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EFFORTS AND INEQUALITY OF OPPORTUNITIES IN THE BOLIVIAN LABOR MARKET
ESFUERZOS Y DESIGUALDAD DE OPORTUNIDADES EN EL MERCADO LABORAL BOLIVIANO

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ABSTRACT

The equitable distribution of income, along with human development indices, is among the factors that differentiate developed from developing countries. In this paper, efforts and other variables related to the circumstances of individuals were quantified and analyzed together with traditional determinants in order to explain inequality in the working population of Bolivia. We estimated econometric models by merging the extended Mincer equation with John Roemer's theory of Inequality of Opportunity. We find that efforts are important determinants of the levels of wage inequality in the country as well as regional development, labor informality, gender and ethnicity. In this sense, the paper separates the part of wage inequality that may be attributed to situations that are beyond the control of individuals and that can be attributed to conscious decisions. Micro simulations determined that it would be possible to reduce inequality by as much as 21% if it gives people the chance to make similar efforts to improve their wages.

RESUMEN

La repartición equitativa de ingresos, junto con los índices de desarrollo humano son algunos de los factores que distinguen de los países desarrollados de los que están en vías de desarrollo. En este trabajo, con el fin de explicar la desigualdad en la población trabajadora de Bolivia, se cuantificaron y analizaron conjuntamente los esfuerzos y otras variables relacionadas a las circunstancias de los individuos. Para ello se estimaron modelos econométricos fusionando la ecuación de Mincer ampliada con la teoría de igualdad de oportunidades de John Roemer. Se comprobó que los esfuerzos son importantes determinantes de los niveles de desigualdad de ingresos laborales en el país, así como el desarrollo regional, la informalidad laboral, género y etnia. En ese sentido, en el documento se separa la parte de la desigualdad salarial que puede ser atribuida a situaciones que están fuera del control de los individuos y aquella que puede ser atribuida a decisiones conscientes. Mediante micro simulaciones se determinó que sería posible reducir la desigualdad hasta en un 21% si se brinda a las personas similares oportunidades de realizar esfuerzos para la mejora de sus ingresos laborales.

Keywords: Inequality, Quality of Life, Labor Income, Micro simulations.
Palabras Clave: Desigualdad, Calidad de Vida, Ingresos Laborales, Micro simulaciones.

1. INTRODUCTION

1.1 Bolivia's lifetime inequality

In spite of the great social and economic progress that Bolivia has experienced during the last decade, structural inequalities and social exclusion persist. This inequality limits the country's potential of fostering human and productive development, which according to the United Nations Development Program [1],[2] not only leads to a reduction of the rate of skills formation useful for the job market, as well as choices and freedoms, but it may also affect negatively individual psychological well-being and trigger social unrest.

Entering the domain of the labor market, poor employment conditions are evidence of supply and demand imbalances. To illustrate this statement, let us mention that it is possible to find potentially high productive workers with high educational background that do not meet the requirements for different jobs, probably because of a stagnant modernization of the productive matrix due to lack of investment in technological innovation according to globalization trends and consistent features of the labor supply. In a developing economy as Bolivia, highly skilled workers may end up working in the informal labor market, which covers about 71% of it [3]); increasing invisible unemployment statistics or deepening international migration [4], [5].

In 2011 Bolivia's Ministry of Labor established the General Directorate of Employment which offers employment support programs, providing and developing training services, intermediation, job orientation, and skills certification to enhance people's employability and access to formal work sources [6].

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However in terms of competitiveness, the country has underperformed with respect to the average of the region. Fifteen problematic factors for doing business were identified by the World Bank and the World Economic Forum, pinpointing to restrictive labor regulations as the second most important factor [7]. Among these regulations, some major deficiencies were found concerning tax payment on work incentives, the ability of the State to attract talent and hiring-firing practices. These weaknesses also tarnish the business climate and evidence inequality of opportunity **(IOp)** issues in the workforce creating disparities between individuals to get jobs or to undertake independent productive projects.

