion Social, Ola 1" survey conducted by "Banco de Predecion Social". We make the hypothesis that being informal rather than formal sector workers reduces the likelihood of being covered by social protection.

We chose this country not only for the availability of data but also because it is an interesting country to take into account thanks to an important measure that was put in place to extend social protection coverage to workers in the informal section . Our study contributes to the literature as it is a micro study that brings more precision on the effect of belonging to the informal sector on whether or not to join a social protection system. It also contributes to the literature through the use of a complete and fairly recent database that allows for a sample and a number of variables important enough for a more rigorous analysis.

This study will enable through the results obtained, to better help decision-making in the policies of universal coverage in social protection for Uruguay but also for the other countries of Latin America and Africa. We use multinomial analysis for the study and have selected as the dependent variable the different components of social protection that we considered most relevant. The explanatory variables include the type of work held, the region of the workplace, level of education, gender, age, relationship to head of household, level of income. We found for example that being a worker with own accounts

[4] https://ilostat.ilo.org/resources/methods/description-informality/

without local or investment increases the probability of not being beneficiary of pension, health and accident insurance .In fact, being a worker with own account without a local or investment rather than a salaried worker of public sector will increase the relative probability of not being beneficiary of a pension systems by 5.13 unit pension given that the other variables in the model are held constant.

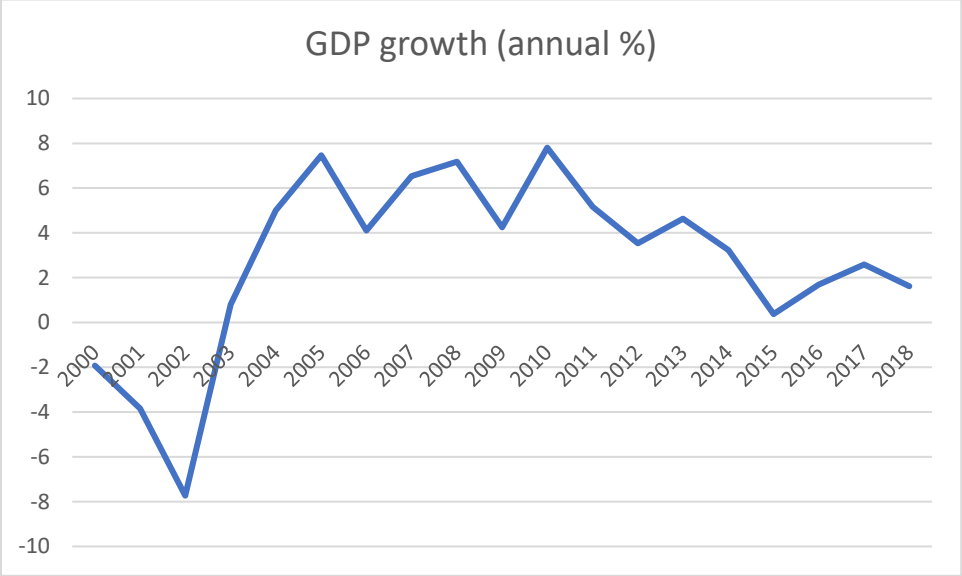
Previously, authors like Mathauer et al., 2008 studied factors explaining the demand for social health insurance for informal sector workers in Kenya; Ana Sojo et al. the determinants of joining the pension systems of private sector employees for five Latin American countries have examined the issue and found a link between the informal sector and social protection coverage

The remaining parts of the article is organized as following: II) Socio-economic context of Uruguay; III) Literature Review IV) Data; V) Model VI) Conclusion.

II)Socioeconomic context of Uruguay :

Uruguay is situated in Latin America and has for surface area 176220 km².It is surrounded by two countries Brazil and Argentina and its capital is Montevideo. From 2000 to 2018, economic growth fluctuated with the lowest level in 2002 (-7,73%) and the highest level in 2005(7,46%). (see following graph)

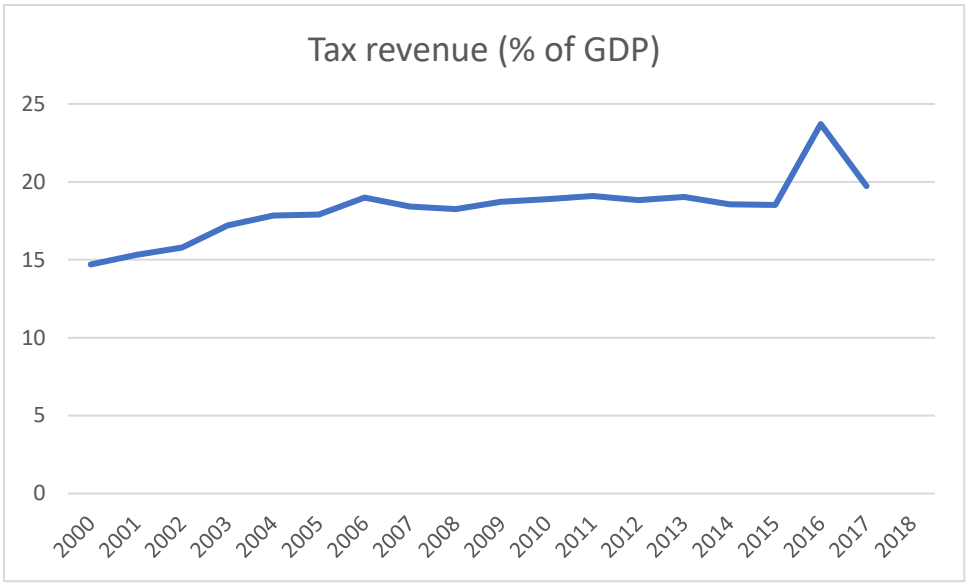
Graph n°6: Evolution of economic growth from 2000 to 2018:



Source: Author with data from WDI database.

Concerning tax revenues in Percentage of GDP, they vary very slightly during the same period between roughly 15% and 24% with the lowest level in 2000 (14,7% GDP) and the highest level in 2016(23,71% GDP).

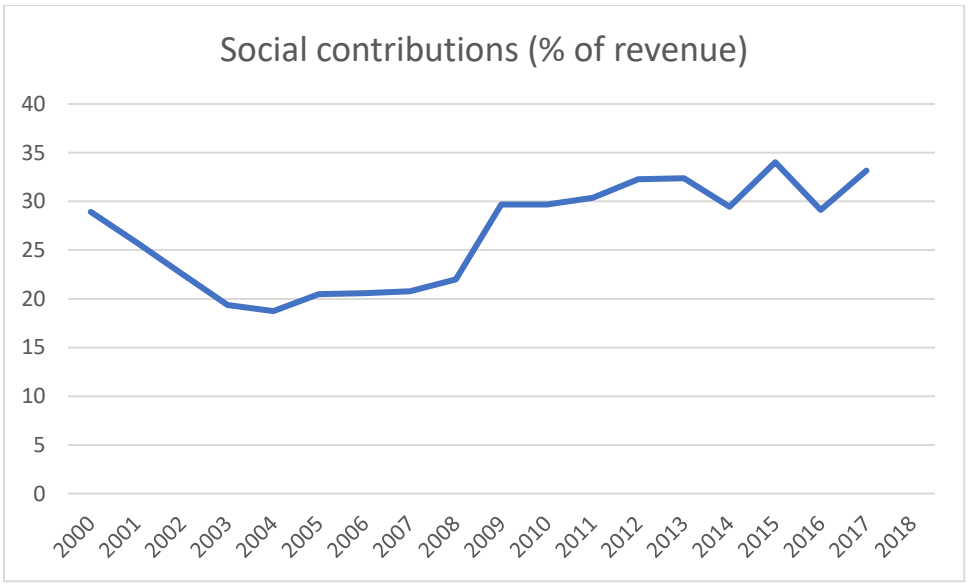
Graph n°7: Evolution of tax revenues from 2000 to 2018:



Source: Author with data from WDI database.

As for social contributions, they fluctuated over the period 2000-2018 with the highest level in 2015 (34,02 %) and the lowest in 2004 (18,74%).

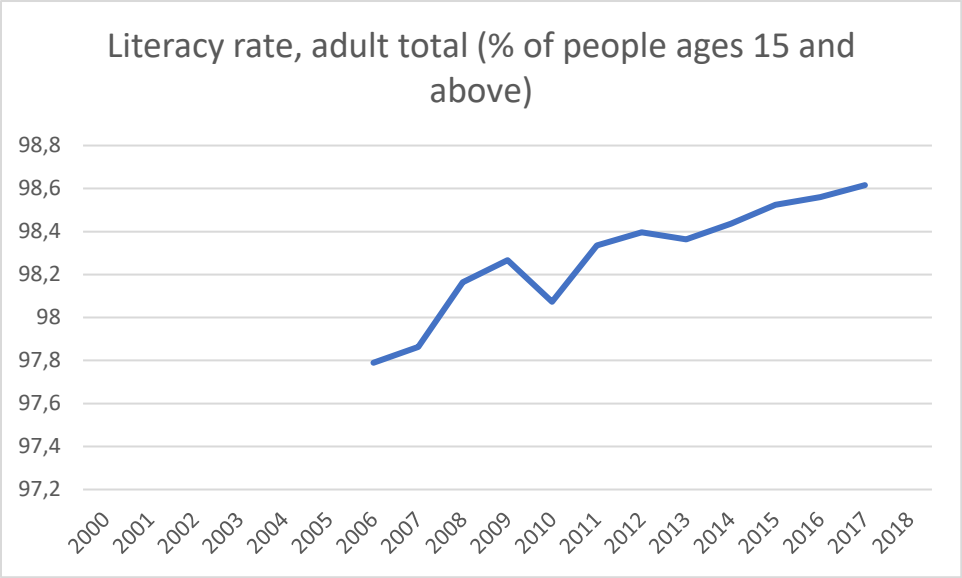
Graph n°8: Evolution of Social contributions from 2000 to 2018.



Source: Author with data from WDI database.

Concerning literacy rate, Uruguay present a high level of education of adult as from 2006 to 2018, it was above 97%.

