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Distributional and welfare effects of replacing monetary benefits with Universal Basic Income in Spain

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Abstract

This papers quantifies the redistributive effects on progressivity, poverty and welfare, that would occur if the monetary benefits currently in place in the Spanish system were to be replaced by a neutral alternative in terms of spending, granting a universal basic income (UBI) to everyone. We have calculated two scenarios: one in which the benefit system is replaced by a basic income, and another in which retirement pensions are maintained, with the rest of monetary benefits being distributed via a UBI. The simulations are carried out using EUROMOD. The implementation of a UBI, even a very radical one that eliminates the existing benefits system, could be: economically sustainable; as redistributive as the current one; almost as poverty reducing as the one in force (or more in some dimensions), and a generator of greater welfare.

JEL: C60, D31, D63, H20, H24, I3

Keywords: basic income, redistribution, inequality, progressivity, poverty, welfare, microsimulation, EUROMOD

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1. Introduction

The discussion regarding the desirability of the implementation of a universal basic income (hereinafter UBI), is often established on the basis of a certain unawareness of its operation and its potential effects. Determining the suitability of an UBI scheme, is not an easy task. It depends to a great extent on how it is implemented, and there are many parameters to be decided upon, both in terms of loss, profit or budget neutrality. Also, whether differentiations exist or not among the group of beneficiaries, the percentage of benefits that would be replaced or maintained, as well as how the received income is to be taxed. On the other hand, the effects of a measure that has consequences both on the immediate distribution of income, as well as on future distribution due to changes in the economic behaviour of recipients, must be limited in the analysis.

The scope and objective of this work involves analysing the redistributive effects of the tax-benefit system in place in Spain and in alternative scenarios, where all monetary benefits are replaced by a basic income in a cost neutral way. To do that three scenarios are analysed: the baseline reference (2015 benefit system), the UBI scenario (the replacement of all monetary benefits with the payment of a UBI of €294.31 per month) and the UBIP scenario (the replacement of all monetary benefits except the retirement pensions with the payment of a UBI of €78.25per month). Obviously, the UBI that can be paid if all monetary benefits are eliminated is greater than that if retirement benefits were maintained. Changes in subsequent employment decisions, as well as changes in tax revenue due to income taxation, are not considered to determine the initial revenue neutrality in which the amount of non-paid monetary benefits is distributed equally.

This simple modification would generate many changes in the distribution of income, and the objective is to evaluate the short-term distributive effects. It is therefore a matter of answering the question: what would the immediate change in the distribution of income be, if all monetary benefits were shared-out equally to everyone? This scenario could be considered as a reference upon which to establish additional changes and nuances, in order to make it a more realistic and applicable reform.

The work is organized into six sections. Section two presents the potential effects that an introduction of UBI could generate, in addition to changes in the distribution of income and their consequences in terms of poverty or welfare. In the third section, the background of the UBI is presented. The fourth section describes the data and the microsimulation methodology used. The fifth, shows the bulk of the results obtained which in turn, is organized into five sub-sections: the first presents the redistributive analysis, the second the effects on progressivity, the third on poverty, the fourth is dedicated to winners and losers, and the fifth concerns welfare analysis. The final section presents the conclusions.

2. Some additional effects to the distributive ones generated by basic income

The fact that the discussion about the UBI arouses so much controversy is a result of the multiple potential effects that it may cause. In this section, we present some consequences that could be generated in addition to those related to the change in income distribution due to the implementation of a UBI.

The first issue is the budgetary cost and its possible sustainability. To be able to affirm that a UBI is sustainable or not, it is necessary to know the scenario in which it is implemented. It is often asserted that the UBI is not sustainable, because there are no resources that maintain a salary paid to everyone for doing nothing. This is only true if the UBI is designed as an additional complement to the protection policy through money transfers that already exist. It is not possible to maintain the current public spending policy and also pay a UBI to everyone, but it is possible to substitute part of the expense for a measure such as the UBI, even without any collection cost. However, the scenarios must be clarified before discussing them and any scenario is, in principle, feasible, at least as a theoretical scenario upon which to base discussion. The possibilities of combining a basic income with the replacement of part of the expenditure are practically endless, and substitutions can be designed to maintain the difference between expenditure and collection, as well as to overcome the minuend over the subtrahend or *vice versa*, leading to net losses in budgetary terms in the first case, and gains in the second.

In line with the budgetary cost linked to alternative UBI designs, we must bear in mind that it is possible to envisage savings in management costs due to the simplicity linked to the UBI. This simplicity lies in treating the entire population in a uniform way, or at most, considering age differences. Since this is a universal measure, the control of beneficiaries is greatly simplified, generating consequent savings in management and supervision of the application of monetary benefits, based on compliance with certain requirements.

Another issue subject to debate is the influence that the UBI payment could have upon the female work force. It is well known that most part-time work is carried out by women, that a wage gap exists to the detriment of female employees, and that the distribution of domestic chores is unbalanced, with women taking on most of the tasks. Some feminist groups fear that a UBI would increase the vulnerability of women if they chose to dedicate themselves to motherhood and caring for the home if the UBI were a disincentive for paid work. This view however, ignores the fact that women also have incentives for personal and professional fulfilment, or that a guaranteed income could increase the entrepreneurial spirit that would be of lower risk in this context.

But women are not the only group whose employment decisions could be affected. The general population is the group that must be taken into account for the study of potential changes on the job market, both in terms of participation and hours offered. On many occasions, the discussion and consideration of a UBI comes from the need to provide a livelihood in a scenario that is no longer one of disincentive for workers regarding job offers, but rather a destruction of it as a consequence of digital disruption. The development of robotics and artificial intelligence increasingly threatens further, the survival of jobs and

professions. According to Benedikt and Osborne (2013), 47% of the US work force could be threatened, while the percentage is even higher in countries such as Argentina (65%), India (69%) and China (77%), according to the World Bank.

Faced with a scenario in which the job market itself will expel a high percentage of workers, the potential disincentive to work generated by a universal basic income would compensate the situation by reconciling the hopes and needs of job providers and job seekers. In any case, to date, studies on the effects that the UBI could generate on employment are inconclusive, since the actions put into practice, cannot be generalized.

The “invitation effect” to other countries in worse economic circumstances, is introduced as another element to be considered when discussing the convenience of introducing the UBI. Many are the voices that proclaim that the establishment of an unconditional income for all citizens (including immigrants) would generate a considerable attraction effect, especially on the assumption that economic reasons are a decisive element in migratory decision-making, just as established in the neoclassical model. Against this argument Boso and Vancea (2011) believe that *"Even if, for a moment, we accept the neoclassical thesis about migration processes, following its logic, the mere existence of economic disparities between different areas already generates flows of people who migrate. Then, the weight of introducing a basic income in a rich country on the decision of a person from a poor country to emigrate must, at least, be questioned."* In order to determine the importance of the invitation effect, the design of the UBI must take into account whether it should be established for all residents, or if a criterion of prior residence in the country is required to be able to receive it.

When considering the movements of people generated by the existence of a UBI, the "invitation effect" is often presented exclusively outside the country’s borders. We must take into account the potential movements that could occur within borders. In the same way that large cities have generated an attractive effect for rural areas due to economic and employment opportunities and, in general, the enjoyment of a better standard of living, movement can take place in an inverse manner. If the population obtains an income that is sufficient for them to live on and provides them with greater purchasing capacity in a rural area, without the need for employment options offered by a large city, then life in rural areas becomes advantageous in comparative terms.

An effect that must not be overlooked is how the receipt of an unconditional income may affect the training decisions made by young people who have not yet finished their training, and may decide to abandon their studies due to a short-term vision of what is better for them. In this sense, the same argument mentioned previously can be applied in terms of a disincentive to work: if income is provided unconditionally, it should be seen as an addition to what can be earned through work and should not be understood as a substitute but instead, as a complement. However, the risk of decision-making among young people who choose not to study or work does exist, and the scope of these effects will depend both on the maturity and sense of responsibility. It will also depend on participation and rewards options consistent with training on the job market and finally, on the awareness of the convenience of training based on the economic, social and personal benefit seen in the environment, together with the cost of continued training.