In relation to these issues, Bolivia's central government conceives its development vision on the proposal of "Vivir Bien" (Ministerio de Economía y Finanzas Públicas [8]) which aims at accounting for different aspects of prosper and peaceful interactions amongst citizens as well between citizens and nature. Even if Vivir Bien is clearly a holistic concept, most research on inequality of wellbeing are merely concerned with economic inequality results and effects, presenting a degree of limitation at only explaining its causes.

In this sense, it is important to identify the variables that generate IOp to improve the target of public policies, facilitating the understanding of better results in this significant matter and building sustainable economic development from inside out. Hence the proposal of this research relies on taking up John Roemer's theory on Equality of Opportunities to make a shift on the measurement methodology and adapting it to available data in Bolivia. In such a way, evidence found between different types of efforts will relate to the relevance that IOp have with labor informality.

The next section of this paper presents the theoretical baselines of Equality of Opportunity theory and its empirical approach. Section 3 describes the data set and methodology, section 4 presents the econometric estimations and its results. Finally, section 5 summarizes simulation results, and section 6 concludes.

2. INEQUALITY OF OPPORTUNITY FRAMEWORK

2.1. Theoretical Baselines

Given the contribution of John Rawls' Difference Principle [9], the analysis of equality of opportunity took greater body by John Roemer's ethical premise; which explains that a person is not responsible for his "starting point" in life, this is defined by his circumstances, which are determined by a degree of luck/birth lottery; but is responsible for the range of the distribution of exerted effort by other individuals who share their baseline characteristics, which are the same "type". Efforts, conceived as willingly taken decisions, generate "primes" that allow an additional allocation of resources to his enforcer; compensating him for his disadvantaged circumstances. Therefore the greater the effort, the greater the compensation to the individual's starting point [10], [11]. Circumstances can be generationally transmitted by parents, influencing the individuals' biological, physical, geographic, cultural, social, and economic features; and in less magnitude, it may influence the formation of individuals' preferences and family aspirations [12]. Most of efforts essentially correspond to human capital accumulation, job training, decisions regarding the change of economic activity or occupation, residence, or efforts in the current occupation [13].

The Mincer Equation, proposed by Jacob Mincer in 1974, analyses the structure and inequalities of labor incomes [14]. This equation is usually applied to studies focused on the estimation of returns to quality of education, measuring the impact of work experience in the wage gap between men and women, and as a basis for further economic returns of education in developing countries [15]. The simplest form of the equation is comprised by an individual's income, determined by the level of acquired education, age, and labor experience. An extended version introduces not only labor supply, but also labor demand characteristics.

2.2. Empirical Literature

Much of the literature on this subject is quite contemporary. Most studies addressing IOp take an approach on income distribution from an educational scope and also relate with a matter of social mobility. However, they all lead to similar qualitative conclusions. For instance, leading ways for measuring dynamics and results proposed by Bourgignon et al. estimated that inequality can be diminished in a 15-20% in developing countries [16]. These studies show that the effect of circumstances on individuals' income level amounts to 60%, while the remaining 40% was explained by efforts. This latter variable was approximated by the number of years of schooling [17]. Other papers from different authors presented similar results [13], [14], [18] , [19].

Cogneau and Gignoux study used similar data, related to public policies on education, also demonstrating logical results on inequality as Ferreira and Gignoux [20]. And Nuñez and Tartarowsky study which measured economic inequality of opportunities also identified common variables that classified relegated groups in society as Ferreira *et al.* [21].

3. METHODOLOGY

3.1. Data Set

Data comes from the Encuesta de Hogares 2012 (Household Survey), which is collected annually by Bolivia's Census Bureau, Instituto Nacional de Estadística (INE). The sampling conducted is probabilistic, stratified, and by conglomerates; in the urban case, it is a two-stage sampling and rural, three-stage. Each layer obtains an independent and representative sample. These data comprises 31.900 individuals coming from 8.415 households.