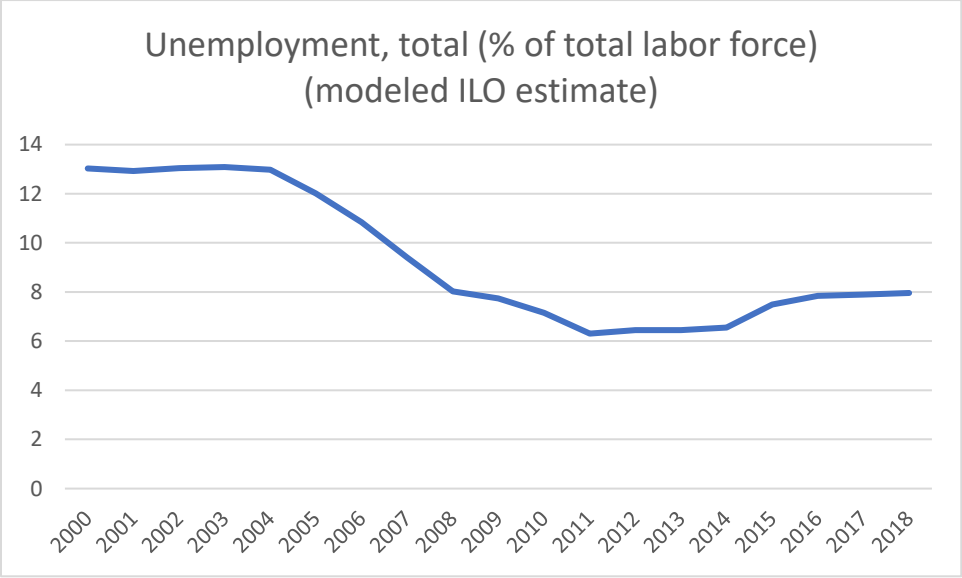
Graph n°9: Evolution of literacy rate from 2000 to 2018.



Source: Data with WDI database.

As for unemployment, it was steady between 2000 and 2004 before going down until 2014 with the lowest level in 2011 (6,31% total labor force).

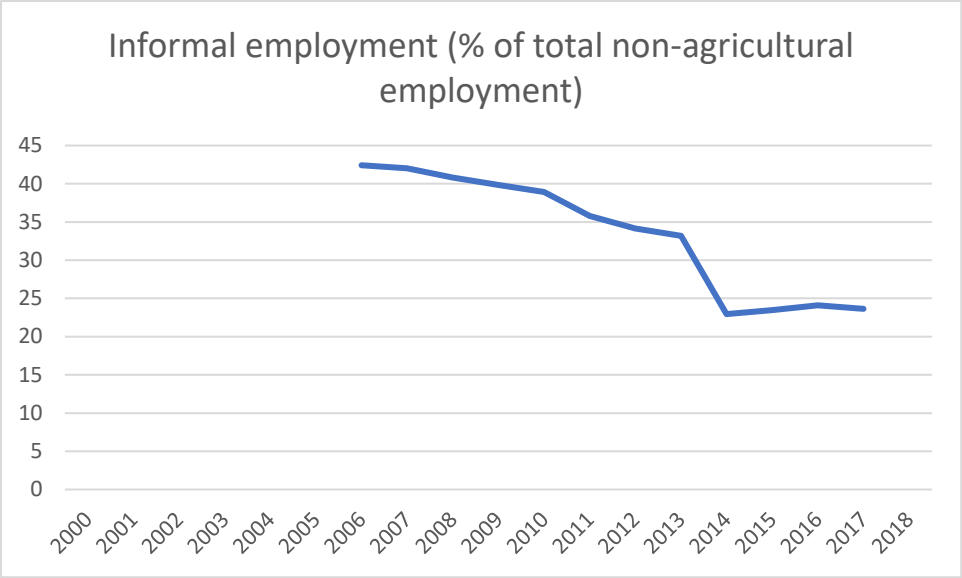
Graph n°10: Evolution of unemployment from 2000 to 2018.



Source: Author with data from WDI database.

Concerning our main explanatory variable, we can observe on the graph below that it has globally decreased from 2006 to 2017.In fact in 2006, Uruguay presented an informal employment rate of 42,42 % and in 2017 it was equal to 22,95%.

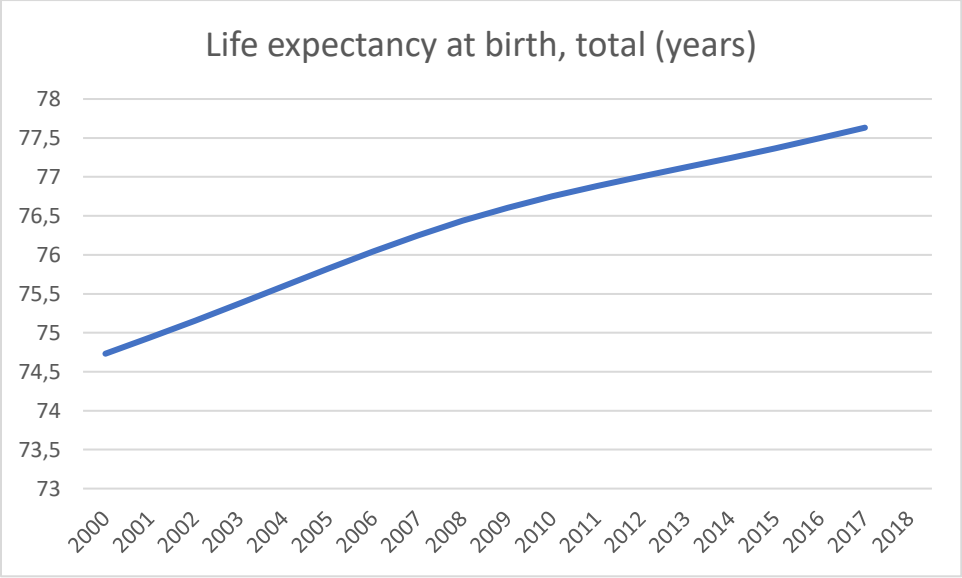
Graph n°11: Evolution of informal employment from 2006 to 2018.



Source: Author with data from WDI database.

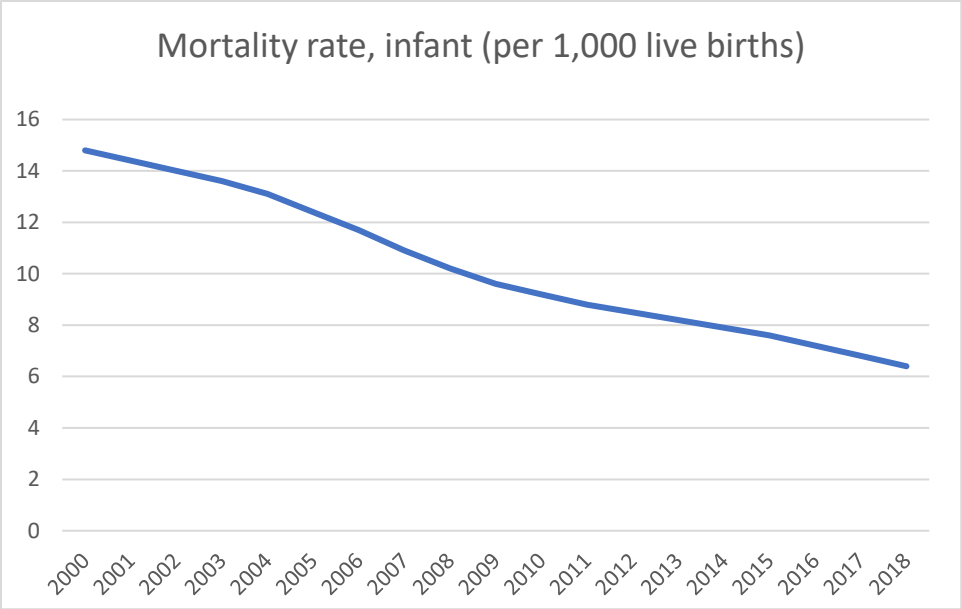
Health status of Uruguayan population has improved as the life expectancy increased overall the period considered and mortality rate decreased.

Graph n°12: Evolution of life expectancy at birth from 2000 to 2018.



Source: Author with data from WDI database.

Graph n°13: Evolution of mortality rate from 2000 to 2018.



Source: Author with data from WDI database.

III)Factors explaining the low coverage of informal sector workers:

As already mentioned in the introduction, informal sector can be defined as "all economic activities that remain outside the official framework".(Canagarajah et al. 2001; Pelissery et al.,2007; Mathauer et al.2008;) It is usually characterized by a lack of regulation and written contracts, insecure employment, low income, weak access to formal social protection systems(contributory pension systems, health insurance, unemployment insurance, disability benefits).).(Canagarajah et al. 2001; Maes,2003; Pelissery et al.,2007; Mathauer et al.2008;).It can be explained by the willingness of employers to decrease labor cost by avoiding the payment of social contributions, taxes; the low level of education of workers; the low level of qualified skills of workers; the increase in unemployment; gender inequalities; population that is in great part rural; imperfection of markets, low access to credit, low access to land, ect….(Canagarajah et al. 2001; Maes,2003; Pelissery et al.,2007; Mathauer et al.2008; Ana sojo,2015).

Due to the characteristics of informal workers, it is often difficult for government officials to track them down in order to collect taxes, social contributions to finance social protection. Hence they are often excluded from formal social protection systems. Some studies have tried to highlight the link between the informal sector and the low level of coverage in social protection. Mathauer et al. 2008 for example in their work on "extending social Health insurance to the in formal sector in Kenya", examined the demand determinants[5]for health insurance which is a component of social protection. For this purpose, they interviewed 19 focus group discussions in which different types of informal workers[6] were classified. They then determined the factors affecting the demand for health insurance and qualified each factor by either "major", "medium", "minor", "not at all" for each discussion group. They found that the ability to pay, knowing the existence of the National health Insurance and understanding its functioning, among other has an impact on the demand for health insurance. As it is

[5] Personal and household characteristics, community characteristics, health characteristics.
[6] Taxi, conductor associations, jaa kali association group, farmer groups, loan support groups, CBD groups, Self help groups, women's self groups.

known, Informal workers earn low, non regular income; have a low level of education; live in remote areas. Hence it results in a weak demand for health insurance from them.