The fact that a UBI is stipulated on an individual basis, regardless of the job situation or other conditions, and the type household to which each individual belongs, provides greater freedom for the individual in making economic and non-economic decisions.

There are other potential advantages related to the benefit of a UBI that are not easily quantifiable, but which may be indicated in qualitative reports. For example, the tranquillity that a secure income provides, the possibility of undertaking economic activities with an assured income, more time to devote to the family, and in general, a greater enjoyment of leisure time, not because of the amount time available (which could be less if a person works more hours than before), but for the quality of that time. As regards the choice of job, an increase in the welfare of recipients is also possible, compared to scenarios where the receipt of unemployment benefits is conditioned to accepting job offers that do not provide job satisfaction. Another aspect is that a guaranteed unconditional income could end crime originated by need, as well as indigence, which would generate profits not only to direct recipients, but also have a positive effect upon society as a whole.

There are also other potential negative effects that are evident in the opinions expressed by certain participants in forums and debates. The most recurrent is the lack of acceptance of the idea of having the right to collect an income without being conditioned to earn it. An idea often expressed, is the link between the potential disincentive upon effort, risk assumption, and the incentive to use resources "incorrectly" for the purchase of harmful substances such as alcohol and drugs.

The debate on basic income is evidently very subjective with many areas to be analysed. Its suitability cannot be affirmed or denied without having the opinion supported by an analysis of the multiple potential effects that its implementation could cause, and the modification of these effects depending on how it is designed.

The following section offers a brief summary of the background of the UBI idea, together with some examples of its application presented in a permanent or experimental way.

3. Background of Basic Income

The discussion about UBI as we conceive it now, has been brewing since the Renaissance. Luis Vives wrote that even if a person has led a resolute life and squandered a fortune, we should not let anyone die of hunger. The ideas of Luis Vives inspired actions and thoughts aimed at alleviating poverty. Montesquieu in "The Spirit of the Laws of 1748", declares that "*The State must provide its citizens with a safe subsistence, food, adequate clothing, and a way of life that does not harm their health.*" The social protection systems for health and old age not directed at the poor, which began with Bismarck in 1883, seeded grants given generally and not to the population without resources. However, the first formulation of payment of an unconditional income was established by Joseph Charlier (1848) in his book: *Solution du problème social ou constitution humanitaire*. Although inspired by the tradition of Fourier, the fundamental difference is that it no proof was required to receive it because it proposed to pay all citizens a quarterly or monthly income. John Stuart Mill (1884), re-thinks the payment of a basic income to all citizens regardless of whether they work or not: *"in the distribution, a certain minimum is*

first assigned to the subsistence of every member of the community, whether capable or not of labour ". In later periods, the proposal made by the Nobel Prize winner Meade in 1935 can be cited, with its social dividend. Friedman (1962) suggests a radical simplification of the tax and transfers system through linear negative tax on income. Although the philosophy behind the application is different because we are talking about a tax-deducted income, it is however, a precursor to the discussions of our century. During the 1970's, the debate moved from the USA to Europe, specifically to Denmark, the Netherlands, the United Kingdom, Germany and France.

In addition to theoretical reflections regarding the UBI and its precedents, tracing the practical experiences of its implementation is also interesting. Alaska is the first example. In 1976 it established a payment to citizens from oil profits (the Alaska Permanent Fund) based on length of residence. In 1982, it was reformed and a constant annual amount is paid to any resident. The dividend was originally set at $300, but currently exceeds $2,000.

During the same decade in Manitoba, Canada, an experiment was carried out between 1974 and 1979, which secured a basic annual income, thereby completely eliminating poverty. The programme was called "Mincome" (minimum income). The project was created to evaluate whether giving cheques to the poorest workers would discourage work, and this was not the case, although the results of the researchers were never published.

The Finnish Government carried out a two-year experiment (2017-2018), in which a group of 2,000 unemployed people aged between 25 and 58 received a guaranteed basic income of €560 per month for two years, not subject to tax. The experiment was designed so that no participant loses. The basic income was paid in lieu of unemployment benefit, but it not withdrawn if the beneficiary started to work. The intention was to verify the incentive to work that it generated. The Finnish experiment has been praised for constituting a social experiment in a country that has one of the highest levels of welfare and spending in the world, but it has also been accused of some defects. First of all, the number of participants is actually a fifth of the number originally thought to be adequate. Therefore, the validity of the results is reduced. Also, it is not a universal income, but instead, an unconditional income initially granted to unemployed individuals. At the moment, the participants have stated that they are less stressed and have better motivation.

The Canadian province of Ontario began a pilot project with similar characteristics in June 2017. The study group will receive a basic income for three years, and the control group will not receive the income, but instead will collaborate in the study via different aspects to be evaluated such as food, mental and physical health, stress and anxiety, use of health services, stability at home, education and training, employment and job participation. Participants are selected randomly between the ages of 18 and 64, and if they have lived in the selected regions of Hamilton, Brantford, Brant County and Thunder Bay, for 12 months or more. The participants must be on a low income (less than $34,000 for singles and $48,000 for couples.) The amounts received will vary between up to $16,989 per person (or $24,027 per couple), less 50% of their income earned, and people with disabilities will also receive $500 per month. The participants can continue to work, but will lose half of every dollar they earn.

In Scotland, another experiment was designed and initially expected to begin in 2017, involving the provision of unconditional income.

The Dutch city of Utrecht has been carrying out another experiment since the beginning of 2017. In their case, 250 citizens on unemployment benefit receive a guaranteed monthly income of €960 without any obligation to work. Six different groups are included in the Utrecht experiment, called the "Weten Wat Werkt." They receive different compensations depending upon certain conditions. In addition to the aforementioned group, other participants receive an additional €150 if they do voluntary work involving the maintenance of school playgrounds. Other groups have the option of volunteering, receiving the money at the beginning of the month, and returning it if they have not opted for the job. The goal is to motivate people to see how they react.

In October 2016, a programme was launched in a small town in western Kenya, which later spread to other towns, sponsored by "Give Directly", a non-profit organization. The aim was to determine the effects on the incentive to work after the provision of an income. At the moment, the results are qualitative and seem to indicate that beneficiaries neither want to stop working nor increase their alcohol consumption. The programme has 95 participants who receive $22 a month to save or spend on whatever they like. In this context, $22 is a considerable sum of money, since 45% of the town's residents say this is the largest amount of money they have ever counted upon, given that many people live on less than 75 cents a day. The experiment will be extended to other villages, and will be maintained for 12 years.

4. Data and Microsimulation Methodology

For this work, we have used the EU-SILC database up to year 2015, adapted to the EUROMOD format, and version H0.21+ of the model. EUROMOD is the only tax-benefit micro-simulator that covers all European Union countries. More information about the model could be found in Sutherland and Figari (2013). Its main distinguishing feature is that it covers all European countries within the same framework, which in principle, allows flexibility in the analysis and comparison of results. It calculates the taxes of individuals and households, as well as the right to receive benefits according to the benefit and tax policy rules of each Member State. It can be used to assess the effects of fiscal policies and benefits on total expenditure and public revenue, income inequality, poverty and social exclusion, so that it can measure the cost of the hypothetical reforms, analyse the distributive effects, the number of beneficiaries, the winners and losers, and other consequences that public management must know.

EUROMOD is a static micro-simulation model, in the sense that the calculations of benefits and taxes are arithmetic and the socio-demographic characteristics are not modified. This does not mean that a behavioural component cannot be included. Like most static tax-benefit micro-simulators, EUROMOD combines the characteristics of benefits and taxes of each Member State with a micro-data base that stores information about individuals and households, to produce amongst other calculations, the disposable income of the household.