3.2. Variables

All variables are indicators of circumstances and efforts that influence the degree to which individuals are confronted to IOP by imposition of the economic environment, besides of conscious and voluntary decisions taken to modify certain circumstances faced [10]. These are classified among individual, household and contextual level variables.

Individual variables such as age, education, and work experience are important determinants of levels of labor income that individuals receive during their economically active life from the basic formulation of the Mincer equation, since it is considered that the marginal increase of these variables are investment behavior in human capital for higher earnings [22]. Gender and relationship status variables arise from the sexual division of labor and decisions imparted between household heads on labor insertion [23]. Likewise, human capital is generally represented by levels of education, usually defining a return rate on labor income, and therefore the costs of human capital formation generate a division of labor in which individuals insert into different types of economic activity (Becker G. [24]).

Household head and size variables are also related to what was previously described. These are indicators of labor mobility and intergenerational poverty. However, whereas the cost of investment in human capital becomes more expensive, the amount of investment decreases; likewise when families have many children, the amount of investment also diminishes for each child (Corak M. [26]).

Contextual variables like contributions to pension funds and health insurance coverage are mostly related to direct control over workers' rights and social protection specifications originally established by the General Labor Law (Presidencia del Estado Plurinacional de Bolivia [27]), which establishes these variables as indicators of working conditions, classifying the possible employment status of workers, between a formal or informal source. Variables related to the area of residence, the type of economic activity and firm size complement the above-mentioned determinants of earnings from the perspective of the demand-side in the labor market (Heckman J. et al. [15]), because such variables equally approximate quality of employment and can determine if an internal segmentation in the country's labor market involve a greater or lesser remuneration (Doeringer P. and Piore M. [28]).

Variables such as the type of contract, registration of the firm's legal personality and again the firm size influence in determining whether the entity that employs the individual meets the legal rights framework on employment and operates in an formal economy (ILO [29,30]). It's generally said that people get into the informal economic sector because participation costs are lower, either by a minor amount of income taxation or other social benefit discounts. Often the breach of labor regulations is associated to both social benefits and other labor rights; like the payment frequency and employment stability. Informality also involves performing unpaid domestic labor, working overtime, and lack the fixation of wage related to the minimum wage in agreement to the work to be done (ILO [31,32]).

3.3. Efforts Measurement

Efforts aren't directly observable, and can only be partially observed by some indicators. This suggests multivariate analysis techniques for the construction multidimensional indices that allow measuring latent concepts. Therefore the explanation of observable elements from unobserved latent factors can be addressed through a confirmatory factor analysis (Krishnakumar J. and Nagar A. [36]).

A factor analysis is a statistical instrument that removes redundancy or duplication of a set of correlated observable indicators that are caused by common factors and analyzes the variances of the first through a linear relationship of continuous variables represented in the following equation:

$$Y_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + \varepsilon_i \quad \forall i = 1 \dots n$$

Where Y_i is an observable indicator of effort, β's are the loadings of every unobservable element symbolized as $F_{1;2}$, that is conceived as a latent dimension of effort and ε_i is the classical error term in an attempt to grasp a causal relation. Let us note that if the observable indicators were discrete, the above equation can be represented in non-linear form, evoking probabilistic models.

The variance analysis is composed by the communality and specific variance. The communality represents the sum of sensitivities of latent factors trying to explain Y_i; while the specific variance cannot be accounted by latent factors. Both elements constitute loading coefficients to explain the relationship among latent factors in order to identify effort dimensions.

However this statistical method involves countless combinations of unobservable elements (effort dimensions and loading coefficients); solutions to the problem of minimizing the influence of specific factors in the modeling are invariant to rotations of the coefficient matrix load. Hence it's common to employ the varimax rotation, which consists of the maximization of each loading´s charge in each factor model equations. This operation facilitates one simpler interpretation of efforts (Tryfos P. [34]) and constructs an index which summarizes the implication of the observable features for every individual in the study sample.