As for Ana Sojo et al. 2015, they studied the determinants of affiliation to pension systems of wage earners in the private sector for five Latin American countries (brazil, Chile, Colombia, Costa Rica. They chose personal characteristics of workers (age, sex, educational level, marital status), household size and head, variables related to workplace (occupational category, branch of activity, part-time work, type of labor market insertion, income from work quintile),location, race for independent variables. Using a probit model and households surveys data in 2002 and 2012, they found that being a part-time worker decreases the probability (20%) of being covered in comparison with being a fulltime worker. Furthermore, there is a positive effect of income, education level, living in urban areas, being the head of the household. However this study presents some limits notably on the type of data used which has for consequence the difficulty to compare the results between the five countries studied.(see table N°…, appendix n°).Before this article, other studies on Latin American were carried out by CEPAL(2006), Rofman et al.(2008),Da costa et al.(2011),Auerbach et al.(2007).CEPAL (2006) used a multivariate model to analyze the probability of contributing to social security of workers from 16 Latin American countries in 2005. On the one hand, they found a negative effect for workers with own accounts, workers in the domestic service, workers for companies with less than 5 employees. On the other hand, working in the public, professional, technical sector increased the probability of contributing to social security. This confirms the hypothesis according to which being an informal sector worker reduce the probability of paying social contributions and thus the probability of being covered. They found also a positive impact of age and education level on the probability of contributing to social security. Concerning Rofman et al. (2008), they used data on 18 countries of Latin America over the period 1995-2006 to analyze the relationship between informal sector and social protection coverage. They found a correlation between the size of company (one possible measure of the degree of informality) and the coverage level. Furthermore, persons working in the primary sector are less likely to be covered. As for Da costa et al. (2011), they found also the same results for Brazil, Chile, Mexico over the period 1990-2006.Another study worth mentioning is by Auerbach et al. (2007) who analyzed the factors influencing the probability for workers to be affiliated to a pension system. They found the same results as Rofman et al(2008) and Da Costa

et al.(2011).

From this literature review, we can see there is clearly a link between informal sector and social protection. Our study main aim will be to further the reflection of authors mentioned above with a focus on one country from Latin America, Uruguay; the use of an econometric analysis; the inclusion of more than one component of social protection.

IV)Data:

A) Data presentation:

To carry out our study, we used data from the survey “Encuesta Longitudinal de Protección Social Uruguay 2012 “provided by the institution “Banco de Previsión Social”. This database covers the period 2012-2013, the 19 departments of Uruguay and was produced thanks to the collaboration between the Ministry of Labor and social Security, Ministry of Social Development, Ministry of Economy and Finance, Banco de Previsión Social, National Statistical Institution of Uruguay.The questionary of the survey comprised 11 modules: A. Caracterización socio-demográfica del entrevistado B. Educación del entrevistado C. Salud D. Beneficios entregados por el Estado E. Trayectoria laboral G. Sistema Previsional - activos H. Sistema Previsional - pasivos I. Patrimonio J. Composición y características del

hogar Y. Ingreso del hogar L. Localización del entrevistado.Persons interviewed were aged 14 years old and more.

For our study, we used the variables e6, e9, e15, g1, g11, g22, j12_2, y2,a1a,a1b,a2 which represent respectively the type of labor occupied, the workplace (department),pension benefit, unemployment benefit, maternity benefit, disability benefit, education level, gender, age, and the relationship to the Head Household .[7]For better identification of these variables, we renamed them and for the answers-1,-2,-3 corresponding to "no contesta","no sabe", no recuerda"," we replace them with ".".

We transformed the education level variable, the age variable into categorical variables.

B) Descriptive analysis of the study data:

Of the 25,802 individuals who answered the question on whether or not to access the retirement pension, 73.39% were beneficiaries. There is significant access to this form of social protection.For the unemployment component, it is a contrary situation as only 2.26% persons interviewed are beneficiaries. The same goes for disability benefits for which only 0.52% perceive it. As for maternity benefits, women who were interviewed answered positively by 47.99%.

Table n°1:Distribution of the dependent variables.

		Frequence	Percentage
Pension benefit	1	18936	73.39
	2	6866	26.61
	Tot	25802	100
Unemployment benefit	1	905	2.26
	2	39184	97.74
	Tot	40089	100
Disability benefit	1	210	0.52
	2	39887	99.48
	Tot	40097	100
Maternity benefit	1	813	47.99
	2	881	52.01
	Tot	1694	100

Source: Author with data from ELPS 2012, Ola1.

Concerning the type of labor variable, categories 1(wage earners in the public sector),2(wage earners in the private sector), and 7(workers for own accounts without a local or investment) register the highest number of persons. In fact, for the category 1, we can observe in the following table that it represents 16.80% ; the category 2,58.30% and the category 7,9.69%.When we combine categories 2 up to 12,we can observe that it is far superior to the percentage of public sector. As we saw in the literature review, usually workers from the public sector are those who benefit the most of the formal social protection system. We can assume here that a great part of the individuals interviewed may not be fully covered.

[7] See appendix n°… for details about the variables.

Table n°2: Distibution of the type of labor occupied variable

Type of labor	Frequence	Percentage
1	4319	16.80
2	14986	58.30
3	112	0.44
4	800	3.11
5	650	2.53
6	1915	7.45
7	2491	9.69
8	132	0.51
9	47	0.18
10	66	0.26
11	21	0.08
12	165	0.64
Total	25704	100

Source: Author with database ELPS 2012, Ola1.

V) Econometric analysis:

A) Presentation of the model:

Based on the literature review and taking into account the data available in the database ELPS, we defined the following multinomial model equation :

$$Ln[Pr(y=2)/Pr(Y=1)]=b_0+b_{11}X_{typelabor=1}+.....+b_{112}X_{typelabor=12}+b_{21}X_{workplace=1}+....+b_{220}X_{workplace=20}+ b_{31}X_{edudummy=1}+....+b_{35}X_{edudummy=5}+ b_{41}X_{sex=1}+b_{42}X_{sex=2}+ b_{51}X_{agedummy=1}+....+b_{53}X_{agedummy=3}+ b_{61}X_{HeadHH=1}+....+b_{613}X_{HeadHH=13}+ b_{71}X_{revenue=1}+....+b_{76}X_{revenue=6}$$

With y being equal to pension benefit, health and accident insurance, unemployment benefit, disability benefit.

We assume that the probability that y=1 instead of y=0 will increase if the labor occupied by the individual is more formal(eg: wage earner in the public sector);the workplace is located in urban areas notably in the capital(Montevideo); the individual is more educated; the individual is male; the individual is elder; the individual is the head of the household.(conf literature review).

B. Analysis of the Pension benefit variable:

B.1.Selection of the most relevant model:

To select the most relevant model, we use the forward method regression that it is to say we added one explanatory variable after another. We then calculate for each model the AIC such as we retain the model with the lowest value of AIC.

*Model A: we regress the dependent variable pension benefit with the type of labor variable. We obtain the following results:

Table 3:Model A

Multinomial logistic regression — Number of obs = 25,586
LR chi2(11) = 7172.57
Prob > chi2 = 0.0000
Log likelihood = -11123.477 — Pseudo R2 = 0.2438

pensionben~y	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1	(base outcome)					
2						
Type_Labor2	2.196406	.0963284	22.80	0.000	2.007605	2.385206
Type_Labor3	1.55651	.3096456	5.03	0.000	.9496161	2.163404
Type_Labor4	2.378252	.1266273	18.78	0.000	2.130067	2.626437
Type_Labor5	.9881132	.1809244	5.46	0.000	.6335079	1.342718
Type_Labor6	3.58668	.1046704	34.27	0.000	3.38153	3.791831
Type_Labor7	5.398356	.1104655	48.87	0.000	5.181848	5.614865
Type_Labor8	21.48094	684.7232	0.03	0.975	-1320.552	1363.514
Type_Labor9	2.0062	.4255896	4.71	0.000	1.172059	2.84034
Type_Labor10	3.892085	.2662521	14.62	0.000	3.37024	4.413929
Type_Labor11	21.48094	1677.223	0.01	0.990	-3265.815	3308.777
Type_Labor12	3.793491	.1826531	20.77	0.000	3.435497	4.151484
_cons	-3.586633	.0941247	-38.11	0.000	-3.771114	-3.402152

Source: Author with database ELPS 2012, Ola1.

The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 is equal to 0.2438.

*Model B: we regress the dependent variable pension benefit with the type of labor variable, the workplace variable. The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.2611 with the addition of the workplace variable.

* Model C: we regress the dependent variable pension benefit with the type of labor variable, the workplace variable, the education level variable. The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.2769 with the addition of the education variable.

*Model D: we regress the dependent variable pension benefit with the type of labor variable, the workplace variable, the education level variable, the gender variable. The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.2787 with the addition of the gender variable.

*Model E : we regress the dependent variable pension benefit with the type of labor variable, the workplace variable, the education level variable, the gender variable, the age variable. The probability

associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.2953 with the addition of the age variable.

*Model F: we regress the dependent variable pension benefit with the type of labor variable, the workplace variable, the education level variable, the gender variable, the age variable, the Head of the household. The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.3038 with the addition of the Head of the household variable.

* Model G (see table below): we regress the dependent variable pension benefit with the type of labor variable, the workplace variable, the education level variable, the gender variable, the age variable, the Head of the household variable, the revenue variable. The probability associated with the statistic test of global significance of the model is inferior to 5% which means that we do not accept the null hypothesis according to which all of the coefficients associated with independent variables are simultaneously equal to zero. The Pseudo R^2 has risen to 0.40 with the addition of the revenue variable.

From the results above we can assume that model G is the model that we should select for further analysis. In fact, when we use the “estat ic” command to get the AIC for each model, we observe that the model G register the weakest AIC. (see table below).

Table n°4:AIC test.