EUROMOD uses the EU-SILC as the input database for most countries. Some of them use the version published by Eurostat and others, their own national versions. These surveys are transformed into a homogeneous format and structure based on internal processes.

5. Description and Results of Simulated Scenarios

A UBI simulation scenario can be designed based on the desired objective; for example, the fight against poverty. A UBI equal to the poverty line can then be established. However, this strategy can lead to excessive and unaffordable budgetary costs, which is why we have chosen an alternative design with the aim of replacing current economic benefits, and calculating the amount of basic income that could be paid without increasing the net budgetary cost. This scenario generates a new taxable income in which UBI takes part, having some consequences in terms of PIT collection, which coincidentally, would represent the same value as the reference situation. Given that our goal is none other than to offer a benchmark for comparisons, it seems to be valid because it is not a question of simulating a reform envisaged to be potentially implemented in the short term. Since the elimination of the monetary benefits system would imply a very important loss for the group of retirees who have acquired their pension rights throughout their lives and have planned according to these, we propose another alternative scenario where retirement pensions remain unchanged but the remaining benefits are modified. This scenario implies having a much smaller pool of resources to be distributed via a UBI, since the bulk of monetary benefits correspond to pensions.

When discussing the suitability of the UBI, it is sometimes argued that "giving a UBI to the rich and the poor is unfair". What is fair or not, is based on a subjective criterion. Hence the empirical analysis to determine whether it has contributed or not to a more or less equal distribution, tends to use indices based on the dispersion of the distribution, such as the Gini index. Using a statistical index of these characteristics, providing a constant quantity to everyone does not make the distribution more unequal; instead, quite the opposite. If a UBI is handed out, the inequality in income after receiving the UBI will always be lower than before receiving it, just as the inequality will decrease the more the larger the UBI is. Consider that the same amount represents proportionally less, the higher the level of income received, so this transfer is progressive. At most, if the importance of the UBI made the starting income irrelevant, then everyone would have the same and inequality would be zero. The catch to this reasoning is that nothing is said about how resources are obtained to grant an increasingly larger and more redistributive UBI: if the resources to finance it are detracted in a non-progressive/redistributive way, the final effect will be a worsened distribution. Talking now in terms of efficiency rather than equity, a different thing would be if we consider it optimal to distribute an unconditional income. This policy is often criticized for the potential disincentive and envious effects that can be felt by those who work, compared to those receiving income without effort. As mentioned at the beginning, the aim of this work is not to position itself either for or against the UBI.

5.1. Distributional effects of the tax and transfer system

The scenario, to which the simulation of two basic income alternatives is compared, is the income distribution observed for Spain in 2015 on the basis of EU-SILC. The application of monetary benefits and current income tax regulations in that year are also considered. For the creation of the simulated scenarios (indicated by UBI when all monetary benefits are replaced by a basic income, or UBIP when retirement pensions are maintained and other monetary benefits are replaced), the value of all monetary benefits is calculated, or all monetary benefits except retirement pensions, and divided in equal parts for all, regardless of age, income or any condition of need other than income. Although such distribution would not generate costs in budgetary terms through expenditure, the requirement of the same PIT structure for a different taxable income distribution would result in a variation of the total PIT revenue.

The amounts of total benefits, revenue and disposable income for the two simulated and reference scenarios (elevated at the population level), are presented in table 1.

Although the extent of the benefits granted in aggregate terms is the same as in the baseline scenario and the two simulations, the total revenue decreases by 3.56% in the scenario in which retirement pensions are eliminated (BI), and rises by 1.81% when these are maintained (BPI). This has an effect upon disposable income, which increases by 0.51% in the first case, and decreases by 0.26% in the second. The changes in aggregate scales seems to not be economically significant.

The application of the current tax-benefit structure to the reference scenario and the two simulations, generates different effects on inequality and redistribution. The Gini index of the gross income is obtained in order to compare the effects, before the application of monetary benefits and PIT, which is the same in all scenarios, as well as of the net income, which is the result of adding the monetary benefits and subtracting the income tax and social contributions from the previous gross income. One should be aware that the joint action of the tax-benefit system makes the aggregate disposable income higher than the original income, since the total amount of benefits distributed exceeds the value of the tax revenue. This means that the "effective average rate" of the policy of imposing and paying benefits to families is negative, since a subsidy is granted on average.

Table 1. Monthly value in € of different magnitudes in the reference scenario (2015) and simulated scenarios (UBI and UBIP)

	Revenue		Benefits		Disposable income	
	Total	**Variation**	**Total**	**Variation**	**Total**	**Variation**
2015	5,697,542,365		13,496,711,317		39,748,562,580	
UBI	5,494,977,119	-3.56%	13,496,432,813	0.00%	39,951,260,238	0.51%
UBIP	5,800,663,795	1.81%	13,497,289,305	0.00%	39,645,566,058	-0.26%

The difference between the Gini indices of the original income and the net income, gives us the Reynolds-Smolensky index, which indicates the redistributive effect achieved. This effect can be decomposed into a combination that depends upon the effective average rate and the

Kakwani index of progressivity, from which the purely restructuring effect is discounted. We also refer to the Kakwani index in the following section to analyse the progressivity of each scenario.

The redistributive effects achieved in the reference situation and the simulated scenarios are shown in table 2 in global terms and table 3 separates the effect due to benefits and the effect due to taxation.

The application of any of the tax and benefit policies leads to a significant decrease in inequality, which is around 0.18 or 0.19 points. The most redistributive policy is the one that existed in 2015, followed by the application of a UBI eliminating retirement pensions, and lastly, the application of a UBI that keeps retirement pensions in force. Despite the radical change in structure that is being analysed, the redistributive effects imply small differences.

To know to what extent the application of benefits and taxes has contributed to the redistributive effect, the Reynolds-Smolensky indices are calculated separately. Table 3 highlights two important conclusions. Firstly, the effects of the application of the same tax structure but with very different benefit systems from those in force in 2015, do not give rise to large differences in the distributional results. Secondly, the real contribution to redistribution occurs through transfers, and not tax payments.

Table 2. Inequality of the original income (Gini) and disposable income (original income plus benefits less PIT and SSCC). Redistributive effect of the total application of the tax-benefit system (Reynolds-Smolensky).

	Baseline 2015	**Simulation UBI**	**Simulation UBIP**
Gini original income	0.5323	0.5323	0.5323
Gini disposable income	0.3370	0.3420	0.3491
RS Taxes and benefits	0.1953	0.1903	0.1831

Table 3. Redistributive effect (Reynolds-Smolensky) of benefits, taxes, and both together.

RS of benefits (only benefits compared to original income)			
	Baseline 2015	Simulation UBI	Simulation UBIP
Gini income plus benefits	0.3793	0.3888	0.3909
Gini original income	0.5323	0.5323	0.5323
RS Benefits	0.1530	0.1434	0.1414
RS of taxes (only PIT and contributions compared to income plus benefits)			
	Baseline 2015	Simulation UBI	Simulation UBIP
Gini income plus benefits	0.3793	0.3888	0.3909
Gini disposable income	0.3370	0.3420	0.3491
RS of taxes	0.0423	0.0468	0.0417
Sum of RS. Total effect	0.1953	0.1903	0.1831

The payment of taxes contributes to the decrease of inequality by around 0.04 points. This can be more when a basic income without retirement pensions is applied (UBI 0.046882). When following the 2015 reference structure, it equates to 0.042301, and lastly, the application of a UBIP, in other words, maintaining retirement pensions, equates to 0.041761. Remember that here, the tax structure is the same in all cases, but it is applied to income with different benefits, because although the amount of benefits distributed is the same, each scenario implies a different distribution at a micro level.