3.4. Determinants of IOP

The econometric modelling is conducted in two stages, building on Heckman's two stage procedure, which is commonly used in this type of empirical research (Wooldridge J. [35]): The first stage consists of the estimation of a discrete choice model conceptually grounded on an extension of the Mincer equation to analyze the determinants of decision to participate in the Bolivian labor market, in order to account for self-selection into the workers sample [35]. Results of this first estimation are then used in the second stage in order to avoid selection bias; this stage consists of a classical econometric multivariate regression also grounded on an extension of the Mincer equation. One key feature of our econometric strategy is the fact the second stage includes measures of efforts (treated as latent variables) allowing the application of Roemer's theory at full scope.

4. ESTIMATION RESULTS

4.1. Efforts Index

Table 1 shows that the loadings of the years of education and the main occupation of the individual are explained by one common factor, different from the one that explains weekly working hours and the importance of labor income in the total household income.

Thus, we would like to interpret that the factor that explains the years of education and the individual's main occupation is an "Academic Effort", and the factor that explains the weekly working hours and the percentage of labor income in the total household income is a "Physical Effort." In other words, we argue that the fact of having more years of education and a more stable and higher value-added primary occupation is both indicators of higher academic effort. Furthermore, more weekly work hours and a higher percentage of labor income in relation to total household income are considered indicators of greater physical effort.

TABLE 1 - ROTATED LOADINGS AND UNIQUE VARIATIONS

Variables	Academic Effort	Physical Effort	Uniqueness
Years of education	0.8489	-	0.2763
Main occupation	0.8498	-	0.2768
Weekly working hours	-	0.7965	0.3542
Percentage of labor income over household income	-	0.7802	0.3714

Source: Own.
Note: This table only shows loading coefficients larger than 0.7.

4.2. Determinants of Inequality of Opportunity

The first model explains the decision to enter or not to the labor market; its overall rate of positive predictive value is estimated to be 97.05%. The results of the variables of the model are shown in Table 2. and it is important to consider the influence of labor informality in the interpretation of the model because of the high incidence of informality in the Bolivian labor market (Rojas B. [36]). The marginal increase of age has a positive impact in the labor market participation. Individuals who are men are more likely to enter the market compared to women, as are also married people in and in-cohabiting. Relationship status and gender variable suit to the theory of costs of reproduction and sexual division of labor (Becker G. [24]). Individuals who acquired a level of incomplete primary education are more likely to work in the market, in counterpart individuals who graduate from high school have higher reservation utility; this may be due to the large proportion of jobs that are characterized by poor working conditions. Early entries into the labor market may also result from various reasons that cause school dropouts, as the absence of fulfilling household

needs; consequently influenced by Becker's theory, which explains that once both parents are working, and still can't satisfy the household needs, then children are the following agents to enter the labor market. The same can occur in the case of indigenous people, due to a negative reservation utility that give them a greater flexibility to accept a lower human quality work.

Regarding the above, individuals who are trilingual are more reluctant to entry an informal labor market; due to their human capital investment, their reservation utility will be greater and so the resistance to accept a job that may involve invisible unemployment. In this sense, the Bolivian case notes that more educated people tend to be less likely to enter the informal labor market, because these individuals have higher preferences, expecting to find a job where they can be fully employed, in order to play their full knowledge and receive fair remuneration to the activities undertaken (Becker G. [22]).

In exchange, individuals' predisposition living in urban areas tends to be negative in comparison to rural residents. The market incorporation of these rural residents living in developing countries is often positively correlated to low household income, because families use productive inputs they naturally have access to, therefore traditional activities related to land working are usually performed as a means of subsistence (Blanco M. and Jiménez D. [37], FAO, ILO, and ECLAC [38]).

TABLE 2 - MODEL RESULTS TO DETERMINANTS OF LABOR MARKET PARTICIPATION

Number of observations	12832
LR chi2(11)	363.63
Prob > chi2	0
Pseudo R2	0.1067

Worker	**Coefficient**
Individual	
Age	0.0073***
Man	0.1563***
Married	0.2655***
Cohabitant	0.3817***
Incomplete primary education	0.2498***
Complete secondary education	0.1924***
Ethnicity	0.2656***
Trilingual	-0.3092***
Household	
Household head	0.3648***
Context	
Urban area	-0.2188***
Contributions to pension funds	0.4441***
_constant	1.2098***

Note: *** p-value <0.001
Source: Own.