	Obs	ll(null)	ll(model)	dif	AIC
Model A	25586	-14709.76	-11123.48	12	22270.95
Model B	25522	-14669.6	-10839.87	31	21741.75
Model C	20557	-11537.62	-8342.896	35	16755.79
Model D	20557	-11537.62	-8342.896	35	16755.79
Model E	20557	-11537.62	-8130.738	38	16337.48
Model F	20557	-11537.62	-8032.868	50	16165.74
Model G	7158	-3983.471	-2389.832	55	4889.665

Source: Author with database ELPS 2012, Ola1.

Table n°5:Model G.

Multinomial logistic regression — Number of obs = 7,158
LR chi2(54) = 3187.28
Prob > chi2 = 0.0000
Log likelihood = -2389.8324 — Pseudo R2 = 0.4001

pensionben~y	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1	(base outcome)					
2						
Type_Labor2	1.610062	.1885377	8.54	0.000	1.240534	1.979589
Type_Labor3	2.71144	.507838	5.34	0.000	1.716096	3.706784
Type_Labor4	2.970393	.2565999	11.58	0.000	2.467467	3.47332
Type_Labor5	1.061315	.359288	2.95	0.003	.3571231	1.765506
Type_Labor6	3.497353	.2092401	16.71	0.000	3.08725	3.907456
Type_Labor7	5.126725	.2201215	23.29	0.000	4.695295	5.558156
Type_Labor8	19.15801	586.3188	0.03	0.974	-1130.006	1168.322
Type_Labor9	2.722742	.6857157	3.97	0.000	1.378764	4.06672
Type_Labor10	1.88949	.4636526	4.08	0.000	.9807471	2.798232
Type_Labor11	21.12327	1909.082	0.01	0.991	-3720.608	3762.855
Type_Labor12	3.586994	.4251876	8.44	0.000	2.753642	4.420347
region_Lb2	.1460388	.2418747	0.60	0.546	-.3280269	.6201044
region_Lb3	.2304869	.120072	1.92	0.055	-.0048499	.4658238
region_Lb4	.3224804	.2225106	1.45	0.147	-.1136324	.7585933
region_Lb5	-.0094428	.1558224	-0.06	0.952	-.3148491	.2959636
region_Lb6	1.230074	.2239967	5.49	0.000	.7910487	1.6691
region_Lb7	.005086	.3502432	0.01	0.988	-.681378	.69155
region_Lb8	1.04621	.4849715	2.16	0.031	.0956838	1.996737
region_Lb9	-1.327714	.2670526	-4.97	0.000	-1.851128	-.804301
region_Lb10	-.1217934	.2313951	-0.53	0.599	-.5753194	.3317326
region_Lb11	-.3038488	.2526017	-1.20	0.229	-.7989391	.1912415
region_Lb12	-.3060555	.1889876	-1.62	0.105	-.6764644	.0643534
region_Lb13	-.7632342	.2062864	-3.70	0.000	-1.167548	-.3589203
region_Lb14	.0132918	.3814307	0.03	0.972	-.7342987	.7608822
region_Lb15	-.2022355	.1990529	-1.02	0.310	-.5923721	.1879011
region_Lb16	-.8171161	.3196902	-2.56	0.011	-1.443697	-.1905348
region_Lb17	.3760228	.1958829	1.92	0.055	-.0079007	.7599462
region_Lb18	-1.006716	.4261399	-2.36	0.018	-1.841935	-.1714973
region_Lb19	-.3399372	.3271797	-1.04	0.299	-.9811977	.3013233
region_Lb20	-.2153049	.5161289	-0.42	0.677	-1.226899	.7962892
edudummy2	.0079673	.102788	0.08	0.938	-.1934935	.209428
edudummy3	-.0353677	.1037072	-0.34	0.733	-.2386301	.1678946
edudummy4	-.4239597	.229184	-1.85	0.064	-.8731521	.0252326
edudummy5	-.2540061	.1431363	-1.77	0.076	-.534548	.0265358
sex1	-.2421593	.0888635	-2.73	0.006	-.4163286	-.0679901
agedummy2	-.7486644	.1209275	-6.19	0.000	-.985678	-.5116508
agedummy3	.1079168	.1694159	0.64	0.524	-.2241323	.4399659
HeadHH2	.2047653	.3413419	0.60	0.549	-.4642525	.8737832
HeadHH3	-.3737092	.3496525	-1.07	0.285	-1.059015	.311597
HeadHH4	-.0505549	.3675497	-0.14	0.891	-.7709391	.6698294
HeadHH5	1.241715	.3441208	3.61	0.000	.5672505	1.916179
HeadHH6	.8720283	.3491193	2.50	0.012	.187767	1.55629
HeadHH7	.5968134	.4585686	1.30	0.193	-.3019645	1.495591
HeadHH8	.7728407	.5274708	1.47	0.143	-.2609831	1.806665
HeadHH9	1.632439	.6378026	2.56	0.010	.3823687	2.882509
HeadHH10	1.476277	.5498149	2.69	0.007	.39866	2.553895
HeadHH11	.8868581	.4600854	1.93	0.054	-.0148928	1.788609
HeadHH12	1.32802	.5302297	2.50	0.012	.288789	2.367251
HeadHH13	-1.220142	.6393711	-1.91	0.056	-2.473286	.0330023
revenue2	-.9401385	.1547405	-6.08	0.000	-1.243424	-.6368527
revenue3	-2.148683	.1607597	-13.37	0.000	-2.463766	-1.8336
revenue4	-3.096788	.184672	-16.77	0.000	-3.458738	-2.734837
revenue5	-2.256453	.2182818	-10.34	0.000	-2.684278	-1.828629
revenue6	-4.764012	.4981564	-9.56	0.000	-5.740381	-3.787644
_cons	-1.122851	.4140937	-2.71	0.007	-1.934459	-.3112419

Source: Author with database ELPS 2012, Ola1.

B.2.Wald Test and interpretation of the results:

1.Wald Test:

We carry out the Wald test to check if the coefficients of two variables are simultaneously equal to zero or not. In all cases where we combine each time two independent variables, we obtained a probability inferior to 5%. Hence the null hypothesis is rejected and we can conclude that including each two independent variables enable a more statistically significant model.

Table 6:Wald Test.

Test	Chi2(df)	Prob	Test	Chi2(df)	Prob
Type_labor workplace	1003.64	0.0000	Agedummy sex	90.15	0.0000
Type labor edudummy	958.71	0.0000	Agedummy HeadHH	354.05	0.0000
Type labor agedummy	1006.40	0.0000	Agedummy revenue	497.84	0.0000
Type labor sex	954.41	0.0000	Sex HeadHH	131.87	0.0000
Type labor HeadHH	1026.86	0.0000	Sex revenue	467.17	0.0000
Type labor Revenue	1215.03	0.0000	HeadHH revenue	548.98	0.0000
Workplace edudummy	115.03	0.0000			
Workplace agedummy	199.76	0.0000			
Workplace sex	113.47	0.0000			
Workplace HeadHH	235.30	0.0000			
Workplace revenue	517.11	0.0000			
Edudummy agedummy	91.62	0.0000			
Edudummy sex	14.13	0.0000			
Edudummy HeadHH	145.28	0.0000			
Edudummy revenue	505.02	0.0000			

Source: Author with database ELPS 2012, Ola1.

2.Interpretation of results and discussion:

The different types of labor occupied by individuals have positive and significant (except categories 8 and 11) coefficients. (see table n°…) This means that the probability of not being beneficiary of pension of people employed in the categories 2,3,4,5,6,7,9,10,12 is higher than the probability of being beneficiary in comparison with the probability of workers of the public sector. This confirms the assumption made in the study as the first group of workers are more likely from the informal sector thus they deal with numerous barriers to be eligible for formal social protection schemes. For example, for the category 7, being a worker with own account without a local or investment rather than a

salaried worker of public sector will increase the relative probability of not being beneficiary of a pension systems by 5.13 unit pension given that the other variables in the model are held constant. Furthermore, the relative risk ratio associated with this category equals 168.46 which means that being a worker with own account without a local or investment rather than a salaried worker of public sector increase the relative risk of not being beneficiary of pension by a factor of 168.46 given that the other variables in the model are held constant.

Concerning the workplace, it is normally expected that working in urban areas, more developed cities decreases the probability of not being beneficiary of pension given that the other variables in the model are held constant. An article written by the news paper el Pais classified the 19 departments of Uruguay in 3 groups according to an indicator called "Indicador Desarollo Departamental" (IDD) an equivalent of Development indicator of a department. This indicator takes into account four dimensions: the citizen security and a trustworthy systems of rights ; inclusive, prepared and healthy society; a market of efficient, dynamic factors; physical and technological infrastructure. The first group with the highest IDD over the period 2007-2015 includes Colonia (5), Montevideo (1), Lavalleja (9),Soriano(17).The second one comprises departments with a medium value of IDD: Canelones(3),Durazno(6),Flores(7),Florida(8),Maldonado (10), Paysandú (11),Rocha (14),Rio Nego (12),San José (16) and Treinta y Tres(19).The third group characterized by the lowest level of IDD is composed of Artigas(2), Cerro Largo(4), Rivera(13), Salto(15) and Tacuarembó (18).

Regarding this classification, we expected that people working in the last group are less likely to be beneficiaries of pension as they will likely earn low income, occupy more informal sector activities and thus will likely not be able to afford the affiliation to a pension system. However, the regression show contrast results as for example working in Tacuarembó rather than in Montevideo decreases the probability of not being beneficiary of a pension by one unit. Nevertheless, there are some cases where the assumption is verified such as in Artigas, Canelones, Durazno, Cerro Largo, Flores, Rocha. A possible explanation of these results is the existence of social programs aiming to cover elder persons who would not be beneficiaries of pensions in the absence of them.

As for the education variable, the more the individuals are educated, the more likely they will be beneficiaries of pensions. Having the highest level of education represented by the category 5 instead of the lowest one, decreases the probability of not being beneficiary of a pension by 0.25 unit. The relative risk ratio associated with this category equals 0.78 (<1) which means that having the highest level of education rather than the lowest one decrease the relative risk of not being beneficiary of pension by a factor of 0.78 given that the other variables in the model are held constant.