On the other hand, the receipt of benefits results in an income that is more equally distributed, as can be deduced from the RS indices obtained of more than 0.14 points. The payment of benefits that achieves the greatest redistribution is the system in place in 2015 (0.153034), followed by the UBI scenario (0.143482), and finally the UBIP scenario (0.141426). However, the differences are very small despite the radical change that is being simulated. In terms of relative weight, the differences are not large either. The percentage of the global RS due to taxes is between 22 to 25%, whilst the percentage due to transfers of between 75 to 78%, represent one quarter and three quarters of taxes and transfers respectively, in the explanation of the redistributive effect. The weight percentages in the explanation of the RS obtained in each scenario, are as follows:

Table 4. Contribution of taxes and transfers to the total redistributive effect

% of RS explained by:	2015	UBI	UBIP
Taxes	22%	25%	23%
Benefits	78%	75%	77%
	100%	**100%**	**100%**

5.2. Effects on progressivity.

The effects on progressivity determine the final effects in terms of redistribution. In order to understand the redistributive results presented in the previous section better, the Kakwani indices achieved by the payment of benefits in 2015 and their monetary equivalent, have been calculated based upon whether a basic income was granted with or without the maintenance of retirement pensions, as well as the PIT and the social contributions paid in each of the scenarios, assuming no changes to the corresponding regulations.

One must be aware that the redistribution value measured by the Reynolds-Smolensky index (RS) can also be obtained from the expression:

$$RS = \frac{t}{(1-t)} \cdot K - R \qquad (1)$$

Where *t* is the effective average type, *K* is the Kakwani progressivity index, and *R* represents the re-rank effect.

Since the rates of progressivity and redistribution have been calculated on equivalent income, the interpretation of effective average rates is not directly the percentage of income that has been given or removed via benefits or taxes by the tax system. Effective average rates are only positive when considering the isolated effect of the payment of PIT, but since the monetary

benefits are greater than the collection, we are considering subsidy as the final effect; in other words, the average rate of tax and benefits is negative.

In table 5 we present the values of the Reynolds-Smolensky index, the Kakwani index, the effective average rate and re-ranking for each scenario with UBI application, taking into account both transfers and taxes jointly, or as individual components.

The information contained in table 5 summarizes all the effects that are achieved through the payment of PIT and social contributions (SSCC), as well as the collection of benefits both in the reference situation and the simulated ones. In addition, the effects are analysed both separately and jointly. The RS row shows the same results as those already acquired in the previous section, which can be obtained from the difference between the Gini indexes (as was carried out), or from considering the progressivity effect, conveniently weighted by the average type and corrected for the realignment effect.

Table 5. Redistributive effect (RS), progressivity (K), effective average rate (t) and re-ranking (R) achieved by the application of benefits and income tax separately and/or jointly, both in the reference and simulated situations.

	Benefits			**PIT and SSCC**			**Total effect**		
	2015	**UBI**	**UBIP**	**2015**	**UBI**	**UBIP**	**2015**	**UBI**	**UBIP**
K	-0.8536	-0.5116	-0.7863	0.2110	0.2418	0.2047	-2.5858	-1.3691	-2.4037
t	-0.3515	-0.3954	-0.3542	0.1725	0.1653	0.1741	-0.1184	-0.1647	-0.1185
R	0.0690	0.0015	0.0642	0.0017	0.0010	0.0014	0.0784	0.0032	0.0714
RS	0.1530	0.1435	0.1414	0.0423	0.0469	0.0418	0.1953	0.1904	0.1832

The mere consideration of the RS index, leads us to conclude that both the receipt of 2015 benefits, as well as the two basic income alternatives, are redistributive in the expected sense, achieving an RS of 0.1530 in the reference situation; 0.1435 with the payment of a UBI, and 0.1414 with the UBIP that maintains retirement pensions. These small differences between the simulated and reference scenarios in the redistributive effect hide large differences that occur *en route* to obtaining the final result. The payment of benefits in the reference scenario leads to a very large progressive effect, which is due to the fact that the monetary transfers are distributed more disproportionately to lower income units than what happens with the payment of a basic income. This is reflected in the value obtained from the Kakwani index, which is -0.8536 in 2015, compared to -0.5116 with a UBI or -0.7863 with a UBIP. In all cases, the value is negative, indicating that proportionally, more benefits are received in cases of low income. This regressivity in the distribution of monetary benefits actually means progressivity, because it is a benefit with a negative effective rate instead of a positive one. With such a different change in terms of progressivity, one would not expect a very even redistributive effect, taking into account that the real effective rate of the benefits (and not that of

equivalent income), is the same in all scenarios, since a neutral reform has been designed in terms of benefit expenditure.

Only one component is left to explain why such a different progression leads to a similar redistributive effect, and this is the correction due to the re-ranking effect. If anonymity is considered as a desirable principle, then what is really important is the change in the distribution of income, and not who holds each place. However, as in 2015, the payment of benefits generates a huge realignment effect, compared to the two scenarios in which a UBI was granted. This explains why a similar redistributive effect is finally achieved: the realignment effect in the reference situation is practically 50 times more than that achieved with a UBI.

A system like the one in force in 2015, grants benefits for attributes other than income and for which the receiving units have different needs. This means that by aligning the units from lowest income to highest, and checking their income plus benefits, there will be significant leaps, since the monetary benefits will alter the alignment of the income plus the benefits, with respect to the original situation.

Nevertheless, the payment of a basic income means that all incomes have to be moved constantly and therefore it is easier to leave the initial alignment unchanged. Even in the UBI scenario there is a certain re-ranking, both when considering benefits (0.0015) as well as taking into account the tax and benefits system (0.0032), since the redistributive analysis is based on income equivalents and not on individuals. The UBIP scenario gives rise to re-ranking values always below those in the 2015 system. However, they are much closer than those obtained with the UBI, since the maintenance of the pension system greatly affects the final result. In order to compare the magnitude of the effects in the reference situation in relation to the simulated ones, the ratios of the values in table 5 have been calculated in table 6.

Table 6. Comparison by ratio of the effects achieved in the simulated scenarios (BI and BPI) with respect to the reference scenario (2015).

	Benefits			PIT			Total effect		
	2015	UBI	UBIP	2015	UBI	UBIP	2015	UBI	UBIP
K	100%	60%	92%	100%	115%	97%	100%	53%	93%
t	100%	112%	101%	100%	96%	101%	100%	139%	100%
R	100%	2%	93%	100%	60%	83%	100%	4%	91%
RS	100%	94%	92%	100%	111%	99%	100%	97%	94%

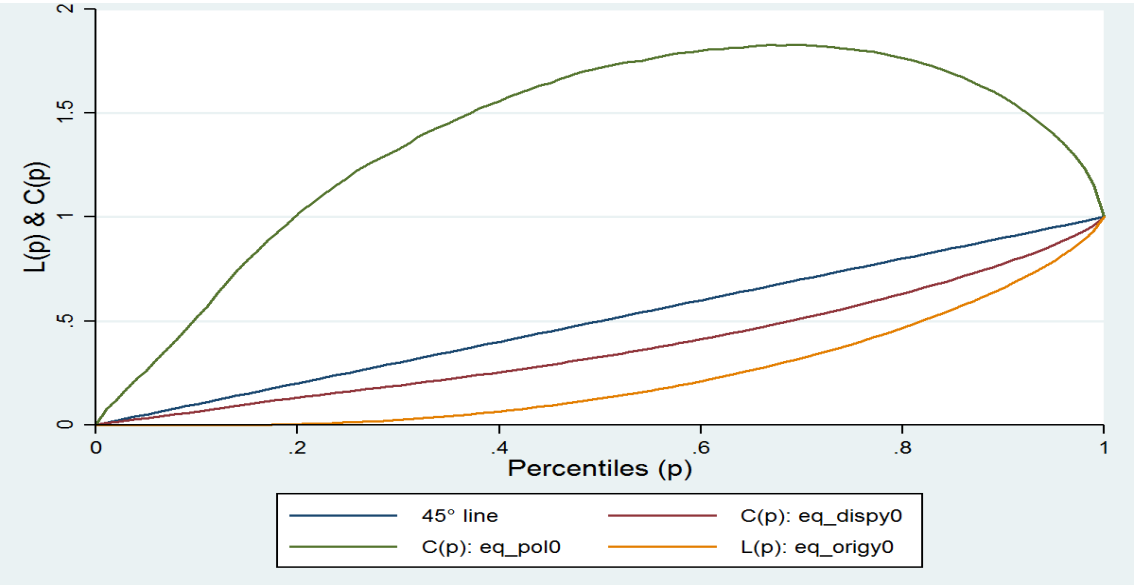
If we summarize the importance of the effects, we can say that:

- The total redistributive effect is very similar in all the scenarios analysed, with the reference situation being the most redistributive, whilst the application of the UBI achieves 97% of the redistribution of the reference scenario, and the UBIP, 94%.