Let us recall that the model for analyzing determinants of labor incomes, is corrected for selection bias, as shown in Table 3. Our results present a goodness of fitness of 0.4305 which is similar to other labor market studies in Bolivia, like the one presented by Muriel [39] for which case makes a distinction between dependent and self-employed workers. Classic theory explaining labor income relates fully to the conditions of dependent workers. However, human capital characteristics are very weak determinants for both types of workers, mainly because of the amount of self-employed workers inserted in informal markets.

Analyzing the variables of the model, the marginal rise of age increases workers' income in 3.13%. If these workers are men, it's likely that their income is 21.60% higher than that of women, which suggest that Becker's theory is true in terms of the reproduction costs that limit women's employment, or as mentioned in Muriel's research, it may be because of different labor costs, or potential discrimination.

In relation to labor division theory (Becker G. [24]), relationship status also affect the acquisition of incomes, cohabitants often get 10% more income than single, married and separated individuals; divorced people typically

receive 19% more income because they tend to resume or improve their human capital formation due to their change of relationship status. Finally widowed people tend to receive 11.49% less than they used to earn in more productive stages in their careers.

The variable of ethnicity shows that labor discrimination negatively affects the income of these people on a 49.27% compared to non-indigenous individuals.

TABLE 3 - MODEL RESULTS TO LABOR INCOMES DETERMINANTS

Number of observations	12334
F (22, 12311)	423.07
Prob>F	0
R-squared	0.4305
Adj R-squared	0.4295
Root MSE	0.82517

Labor income	**Coefficient**
Individual	
Age	0.0313***
Man	0.2160***
Cohabitant	0.1001***
Divorced	0.1935***
Widowed	-0.1149***
Ethnicity	-0.4927***
Work experience yield	-0.0004***
Academic effort	0.1348***
Physical effort	0.3799***
Bilingual	0.0714***
Household	
Household size	0.0621***
Context	
Urban area	0.3629***
Economic activity	0.0137***
Large firm	0.2676***
Firm without tax identification	-0.0586***
Firm in general tax regime	0.1258***
No working contract	-0.2448***
Temporary contract	-0.1063***
Contributions to pension funds	0.1170***
Medical insurance	0.0607***
Job searching migration	0.2105***
Inverse Mills ratio	-0.6942***
_constant	6.1387***

Note: *** p-value < 0.001
Source: Own.

Diminishing returns from work experience indeed have a negative effect on earnings, and as individuals age and leave their most productive stage, the marginal increase of age allows the individuals' earnings to shrink by 0.037%.

Academic efforts increase earnings by 13.48%, as education years increase marginally and occupation rises of scale in quality and stability. Compared to Muriel's study, variables related to human capital formation do present interesting coefficients explaining the acquisition of incomes. This phenomenon is mainly because the sample is mostly composed of self-employed workers, besides the data used is from 2004, and the average study years of the Bolivian population was significantly lower than in 2012 (ECLAC [40]). However, addressing occupation quality, Muriel provides a coherent analysis indicating an important influence of labor demand characteristics that affect the acquisition and work performance of different occupations.

Complementing, physical efforts provide a 38% increase of income. Therefore people, who share very similar circumstances to other workers, acquire higher incomes if they work more hours a week and if their labor incomes are more important to compose their total household income.

The fact of being bilingual facilitates income acquisition in 7.14%, compared to other individuals who only speak their native language.

Regarding household characteristics, augmenting a household member, encourages its head to get a job that yields a 6.21% more income, to meet family needs.

Furthermore, living in urban areas increases labor incomes in 36.27% compared to rural areas; as more productive and higher value-added activities take place there.

Consequently economic activities, like in Muriel's study, when individuals get into activities with different production processes, market power, higher quality and stability, incomes improve by 1.37%. When they work in large firms, individuals usually earn 26.76% more than in a smaller firm.