Concerning the gender, being a male rather than a female decreases the probability of not being beneficiary of a pension. In fact, men have more access to education than women in developing countries; they earn more money and tend to have a more regular income than women as they often occupy employment of the formal sector. Hence the result observed. Being a male rather than a female decreases the probability of not being a pension beneficiary by 0.24 unit given that the other variables in the model are held constant.

Concerning the variable revenue, the assumption according to which perceiving a low income leads to a low probability of being beneficiary is verified. The results show negative and significant coefficients of the categories 2 to 6 ([7253-14502]; [14503;29004];[29005;58008];[58009;116016]; more than 116016). Earning more than 116016 represented by the category 6 instead earning the lowest level of income (less than 7253), decreases the probability of not being beneficiary of a pension by 4.76 unit. The relative risk ratio associated with this category equals 0.009 (<1) which means that having the

highest level of education rather than the lowest one decrease the relative risk of not being beneficiary of pension by a factor of 0.009 given that the other variables in the model are held constant.

C)Analysis of the health and accident insurance variable

C.1.Selection of the most relevant model:

We use the same methodology as in B) and after comparing the AIC (see table below) of the models A to G, we selected the las one as it presents the lowest value of AIC in addition to having the highest Pseudo R^2.

Table n°7:AIC test.

	Obs	ll(null)	ll(model)	dif	AIC
Model A	25696	-4902.5	-11123.48	12	9468.215
Model B	25696	-4896.098	-10839.87	31	9302.513
Model C	20622	-4224.971	-8342.896	35	7937.258
Model D	20622	-4224.971	-8342.896	36	7937.56
Model E	20622	-4224.971	-8130.738	38	7905.027
Model F	20622	-4224.971	-8032.868	50	7838.358
Model G	7182	-1265.046	-1031.724	55	2173.448

Source: Author with database ELPS 2012, Ola1.

C.2.Wald Test and interpretation of the results:

1.Wald Test:

As for the analysis of the pension benefit variable, we carry out the Wald test also for the analysis of the health and accident insurance. The probability inferior to 5%. Hence the null hypothesis is rejected and we can conclude that including each two independent variables enable a more statistically significant model.

Table 8:Wald test.

Test	Chi2(df)	Prob	Test	Chi2(df)	Prob
Type_labor workplace	73.48	0.0000	Agedummy sex	22.05	0.0000
Type labor edudummy	55.36	0.0000	Agedummy HeadHH	91.42	0.0000
Type labor agedummy	53.43	0.0000	Agedummy revenue	52.27	0.0000
Type labor sex	36.57	0.0003	Sex HeadHH	85.22	0.0000
Type labor HeadHH	113.07	0.0000	Sex revenue	34.92	0.0000
Type labor Revenue	59.55	0.0000	HeadHH revenue	102.71	0.0000
Workplace edudummy	81.48	0.0000			
Workplace agedummy	71.17	0.0000			
Workplace sex	53.42	0.0000			

Workplace HeadHH	125.23	0.0000			
Workplace revenue	76.36	0.0000			
Edudummy agedummy	43.60	0.0000			
Edudummy sex	25.65	0.0000			
Edudummy HeadHH	145.28	0.0000			
Edudummy revenue	49.74	0.0000			

Source: Author with database ELPS 2012, Ola1.

2.Interpretation of results and discussion:

The categories 4,6,8,9,10,11 and 12 are the type of labor that verify the assumption according to which workers outside the public sector are more likely from informal sector thus they deal with numerous barriers to be eligible for formal social protection schemes. The category 7 is the only one for which the coefficient is significant. Being a worker with own account without a local or investment rather than a salaried worker of public sector will increase the relative probability of not being beneficiary of a health and accident insurance systems by 0.59 unit given that the other variables in the model are held constant. Furthermore, the relative risk ratio associated with this category equals 1.8 which means that being a worker with own account without a local or investment rather than a salaried worker of public sector increase the relative risk of not being beneficiary of health and accident insurance by a factor of 1.8 given that the other variables in the model are held constant.

Concerning the workplace, we observed the same contrast results than in B) for the analysis of the pension benefit variable. Nevertheless, the assumption is verified for example for Artigas, Durazno, Florida, Maldonado, Paysandu, Salto,Treinta y Tres.

As for the education variable, the assumption is not verified for the category 3 to 6 as their coefficients are negative. This can be explained by the fact that being highly educated does not translate translate necessarily in getting a good job in formal sector and a high regular level of income, two factors playing a role in being eligible for formal health and accident insurance schemes. the more the individuals are educated, the more likely they will be beneficiaries of pensions.

Concerning the gender, being a male rather than a female does not decrease the probability of not being beneficiary of a health and accident insurance contrary to pension benefit. Maybe

Women present here some specificities that make them more eligible than men contrary to pension benefits. The results can be explained also by the existence of public programs favouring women especially when they are mothers.

Concerning the variable revenue, the assumption according to which perceiving a low income leads to a low probability of being beneficiary is verified. The results show positive but not significant coefficients of the categories 2 to 6 ([7253-14502]; [14503;29004];[29005;58008];[58009;116016]; more than 116016).

Table n°8: Model G

```
Multinomial logistic regression                 Number of obs     =      7,182
                                                LR chi2(54)       =     466.64
                                                Prob > chi2       =     0.0000
Log likelihood = -1031.7239                     Pseudo R2         =     0.1844
```

healthacci~e	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1						
Type_Labor2	.8615103	.1882749	4.58	0.000	.4924983	1.230522
Type_Labor3	2.300343	.5044786	4.56	0.000	1.311583	3.289103
Type_Labor4	-17.36385	2170.417	-0.01	0.994	-4271.303	4236.575
Type_Labor5	.0645938	.4628516	0.14	0.889	-.8425787	.9717664
Type_Labor6	-16.95288	1317.322	-0.01	0.990	-2598.856	2564.951
Type_Labor7	.5859984	.2706266	2.17	0.030	.0555801	1.116417
Type_Labor8	-15.40994	3952.503	-0.00	0.997	-7762.174	7731.354
Type_Labor9	-17.29377	9902.097	-0.00	0.999	-19425.05	19390.46
Type_Labor10	-16.15695	5892.946	-0.00	0.998	-11566.12	11533.81
Type_Labor11	-16.45137	16236.43	-0.00	0.999	-31839.27	31806.37
Type_Labor12	-17.65038	5628.454	-0.00	0.997	-11049.22	11013.92
region_Lb2	-17.40002	2649.818	-0.01	0.995	-5210.947	5176.147
region_Lb3	.3400276	.1741561	1.95	0.051	-.0013122	.6813673
region_Lb4	.4547135	.342861	1.33	0.185	-.2172818	1.126709
region_Lb5	-.4570643	.2365745	-1.93	0.053	-.9207418	.0066132
region_Lb6	-17.96871	2632.329	-0.01	0.995	-5177.24	5141.302
region_Lb7	.58758	.4496281	1.31	0.191	-.2936749	1.468835
region_Lb8	-18.11124	6264.055	-0.00	0.998	-12295.43	12259.21
region_Lb9	1.264033	.2373803	5.32	0.000	.7987762	1.72929
region_Lb10	-.1887123	.4373629	-0.43	0.666	-1.045928	.6685032
region_Lb11	-17.86863	2977.31	-0.01	0.995	-5853.289	5817.552
region_Lb12	-.7365906	.4364907	-1.69	0.092	-1.592097	.1189155
region_Lb13	-17.69027	2219.354	-0.01	0.994	-4367.543	4332.163
region_Lb14	-18.0935	3384.513	-0.01	0.996	-6651.617	6615.43
region_Lb15	-17.48914	1833.006	-0.01	0.992	-3610.115	3575.136
region_Lb16	.1407833	.4530924	0.31	0.756	-.7472616	1.028828
region_Lb17	-.757505	.4354585	-1.74	0.082	-1.610988	.0959779
region_Lb18	-17.15256	3597.433	-0.00	0.996	-7067.991	7033.686
region_Lb19	-17.27636	3583.67	-0.00	0.996	-7041.141	7006.588
region_Lb20	-17.88985	5383.878	-0.00	0.997	-10570.1	10534.32
edudummy2	.2998335	.1752736	1.71	0.087	-.0436963	.6433634
edudummy3	-.0530926	.1775253	-0.30	0.765	-.4010357	.2948505
edudummy4	-.6865946	.448703	-1.53	0.126	-1.566036	.1928471
edudummy5	-.7614835	.2400394	-3.17	0.002	-1.231952	-.2910149
sex1	-.2325068	.1547242	-1.50	0.133	-.5357607	.070747
agedummy2	.8314132	.2291262	3.63	0.000	.3823341	1.280492
agedummy3	-.0267125	.3829041	-0.07	0.944	-.7771909	.7237658
HeadHH2	17.60536	3431.472	0.01	0.996	-6707.955	6743.166
HeadHH3	17.55881	3431.472	0.01	0.996	-6708.002	6743.119
HeadHH4	17.84611	3431.472	0.01	0.996	-6707.714	6743.407
HeadHH5	16.60891	3431.472	0.00	0.996	-6708.952	6742.17
HeadHH6	18.33086	3431.472	0.01	0.996	-6707.23	6743.891
HeadHH7	18.42032	3431.472	0.01	0.996	-6707.14	6743.981
HeadHH8	19.81936	3431.472	0.01	0.995	-6705.741	6745.38
HeadHH9	-.1807142	9232.28	-0.00	1.000	-18095.12	18094.76
HeadHH10	1.198735	7263.389	0.00	1.000	-14234.78	14237.18
HeadHH11	.9711206	5203.889	0.00	1.000	-10198.46	10200.41
HeadHH12	1.184091	5450.925	0.00	1.000	-10682.43	10684.8
HeadHH13	19.59504	3431.472	0.01	0.995	-6705.966	6745.156
revenue2	-.4066032	.3041443	-1.34	0.181	-1.002715	.1895086
revenue3	-.3769675	.2929141	-1.29	0.198	-.9510685	.1971336
revenue4	.4473129	.3001021	1.49	0.136	-.1408765	1.035502
revenue5	.2820629	.3610109	0.78	0.435	-.4255055	.9896313
revenue6	.6026509	.5337569	1.13	0.259	-.4434933	1.648795
_cons	-21.62406	3431.472	-0.01	0.995	-6747.185	6703.937
2	(base outcome)					

D)Unemployment benefit variable - disability benefit variable:

We use the methodology of analysis as in B) and C) and the following model were selected as the most pertinent to represent the relationship between receiving unemployment-disability and being an informal worker. (see the final results in tables n°9 and 10 below).