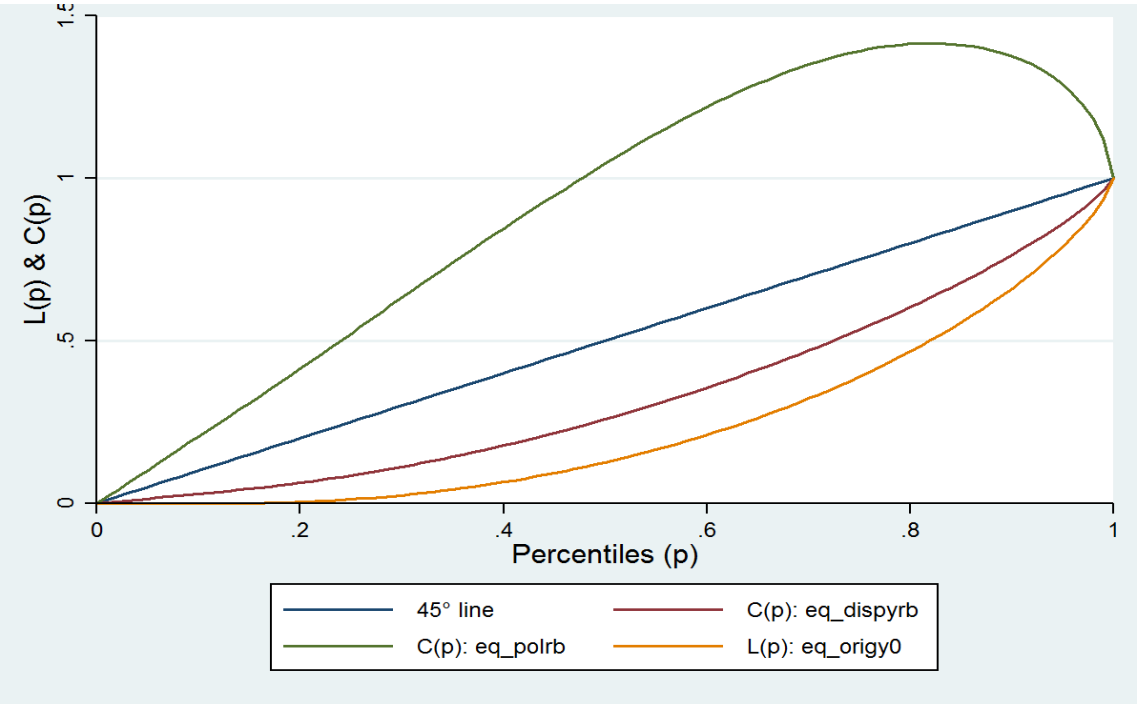
- The effects on progressivity are similar in the reference scenario and the UBIP, but they differ considerably when compared to the UBI. The progressivity achieved by the payment of benefits, that's to say, the payment of the UBI eliminating retirement pensions, is only 60% of that achieved in the reference scenario, resulting in a total progressivity of only 53% of that achieved in 2015.
- Another significant difference occurs when comparing the re-ranking effect in the different scenarios, where once again the reference of 2015 and UBIP are more alike, but still very different from the UBI: the re-ranking produced with UBI is 50 times smaller than that given in 2015.
- The conjugation of the separate effects gives a final result of fairly similar redistribution, but the application of the UBI is much less progressive and generates much less re-ranking than the 2015 scenario.

The graphical representation of the Lorenz curves of the gross income (yellow line), the concentration of the policy (green line) - taking into account benefits and taxes - and the net income (red line) of applying the policy, illustrate the differences between the three scenarios (Graph 1). The blue line represents the equal distribution. In any one of these scenarios, the concentration curve of the policy (represented in green), is above the diagonal, since the net benefits and taxes are positive, and the policy (tax-benefit) is more unequally distributed together than the original income itself, thereby generating a redistributive effect as expected. This makes the concentration curve of the net income (in red) closer to the diagonal (in blue) than the Lorenz curve of the original rent (in yellow) in any of these cases. The concentration curve of net income includes a re-ranking effect that is not merely redistributive, so it has been subtracted in the calculation of the RS indices.

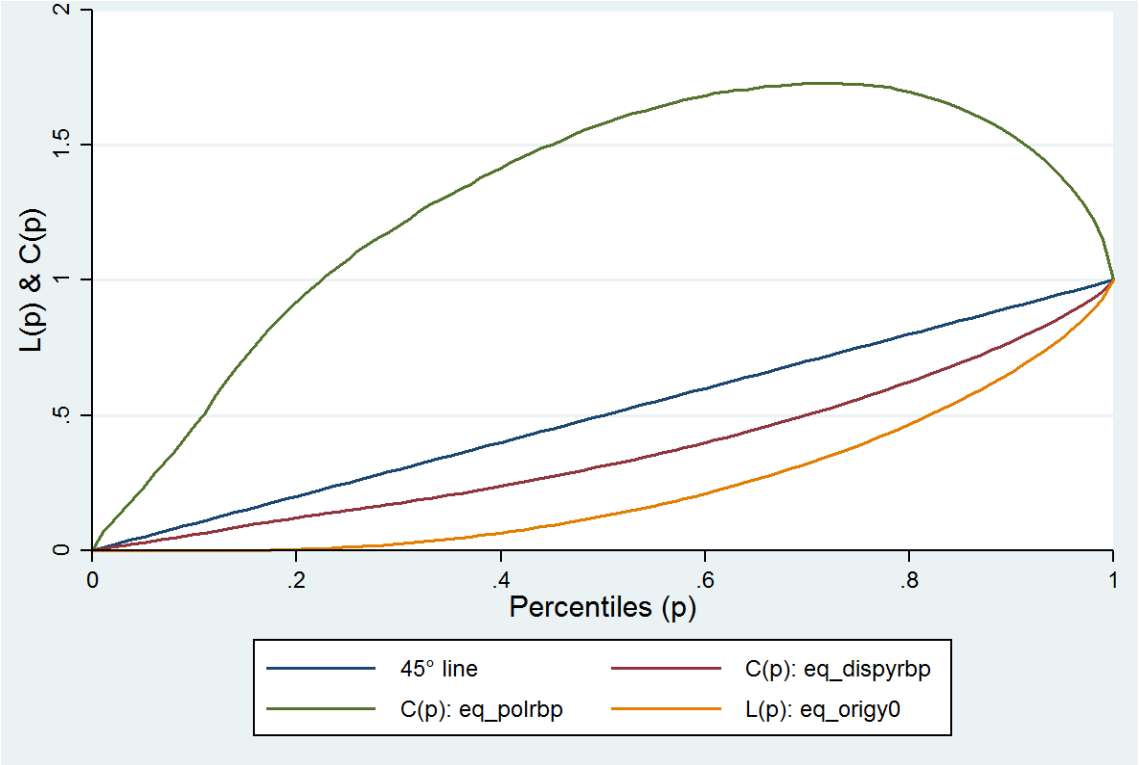
Graph 1. Lorenz curve of the original equivalent income, concentration curve of taxes (ordered by original income) and equivalent transfers in force in 2015, together with the concentration curve of the net equivalent income of the 2015 policy.