When a working contract isn't signed, individuals typically receive 24.46% less income than people who did. If a temporary working contract was signed, individuals likewise receive 10.64% minus income than individuals who signed a permanent contract.

In terms of labor formality and social security, individuals who work in legal firms, contributing regularly to pension funds, gain 11.70% more than those who don't. Workers affiliated to a health insurance, gain 6.07% more income than uninsured.

Finally job searching migrants, tend to have higher incomes by 21.05%; compared to those who didn't decide to migrate for this reason.

5. MICRO SIMULATIONS

The empirical literature presented tends to propose the equalization of circumstance variables for all individuals in the sample, attempting to gauge the portion of income inequality that can be considered as unfair. In contrast, our simulations present different scenarios combining academic and physical efforts, because the circumstantial heterogeneity is an inherent fact of human nature, while quantifying inequality introducing effort variables is a contribution to the related academic literature.

The measurement of inequality in the distribution of earnings uses the Gini coefficient. For this study, Bolivian labor market inequality is characterized by having a mean coefficient of 0.3664.

All simulations are depicted by two-way scatter plots, which compared the original distribution of labor incomes with the proposed scenarios. The vertical axis of the scatter plot represents the quartiles of workers and the horizontal axis the amount of their labor incomes depicted on a logarithmic scale. Simulations are performed by classifying the study sample into quartiles. Each quartile conglomerates 25% of the workers' sample, ordering them according the acquisition of their income from low to high; being the first quartile 25% the poorest, and the fourth quartile richest. The lower limit of effort relative to each quartile presents the average effort at its level, and simulates the same level of effort for all workers sample, along with all the values individually estimated for the rest of the variables set in the labor income econometric model.

In other words, if a level of effort is simulated to 25%, this implies that workers earning less than the first quartile as they fail to generate the effort. However, the workers of the second, third and fourth quartile, with higher incomes, the remaining 75% of the workers with higher incomes will be able to exert it. Similarly, if a certain type of effort is simulated to 99%, it means that only 1% of workers with the highest earnings can perform the effort.

Additionally, simulations are divided by two types of scenarios; one of them is related to one effort at a time (or unique efforts) and the other one combines both types of efforts. Unique efforts simulations only consider the variations of a single type of effort (academic or physical) at different levels, while the production of any other type of effort does not arise; i.e. a simulation is performed on academic efforts without any physical effort and vice versa, presenting the effort type variations previously treated as null. Eight scenarios were proposed for this type of simulations: Academic efforts at 25%, 50%, 75% and 99%, giving physical efforts a value of 0, and vice versa.

Combined efforts use academic efforts as a reference, setting the level of academic efforts and performing quartile combinations at all levels for physical efforts. 16 scenarios were proposed for this type of simulation: Academic efforts at 25% while combining with physical efforts at 25%, 50%, 75% and 99%. Repeating this procedure by only changing

the fixed level of academic effort at 50%, then at 75%, and finally at 99%. Simulations affirm the hypothesis that the behavior of inequality decreases as efforts increase or combine.

The results of the micro simulations are shown in Figure 1. When one type of effort is made, inequality reduction reaches a Gini coefficient of 0.33; equivalent to a decrease of 7.7% for academic efforts and 8.7% for physical efforts. In the case of the combination of academic and physical efforts, a decrease of almost 21.10% is evident; implying a decrease in the Gini coefficient equal to 0.289. Given the results of individual efforts simulations, the average academic efforts, mostly reduces inequality. This logical effect is related to workforce mobility; since this production factor has non-perfect mobility due to physical, skills training, and human capital barriers (Texeira P. [41]). Moreover, jobs characteristics divide internally the labor market, centralizing demand as determinant of working conditions, stability, and prospect of working upward mobility (Thurow L. [42]). This segmentation can be explained by the type of technology used and in other cases, by labor discrimination issues (Doeringer P. and Piore M. [28]).