As for pension benefits, occupying the type of work other than the public sector one except this time for categories 2,6 and 7 decreases the probability of being beneficiary.

Remark: The results found in B), C) and D) confirms globally with some contrast for certain cases the results mentioned in the literature review according to which there is a link between being an informal sector worker and being beneficiary of different components of social protection. This study has for advantage in comparison with some previous studies to be a case study and thus brings more precision to the link between both variables. Furthermore; it is an econometric analysis which confers to it a more rigorous approach.

Tables 9 and :Model G.

Multinomial logistic regression — Number of obs = 7,182
LR chi2(53) = 430.36
Prob > chi2 = 0.0000
Log likelihood = -490.33868 — Pseudo R2 = 0.3050

unemployme~s	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1						
Type_Labor2	1.921441	.4534517	4.24	0.000	1.032692	2.81019
Type_Labor3	-16.00455	5704.337	-0.00	0.998	-11196.3	11164.29
Type_Labor4	-14.93158	1941.567	-0.01	0.994	-3820.334	3790.47
Type_Labor5	-15.36776	2285.079	-0.01	0.995	-4494.04	4463.304
Type_Labor6	.9363783	.606585	1.54	0.123	-.2525065	2.125263
Type_Labor7	3.302292	.5066546	6.52	0.000	2.309268	4.295317
Type_Labor8	-13.46599	3483.155	-0.00	0.997	-6840.325	6813.393
Type_Labor9	-14.73043	13079.13	-0.00	0.999	-25649.36	25619.9
Type_Labor10	-15.55285	6940.299	-0.00	0.998	-13618.29	13587.18
Type_Labor11	50.11138	.	.	.	.	.
Type_Labor12	-16.14255	5437.24	-0.00	0.998	-10672.94	10640.65
region_Lb2	-16.27985	3066.27	-0.01	0.996	-6026.059	5993.499
region_Lb3	-17.12769	1272.417	-0.01	0.989	-2511.019	2476.764
region_Lb4	-17.04591	2242.958	-0.01	0.994	-4413.163	4379.071
region_Lb5	1.208268	.2658004	4.55	0.000	.6873087	1.729227
region_Lb6	-16.62575	3064.459	-0.01	0.996	-6022.856	5989.604
region_Lb7	-15.95806	4009.97	-0.00	0.997	-7875.355	7843.439
region_Lb8	-16.42632	6506.86	-0.00	0.998	-12769.64	12736.78
region_Lb9	.6574379	.486733	1.35	0.177	-.2965413	1.611417
region_Lb10	1.752203	.3878727	4.52	0.000	.9919862	2.512419
region_Lb11	-17.10933	2950.171	-0.01	0.995	-5799.337	5765.119
region_Lb12	-.2333599	.4858139	-0.48	0.631	-1.185538	.7188179
region_Lb13	1.305414	.4013378	3.25	0.001	.5188064	2.092022
region_Lb14	1.080572	.4804459	2.25	0.025	.1389154	2.022229
region_Lb15	1.293697	.3773138	3.43	0.001	.5541759	2.033219
region_Lb16	2.01405	.4924152	4.09	0.000	1.048934	2.979166
region_Lb17	.5122926	.4628198	1.11	0.268	-.3948176	1.419403
region_Lb18	-16.42036	3338.148	-0.00	0.996	-6559.071	6526.23
region_Lb19	-16.38919	3617.251	-0.00	0.996	-7106.071	7073.292
region_Lb20	-16.40591	5273.852	-0.00	0.998	-10352.97	10320.15
edudummy2	1.010041	.2696511	3.75	0.000	.481535	1.538548
edudummy3	.8328573	.278461	2.99	0.003	.2870838	1.378631
edudummy4	-15.9274	2056.979	-0.01	0.994	-4047.532	4015.677
edudummy5	.8664889	.3573185	2.42	0.015	.1661575	1.56682
sex1	.7343027	.2535504	2.90	0.004	.2373531	1.231252
agedummy2	1.549266	.3709577	4.18	0.000	.8222022	2.27633
agedummy3	-15.33655	1206.112	-0.01	0.990	-2379.272	2348.599
HeadHH2	16.29868	3172.146	0.01	0.996	-6200.993	6233.591
HeadHH3	16.61003	3172.146	0.01	0.996	-6200.682	6233.902
HeadHH4	17.49407	3172.146	0.01	0.996	-6199.798	6234.786
HeadHH5	16.12503	3172.146	0.01	0.996	-6201.167	6233.417
HeadHH6	17.61458	3172.146	0.01	0.996	-6199.677	6234.907
HeadHH7	-.4874793	4482.695	-0.00	1.000	-8786.408	8785.433
HeadHH8	.3879177	5896.163	0.00	1.000	-11555.88	11556.65
HeadHH9	.8794466	9963.578	0.00	1.000	-19527.37	19529.13
HeadHH10	17.09833	9814.617	0.00	0.999	-19219.2	19253.39
HeadHH11	-.9088905	4522.272	-0.00	1.000	-8864.4	8862.582
HeadHH12	.4214625	6762.664	0.00	1.000	-13254.16	13255
HeadHH13	18.3394	3172.146	0.01	0.995	-6198.953	6235.631
revenue2	17.46068	1525.687	0.01	0.991	-2972.831	3007.753
revenue3	17.37882	1525.687	0.01	0.991	-2972.913	3007.671
revenue4	17.78453	1525.687	0.01	0.991	-2972.507	3008.076
revenue5	.5894004	2034.134	0.00	1.000	-3986.241	3987.42
revenue6	.8104616	3296.599	0.00	1.000	-6460.404	6462.025
_cons	-42.25084	3519.982	-0.01	0.990	-6941.288	6856.787
2	(base outcome)					

Source: Author

Multinomial logistic regression — Number of obs = 7,182
LR chi2(54) = 206.21
Prob > chi2 = 0.0000
Log likelihood = -123.45236 — Pseudo R2 = 0.4551

disability~s	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1						
Type_Labor2	-2.49352	.6700907	-3.72	0.000	-3.806874	-1.180166
Type_Labor3	-20.62104	35312.5	-0.00	1.000	-69231.84	69190.6
Type_Labor4	.8367938	.5577777	1.50	0.134	-.2564304	1.930018
Type_Labor5	-19.54268	11517.58	-0.00	0.999	-22593.58	22554.5
Type_Labor6	-16.04697	4939.373	-0.00	0.997	-9697.04	9664.946
Type_Labor7	2.555403	.651829	3.92	0.000	1.277842	3.832964
Type_Labor8	-1.546395	28328.18	-0.00	1.000	-55523.75	55520.66
Type_Labor9	-22.25831	58245.5	-0.00	1.000	-114181.3	114136.8
Type_Labor10	-4.990037	34374.55	-0.00	1.000	-67377.87	67367.89
Type_Labor11	-22.42079	119557.1	-0.00	1.000	-234350	234305.2
Type_Labor12	-18.58488	26362.9	-0.00	0.999	-51688.92	51651.75
region_Lb2	-18.57597	14880.99	-0.00	0.999	-29184.78	29147.62
region_Lb3	-19.92995	4559.861	-0.00	0.997	-8957.093	8917.233
region_Lb4	-19.40454	12321.26	-0.00	0.999	-24168.63	24129.82
region_Lb5	-17.81106	7164.841	-0.00	0.998	-14060.64	14025.02
region_Lb6	-20.11024	11898.22	-0.00	0.999	-23340.2	23299.98
region_Lb7	2.920354	.8473559	3.45	0.001	1.259567	4.581141
region_Lb8	-16.90768	31244.41	-0.00	1.000	-61254.82	61221
region_Lb9	-20.00503	9842.955	-0.00	0.998	-19311.84	19271.83
region_Lb10	-19.20228	12651.4	-0.00	0.999	-24815.49	24777.08
region_Lb11	-17.80592	11116.08	-0.00	0.999	-21804.92	21769.31
region_Lb12	-20.25986	7498.694	-0.00	0.998	-14717.43	14676.91
region_Lb13	-16.84833	7218.596	-0.00	0.998	-14165.04	14131.34
region_Lb14	-19.72434	16732.58	-0.00	0.999	-32814.97	32775.52
region_Lb15	-18.93983	10288.01	-0.00	0.999	-20183.08	20145.2
region_Lb16	-22.09248	12195.76	-0.00	0.999	-23925.35	23881.17
region_Lb17	-17.66275	9442.758	-0.00	0.999	-18525.13	18489.8
region_Lb18	-19.04367	17093.81	-0.00	0.999	-33522.29	33484.21
region_Lb19	-18.6354	16453.87	-0.00	0.999	-32267.64	32230.37
region_Lb20	-19.60324	26464.57	-0.00	0.999	-51889.21	51850
edudummy2	17.08812	2168.403	0.01	0.994	-4232.904	4267.08
edudummy3	17.69457	2168.403	0.01	0.993	-4232.297	4267.687
edudummy4	-1.666636	10037.19	-0.00	1.000	-19674.2	19670.87
edudummy5	18.8539	2168.403	0.01	0.993	-4231.138	4268.846
sex1	-.7635832	.5677917	-1.34	0.179	-1.876434	.349268
agedummy2	-1.430213	.7949645	-1.80	0.072	-2.988315	.1278886
agedummy3	-19.7356	3721.951	-0.01	0.996	-7314.625	7275.153
HeadHH2	17.44557	9017.747	0.00	0.998	-17657.01	17691.91
HeadHH3	18.77111	9017.747	0.00	0.998	-17655.69	17693.23
HeadHH4	-2.176778	11190.45	-0.00	1.000	-21935.05	21930.7
HeadHH5	19.04316	9017.747	0.00	0.998	-17655.42	17693.5
HeadHH6	19.28447	9017.747	0.00	0.998	-17655.18	17693.74
HeadHH7	1.255024	11752.3	0.00	1.000	-23032.83	23035.34
HeadHH8	-.8346952	23184.31	-0.00	1.000	-45441.25	45439.58
HeadHH9	.4229483	55059.74	0.00	1.000	-107914.7	107915.5
HeadHH10	17.27509	50598.86	0.00	1.000	-99154.67	99189.22
HeadHH11	1.380337	20895.11	0.00	1.000	-40952.29	40955.05
HeadHH12	2.026638	25976.38	0.00	1.000	-50910.75	50914.8
HeadHH13	-.4951839	21195.96	-0.00	1.000	-41543.81	41542.82
revenue2	3.264426	6021.607	0.00	1.000	-11798.87	11805.4
revenue3	19.01821	5579.394	0.00	0.997	-10916.39	10954.43
revenue4	18.76607	5579.394	0.00	0.997	-10916.65	10954.18
revenue5	17.4623	5579.394	0.00	0.998	-10917.95	10952.87
revenue6	-1.958326	15244.4	-0.00	1.000	-29880.44	29876.52
_cons	-57.2234	10823.67	-0.01	0.996	-21271.22	21156.78
2	(base outcome)					