Graph 2. Lorenz curve of the equivalent original income, concentration curve of taxes (ordered by original income), and equivalent transfers in force in the UBI scenario, as well as the concentration curve of the equivalent net income of UBI.



Graph 3. Lorenz curve of the equivalent original income, concentration curve of taxes (ordered by original income) and equivalent transfers in force in the UBIP scenario, as well as the concentration curve of the equivalent net income of the UBIP.



5.3. Effects on poverty

To determine the changes that the application of the UBI would generate on poverty, the FGT indices have been calculated with parameters 0, 1 and 2, in order to take into account the three relevant dimensions of poverty: incidence, intensity and inequality among the poor. The poverty line that has been used first is €500 per month (table 7), which represents 60% of the average original income, and secondly, 60% of the average disposable income was taken as a reference to determine the line, which increases the value to €694 per month (table 8).

The exclusive application of the 2015 benefit structure manages to reduce the incidence of poverty more than the application of a basic income where retirement pensions were eliminated. However, the intensity and inequality among the poor are further reduced with the application of the UBI. The scenario in which the retirement pensions were maintained (UBIP) does not surpass the results obtained in the other two scenarios in terms of reduction of poverty in any of its dimensions. If the system as a whole is taken into account (taxes and benefits), the conclusion regarding the exclusive consideration of benefits is repeated: the best scenario in terms of reducing the incidence is 2015, and in terms of intensity and inequality then the UBI. The UBIP was not the best in any of these dimensions.

Table 7. FGT poverty indices with parameters 0, 1 and 2. Poverty line = €500/month, 60% of the original income. Distributions of original income, income with benefits, and net income in the reference and simulated scenarios. Reduction in% with respect to original income.

Poverty line=€500/month	2015	UBI	UBIP
Original income			
FGT(0)	0.361838	-	-
FGT(1)	0.252878	-	-
FGT(2)	0.217855	-	-
Income with benefits			
FGT(0)	0.110 **(69%)**	0.154 (57%)	0.143 (60%)
FGT(1)	0.043 (83%)	0.037 **(85%)**	0.059 (77%)
FGT(2)	0.025 (88%)	0.014 **(93%)**	0.034 (84%)
Net income of benefits and taxes			
FGT(0)	0.128 **(64%)**	0.165 (54%)	0.163 (55%)
FGT(1)	0.005 (79%)	0.040 **(84%)**	0.068 (73%)
FGT(2)	0.031 (86%)	0.015 **(93%)**	0.040 (81%)

Note: The percentage of reduction with respect to its equivalent in the original income experienced in the FGT index is shown in brackets, without the application of any tax benefit policy.

The percentage of poor people calculated on the original income, shifts from 36.2% to 11.1% due to the application of the 2015 system, which means a reduction of 69%. If a UBI were applied, the incidence of poverty would decrease to 15.4% and with a UBIP, to 14.3%. These

decreases represent 57% and 60% respectively, that's to say, a decrease in incidence lower than that achieved following the regulations of the reference scenario. If we focus on the intensity of poverty, we can see how the maximum reduction in FGT (1) is achieved in the UBI scenario, which reduces the index by 85%, two points more than in the reference scenario, and eight points more than if pensions were maintained. The same happens when we consider FGT (2) for the measurement of poverty, which incorporates the dimension of inequality: the UBI scenario achieves a reduction of 93% which is higher than that achieved in the reference scenario (88%) or when maintaining retirement pensions (84%).

The joint consideration of the taxes and benefits system, slightly raises the values of the poverty indices with respect to the exclusive consideration of the receipt of monetary benefits, but maintains the conclusions that have just been exposed. Thus, the operative scheme is the one that reduces the incidence of poverty the most. However, the application of a basic income that replaces all monetary benefits achieves more progress in the reduction of the intensity of poverty and inequality among the poor.

The indexes have also been calculated with a poverty line that takes the disposable income as a reference in the reference scenario 2015. In this case, 60% of the average of disposable income is also taken, amounting to €694 per month. The results are shown in table 8.

Table 8. FGT Poverty indices with parameters 0, 1 and 2. Distribution of original income, income with benefits, and net income in the reference and simulated scenarios. Poverty line = €694/month, 60% of disposable income in 2015.

Poverty line= €694/month	**2015**	**UBI**	**UBIP**
Original income			
FGT(0)	0.442	-	-
FGT(1)	0.294	-	-
FGT(2)	0.245	-	-
Income with benefits			
FGT(0)	0.207 **(53%)**	0.245 (44%)	0.226 (49%)
FGT(1)	0.074 **(75%)**	0.082 (72%)	0.093 (68%)
FGT(2)	0.041 (83%)	0.036 **(85%)**	0.054 (78%)
Net income of benefits and taxes			
FGT(0)	0.233 **(47%)**	0.263 (40%)	0.249 (44%)
FGT(1)	0.087 **(70%)**	0.089 (70%)	0.106 (64%)
FGT(2)	0.049 (80%)	0.040**(84%)**	0.063 (74%)

Note: The percentage of reduction with respect to its equivalent in the original income experienced in the FGT index is shown in brackets, without the application of any tax benefit policy.

By raising the poverty line, the values of the indices grow, and the percentage reductions achieved in the different scenarios decrease. When only benefits, but not taxes, are considered, the 2015 baseline scenario is the one that obtains the greatest reduction in incidence and intensity of poverty (53% and 75% reduction in the FGT (0) and FGT (1) indices respectively).

If inequality is considered via FGT (2), then the application of the UBI scenario is the one that obtains the greatest reduction in the poverty index, being 85%. This same pattern is observed when taxes and benefits are included together, although in this case, reductions in any of the indices are slightly lower than when considering benefits exclusively.

5.4. Winners and losers

The analysis of winners and losers has been carried out individually and is not related to the equivalent income, since the UBI is granted on an individual basis in an intentional way, so as not to condition the performance of the people within the family unit. We have defined winners as those who have a superior individual disposable income (not equivalent), with the application of the UBI or UBIP compared to the one available in 2015.

There are groups which are considered *a priori* winners or losers, and the analysis confirms such forecasts. Having eliminated a benefit system that takes into account personal characteristics such as being unemployed, handicapped, retired, or a survivor of the main contributor to household income, and having distributed the basic income money equally between all citizens without taking into account at all their personal circumstances, it is understandable that losers are located among the former losers of benefits, since the new basic income in general, does not compensate the benefits they received. Remember that the exercise carried out is purely theoretical, with no intention of suggesting that basic income should be implemented. If it were applied, it would be necessary to mainly fight against the rejection of the collectives that, in a contributory or supportive way, have acquired the right to receive a livelihood from the system. In particular, it would be a case of substituting retirement pensions. These represent the greatest amount in payments since they are received by a large and growing group of beneficiaries due to the aging of our country's population. Among the winners were all those under 18 who were not earning any income, since the UBI was designed to be distributed to everyone, regardless of age. In most cases, this group passes from having no income at all, to receiving a UBI.

First, we show the resulting number of winners and losers, the percentage that each group represents in the population as a whole, as well as the value of the average gain or loss (negative value). The gain or loss has been defined as the difference in disposable income when applying the basic income and disposable income, according to 2015 regulations. In this case, the equivalence scale has not been taken into account either, since the comparison is made individually.

Before analysing winners and losers according to their specific characteristics, we present a total count for each scenario, as well as the average values of gains and losses.

Table 9 shows that in both simulated scenarios, the number of winners far exceeds the number of losers. In the case of UBI, 74% of the population wins and 26% loses, and in the case of UBIP, 80% wins and 20% lose. However, it is not sufficient to count how many people are located in each of the groups, and we must take into account the magnitude of gains and losses. On average, UBI leads to a gain of €4.4. This is the result of obtaining the weighted average according to the number of winners and losers who earn on average €252.1, and lose on average €698.8. Thus, the loss is an average of 2.7 times the magnitude of the gain. In short, there are thrice as many winners as losers, but those who lose, lose three times more than the winners.