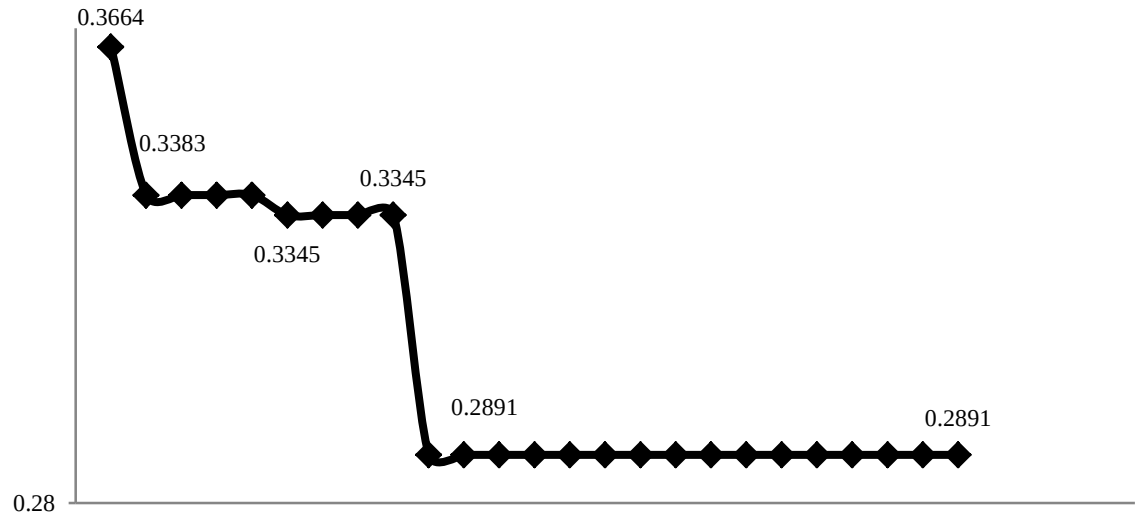

Figure 1 - GINI coefficient evolution to the proposed scenarios.
Source: Own.

Whereas more physical efforts are made, the lower the Gini coefficient. Because the more working overtime and insertion in jobs relevant to sustain the household needs, can be explained by Becker and Murphy's theory of rational addiction. Where addictions are rational in the sense of involving utility maximization, based on the individual's future stable preferences. For this, the addiction good is work, purchasing more consumption that creates greater capacity to satisfy household needs.

Simulations relating both types of efforts, identified various combinations that reduced inequality the most. It appears that these different combinations meet the different yields on work productivity and different preference sets in relation to prospects on life quality styles, based on Roemer's ethical premise [10]. For example, the Bolivian wage average for private institutions in the year 2012 is of 3278 Bs. [3], for which the wage average for men is 3975 Bs. and for women is 2386 Bs., illustrating a wage gap of 40%. In order for a woman to gain as much as a man, she would have to at least exert the same kind of academic efforts as the poorest 25% and the physical efforts of the richest 1% of the Bolivian working population.

6. CONCLUSIONS

This research lays foundations for addressing the public policies challenge of determining appropriate mechanisms to attack and reduce IOp in Bolivia. By identifying the variables that cause such socioeconomic inequality at workplaces, the government guideline may re-focus the development concept and aim to redistribute wealth more fairly.

Some essential participation determinants of the labor market are largely related to Becker's theory on sexual division of labor, reservation utility, and education levels. In addition, among determinants of incomes, variables such as area of residence, job searching migration, ethnicity and gender are obviously striking. It is also found that physical efforts, in greater extent than academic, accurately reflect the predominance of the requirements imposed by labor market demand and the high degree of informality affecting the decisions of workers and their quality of life.

The reduction of inequality obtained by simulations on efforts fluctuates from 7% to 21%, similar to that achieved in most of empirical studies. The results highlight the existence of different mechanisms to quantify the unequal

distribution of income and to effectively reduce IOp among individuals; while also confirming market imperfections' effect and Roemer's premise, transcending quality of life.

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