Conclusion:

The current low level of coverage in social protection in developing countries can be explained by a persistent presence of the informal sector. This sector has for characteristics ,a lack of regulation and written contracts, insecure employment, low income, weak access to formal social protection systems(contributory pension systems, health insurance, unemployment insurance, disability benefits).(WB,2001;SP Asia ; SS SI SSA , Extending SHI IS Kenya;).It results in low level of resources available to finance the coverage of informal sector workers; the existence of institutional constraints for them to be affiliated to formal social protection schemes.

The main purpose of our study was to prove empirically the relationship between social protection and informal sector. Using a multinomial model, we found for example that being a worker with own accounts without local or investment increases the probability of not being beneficiary of pension, health and accident insurance .In fact, being a worker with own account without a local or investment rather than a salaried worker of public sector will increase the relative probability of not being beneficiary of a pension systems by 5.13 unit pension given that the other variables in the model are held constant. Furthermore, the relative risk ratio associated with this category equals 168.46 which means that being a worker with own account without a local or investment rather than a salaried worker of public sector increase the relative risk of not being beneficiary of pension by a factor of 168.46 given that the other variables in the model are held constant. Being a worker with own account without a local or investment rather than a salaried worker of public sector will increase the relative probability of not being beneficiary of a health and accident insurance systems by 0.59 unit given that the other variables in the model are held constant. Furthermore, the relative risk ratio associated with this category equals 1.8 which means that being a worker with own account without a local or investment rather than a salaried worker of public sector increase the relative risk of not being beneficiary of health and accident insurance by a factor of 1.8 given that the other variables in the model are held constant.We can conclude from these observations that government officials should find solutions to extend the social protection coverage to informal sector to close the gap between them and formal sector workers. Uruguay has already implemented a program called Monotributo (monotax)in order to integrate informal sector workers in the social protection system. Regarding the results found in this study, efforts should be maintained in order to increase more and more the number of informal workers being covered by social protection systems.

In our study, we found also that the level of education, the workplace, the gender, revenue can have a significant impact on the social protection coverage. For example, . Having the highest level of education represented by the category 5 instead of the lowest one, decreases the probability of not being beneficiary of a pension by 0.25 unit. The relative risk ratio associated with this category equals 0.78 (<1) which means that having the highest level of education rather than the lowest one decrease the relative risk of not being beneficiary of pension by a factor of 0.78 given that the other variables in the model are held constant. Therefore, government officials should define complementary policies such as urbanization, improving the quality of education, proving employment, women emancipation programs to produce efficient results of measures taken by them to extend the social protection to informal sector workers.

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Appendices :

Appendix n°1 :

Box n°1 : Sustainable development goals related to social protection.

SDG1.No poverty
1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.

SDG3. Good Health and well being.
3.8 Achieve universal health coverage, including financial risk protection, access to safe, effective, quality and affordable essential medicines and vaccines for all.

SDG5.Gender equality
5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.

SDG8.Decent work and economic growth
8.5 By 2030, achieve full and productive employment and decent work for all women and men including for young people and persons with disabilities and equal pay for work of equal value.

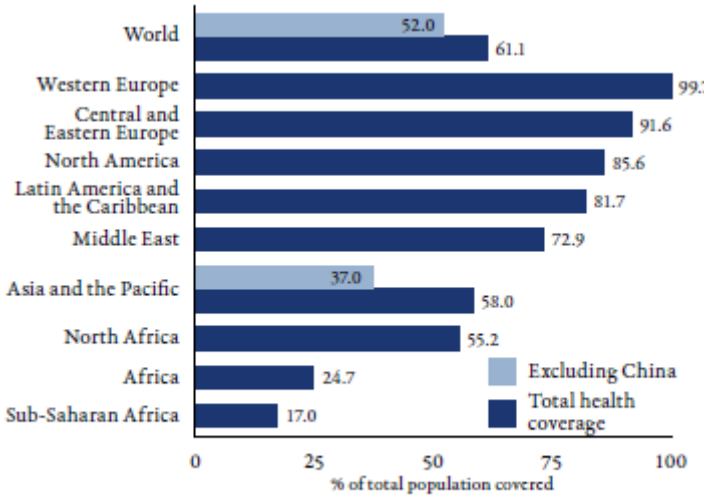
SDG10.Reduced inequalities

10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

Source : UN 2015.A/RES/70/1.

Appendix n°2 :

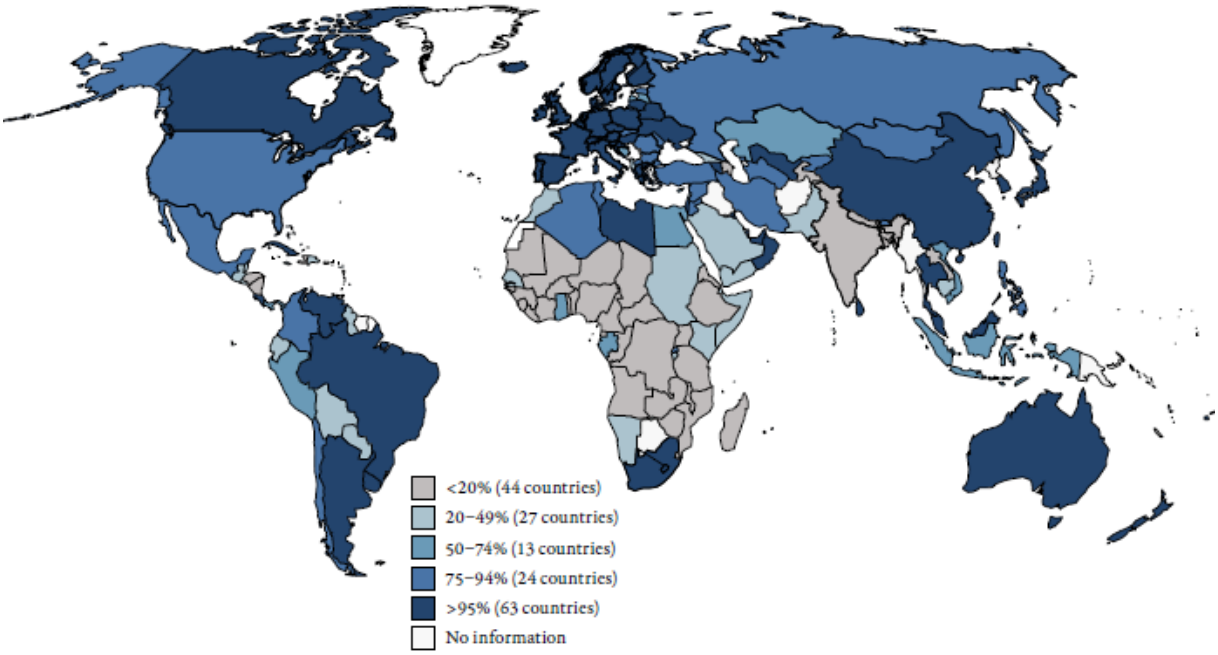
Graph n° 1 : Health coverage by region: Proportion of population affiliated with national health services, social, private or microinsurance programs, latest year available for data (%):



Note: Global average weighted by population, 2012.

Source: World Social Protection Report 2014-2015, p102.

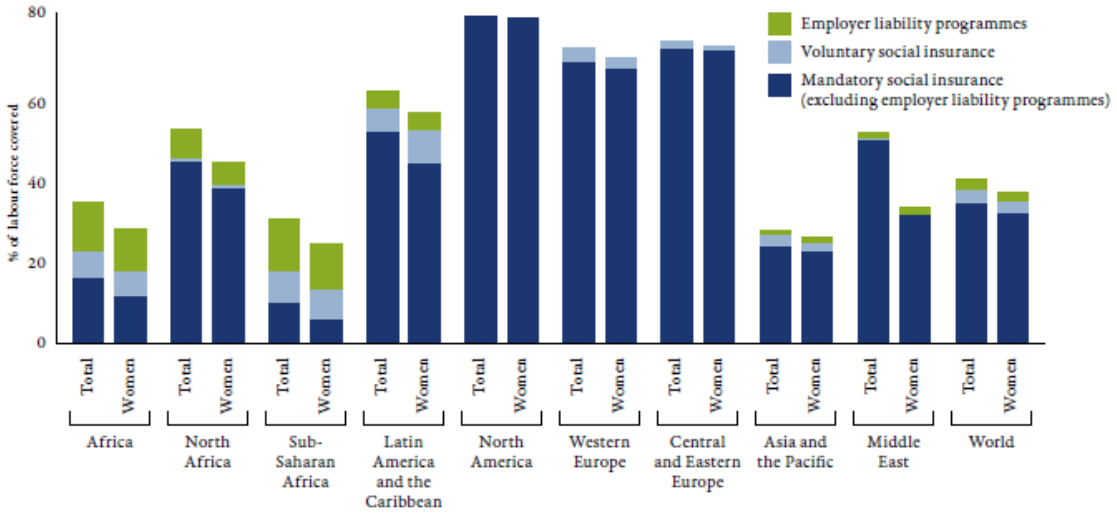
Map n°1 : Health coverage by region: Proportion of population affiliated with national health services, social, private or microinsurance programs, latest year available for data (%):



Source : World Social Protection Report 2014-2015, p103.