Table 9. Number of winners and losers after comparing the simulated scenarios (BI and UBIP) to the reference situation (2015), with the percentage weight and average gain in €/month.

		Losers	Winners	Total
UBI	Average gain	-698.8	252.1	4.4
	N	11.944.499	33.914.277	45.858.776
	%	26%	74%	100%
UBIP	Average gain	-290.7	70.3	-2.3
	N	9.219.977	36.639.293	45.859270
	%	20%	80%	100%

Analysing the second simulated scenario, the UBIP results in 80% of winners who on average, earn €70.3 per month, and 20% of losers who lose an average of €290.7 per month, which is 3.9 times the winnings. The weighting of winners and losers results in an average loss value of €2.3 per month for the total population. In this case, the winners quadruple the losers in number, but the average losses quadruple the average gains in amount.

To explore this result in further depth, we will analyse in the following section, the welfare linked to simulated alternatives with a social welfare function that includes aversion to inequality. Besides knowing the distribution of winners and losers in global terms, it is interesting to analyse it according to different characteristics, as well as to quantify the average values gained and lost. A first analysis is made by deciles of individual income, to check if the gains and losses follow a pattern linked to the level of income, which is presented in tables 10 and 11.

The distribution of winners is practically the same as the average value in the first three deciles (74%). In the fourth to sixth deciles, the percentage of winners is lower than the average, and in deciles 7 to 10, the percentage of winners always exceeds the average. The percentage of losers is complementary by up to 100% with that of winners, since it is higher than the average as regards the intermediate deciles, lower than the average regarding the high deciles, and similar to the average values with respect to the lower deciles.

Table 10. Percentage of winners and losers with respect to the 2015 scenario. Scenario UBI. Average gain and loss in €/month. Deciles of individual income.

Deciles of individual income	**UBI Winners** **%**	**UBI Average gain**	**UBI Losers** **%**	**UBI Average Loss**
1	74%	286	26%	686
2	76%	286	24%	625
3	76%	286	24%	584
4	64%	284	36%	697
5	46%	279	54%	819
6	59%	255	41%	720
7	75%	254	25%	666
8	86%	225	14%	496
9	92%	214	8%	722
10	93%	195	7%	836
Total	*74%*	*252*	*26%*	*699*

Even more interesting than the distribution amongst people who win or lose, is the amount of gains and losses. The average gains per decile are higher in the lowest deciles, ranging between €286 and €195 per month, and therefore the UBI would not go against redistribution. However, the same cannot be said for the average amount of losses, which does not follow a defined pattern. What is important to note though, is that there are deciles such as the fifth, for example, that would have to assume an average monthly loss of €819, or the lowest decile that would lose €686 per month. This implies that a reform of these characteristics would be unaffordable for the losers. This result is of extreme importance, since the global redistributive effects that are very similar to the starting situation, conceal a radical change of situation for an important part of the population.

Table 11 also shows the percentages of winners which are more extreme than in the previous case (80% and 20% respectively), but with a narrower range of variation. When the application of a UBIP scenario is analysed, the average amounts of gains and losses are moderated, since the amount distributed as basic income is also lower (remember: €295/month in the case of UBI and €80/month in the case of UBIP). The gains, which on average are around €70, are decreasing as we consider deciles of higher income. However, the greater losses occur in the first six deciles.

Table 11. Percentage of winners and losers with respect to the 2015 scenario. UBIP scenario. Gain and average loss in €/month. Deciles of individual income.

Deciles of individual income	**UBIP Winners %**	**UBIP Average gain**	**UBIP Losers %**	**UBIP Average Loss**
1	84%	76	16%	353
2	86%	76	14%	329
3	85%	76	15%	294
4	80%	75	20%	328
5	76%	73	24%	334
6	68%	71	32%	309
7	71%	70	29%	272
8	75%	66	25%	186
9	86%	64	14%	272
10	88%	58	12%	254
Total	*80%*	*70*	*20%*	*291*

This way of presenting the results, could mask the situation to which the payment of an individualized income leads. If we rank individuals according to their income, all those who do not obtain any income, even if they live in an economically well-situated home, will be located in the first deciles. Therefore, although our interest is to analyse the effect of the individual UBI and not the equivalent income, we will however calculate deciles of equivalent income, because it is distributed to households according to their true capacity. In this case, the results are different, as shown in table 12, where the percentages of winners and the average gains in each scenario, are analysed.

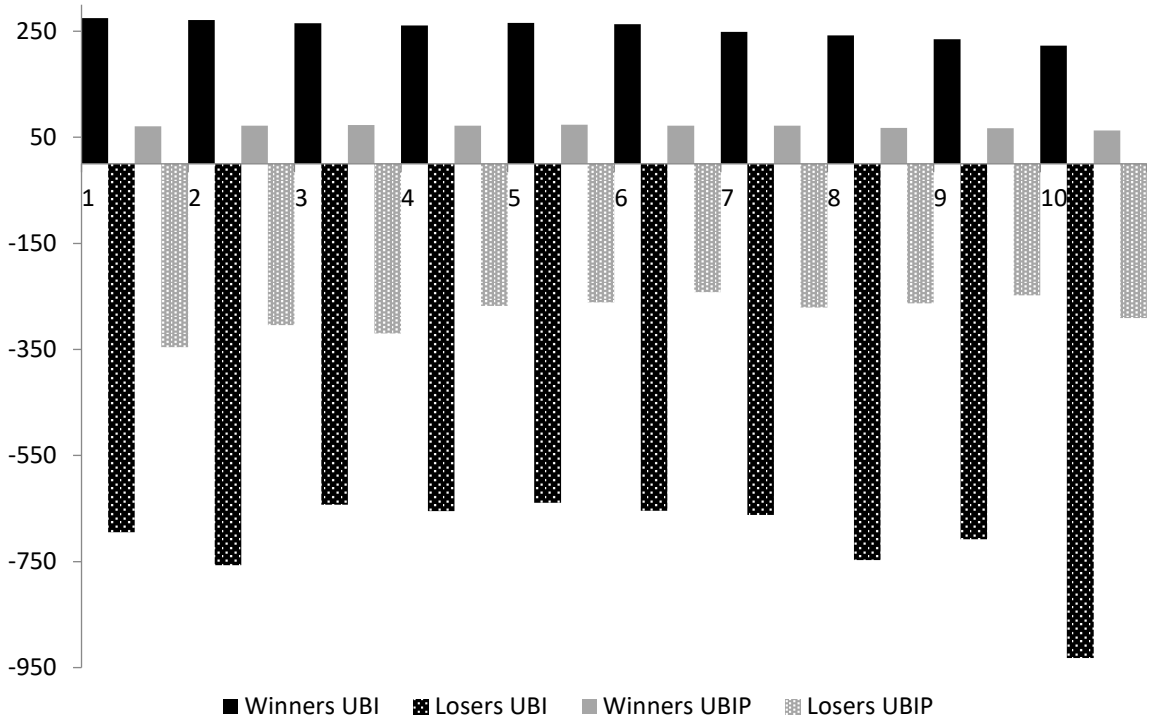
Table 12. Percentage of winners and average gain with respect to the 2015 scenario. UBI and UBIP scenarios. Gain and average loss in €/month. Deciles of equivalent income.