Appendix n°3 :

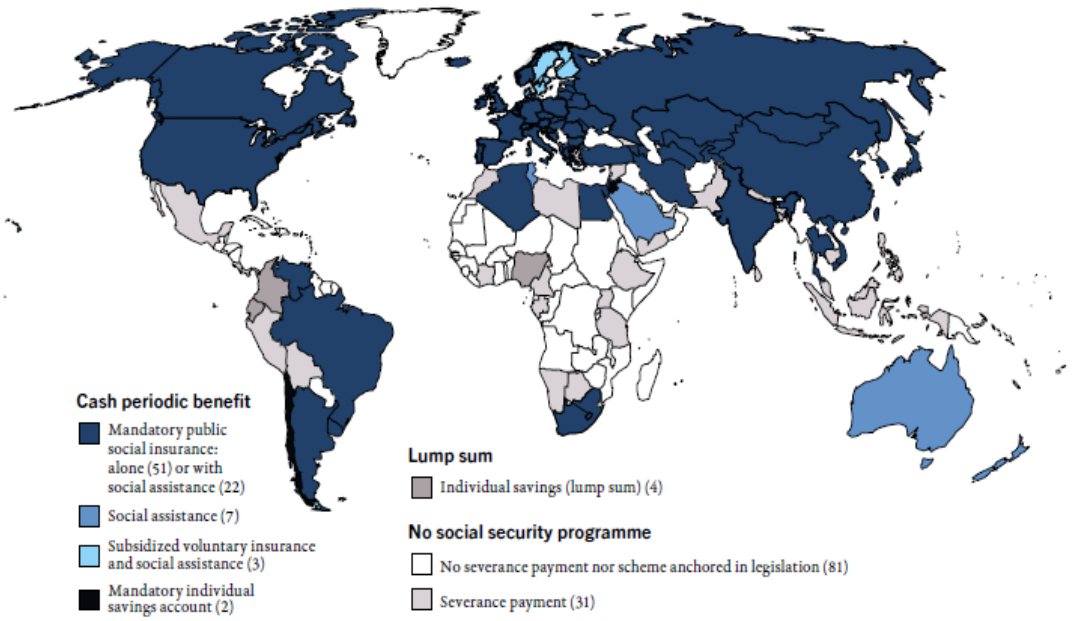
Graph n° 2 : Protection against work injuries.



Notes: Regional and global estimates weighted by the labour force 2012 (ILO KILM, 8th ed.). For individual country information, see Annex IV, table B.4.

Source : World Social Protection Report 2014-2015, p49.

Map n°2 : Distribution of unemployment benefits in the world by program type.

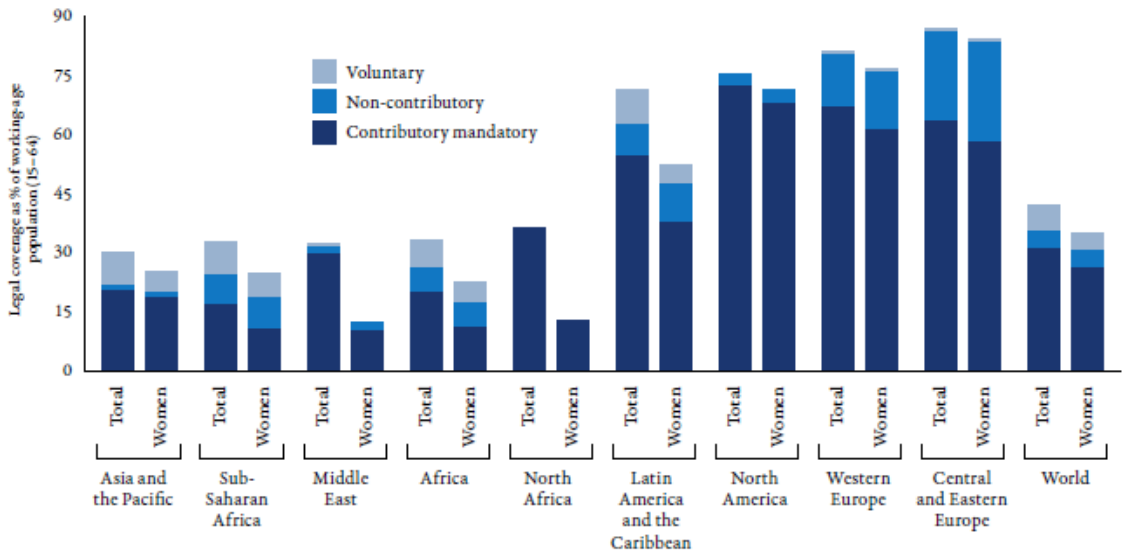


Note: Figures in brackets refer to the number of countries in each group. Information on the type of programme by country is available in Annex IV, table B.3.

Source : World Social Protection Report 2014-2015,p59.

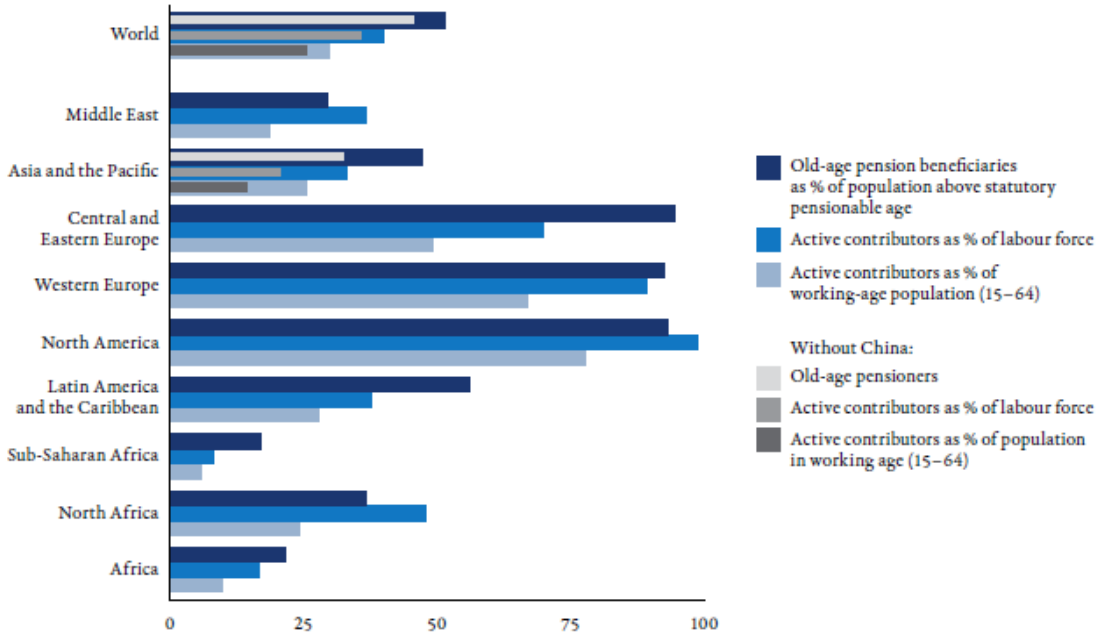
Appendix n°4 :

Graph n°3: Retirement pensions: Extent of legal coverage, by region, latest year available



Source: World Social Protection Report 2014-2015, p109.

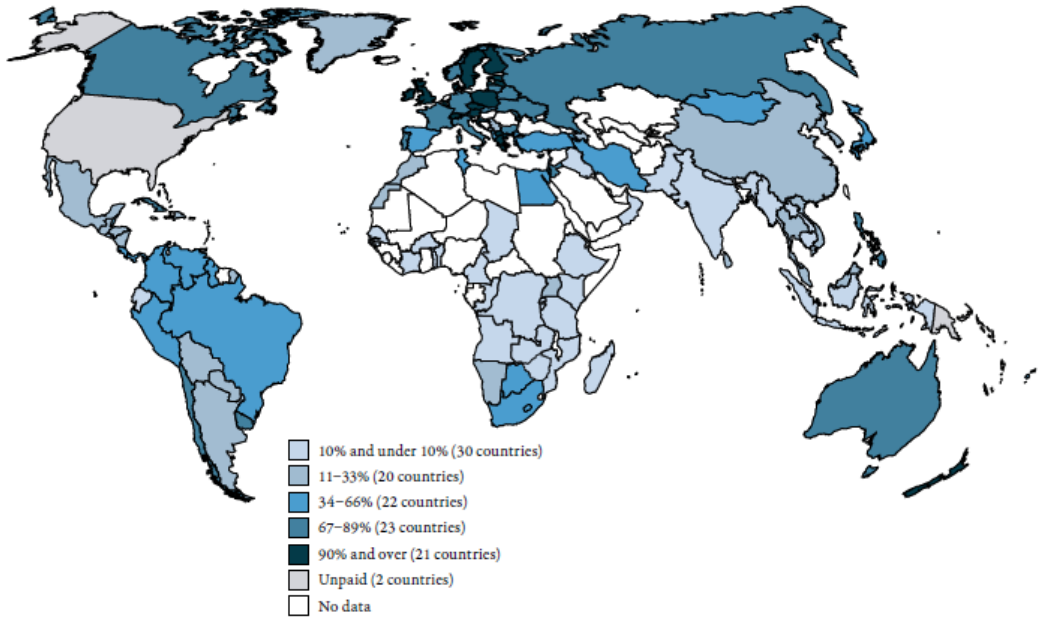
Graph n°4 : Effective coverage in retirement pension by region:



Source: World Social Protection Report 2014-2015, p110.

Appendix n°5:

Map n°3 : Effective coverage for maternity benefits: Working women contributing to social protection programs for maternity or those entitled to these benefits (percentage):



Source: World Social Protection Report 2014-2015, p91.