Deciles of equivalent income	**UBI Winners %**	**UBI Average Gain**	**UBIP Winners %**	**UBIP Average Gain**
1	34%	-360	66%	-70
2	44%	-309	72%	-33
3	64%	-57	72%	-37
4	72%	11	76%	-10
5	79%	80	80%	7
6	85%	129	85%	26
7	87%	130	83%	13
8	89%	135	87%	24
9	91%	150	88%	30
10	92%	134	89%	27
Total	*74%*	*4.4*	*80%*	*2.3*

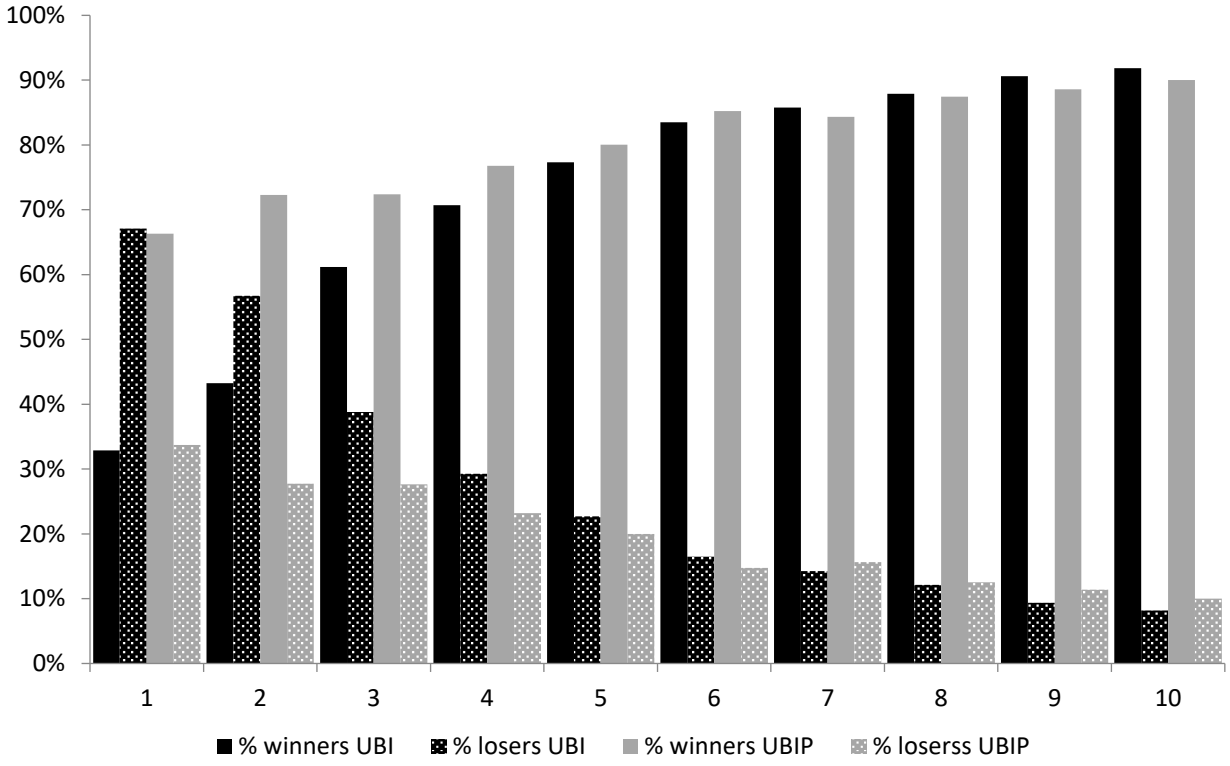
By distributing the deciles according to equivalent income, it can be verified that (although with a much more aggravated effect in BI than in UBIP), the percentage of winners increases as we consider deciles to be better situated in any of the two scenarios. In addition, and on average, the losses occur in the lower income deciles and the gains in the highest income.

To try to offer a more intuitive idea of the distribution of winners and losers, as well as the average amount of profit and loss generated by deciles of equivalent income, the results are presented graphically in graphs 4 and 5.

Graph 4. Average value per decile of equivalent income of the gains and losses with UBI and UBIP.



Graph 5. Percentage of winners and losers per decile of equivalent income with BI and UBIP.



If we take into account people aged 65 or older, the average percentage of global gain that appears in the UBI scenario of 74% translates to only 17% of winners, while 87% of people

aged 65 or more, come out losing. As for the amounts earned on average, an average of €4.4 per month has been calculated for the total population, which becomes €149 if we exclusively consider those under 65, and €-653 among those aged 65 or more (loss). As one can see, the total average values may be masking the situation of certain groups. Since several characteristics are of interest to us, Table 13 shows the average percentage of winners and the value of the average gain in the UBI and UBIP scenarios.

Table 13. Percentage of winners and average gain with respect to the 2015 scenario according to age, pensioners, survivors, the unemployed or disabled. UBI and UBIP scenarios.

		UBI (74% & 4.4)		UBIP (80% & -2.3)	
		%	Gain	%	Gain
<18 years	Yes	99.8%	291	98.9%	76
(18.9%)	No	68%	-62	75%	-20
>=65 years	Yes	17%	-653	74%	-20
(20.1%)	No	87%	149	81%	2
Retirement	Yes	1.5%	-899	75%	-21
(15.2%)	No	86%	148	81%	1
Survival	Yes	52%	-646	69%	-52
(6.3%)	No	78%	45	81%	1
Unemployment	Yes	53%	-87	20%	-271
(11.4%)	No	77%	17	88%	35
Disability	Yes	3.2%	-707	66%	-80
(2.6%)	No	76%	22	80%	-0.3

Note: the first column in parentheses shows the percentage of the population that meets the condition for which it is discriminated.

Table 13 shows that the main losers in the scenarios considered are the retired pensioners in UBI, and the unemployed in UBIP. With respect to winners, in both cases, it is the group of under-18s that represents a greater percentage of winners within the collective and the average amounts of higher earnings. For example, although the average number of winners in the UBI scenario is 74% when considering the entire population, among those under the age of 18, 99.8% of the population win, and the average value gained by this group is €291/month, much more than the total average value calculated at €4.4/month. This same result is maintained in the UBIP scenario, although with a lower average gain, since the amount of the

UBI distributed is also smaller: 98.9% of winners among minors, who on average earn €76/month.

In the case of retirees in the UBI scenario, only 1.5% of this group wins, which implies that 98.5% lose. The average profit of this group is €-899 per month, which indicates that the majority gain is taking place at the expense of a great loss by this minority of retirees, who represent 15.2% of the population.

The recipients of unemployment benefits only win in 20% of the cases in the UBIP scenario, and on average, the unemployed, who represent 11.4% of the population, lose €271 per month. Once again the collective is identified at the expense of which other groups gain.

As a complement to the analysis of winners and losers, two probit models have been developed in which the dichotomous variables explained, are to fulfil the condition of winner in the UBI (winner) or UBIP (winner 2) scenarios. Only dichotomous explanatory variables are used, except for those belonging to the decile that takes ten possible values. A value of 1 is taken when the condition of being a benefits recipient is due to: retirement (retired), survival (survivor), unemployment (unemployed), disability (handicapped) and being under 18 (youth), as well as the income decile to which a person belongs (decile varying from 1 to 10).

Table 14. Probit regression (UBI scenario)

Winner	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Retired	-3935.881***	.0504643	-77.99	0.000	-403.479	-3.836.973
Survivor	-3254.163***	.0547823	-59.40	0.000	-3.361.534	-3.146.792
Unemployed	-1860.371***	.0303091	-61.38	0.000	-1.919.776	-1.800.966
Handicapped	-3598.266***	.0867532	-41.48	0.000	-37.683	-3.428.233
Decile	.0687793***	.0054201	12.69	0.000	.0581561	.0794025
Youth	1887.381***	.1817866	10.38	0.000	1.531.086	2.243.676
_cons	1523.935***	.0397432	38.34	0.000	144.604	160.183
Log likelihood = -5047.4379 Number of obs = 32301						
LR chi2(6) = 28022.05 Prob> chi2 = 0.0000						
Pseudo R2 = 0,7352						

Note: *** represents statistical significance at 1% confidence level.

All the regressors are extremely statistically significant, and having the status of “recipient” of any monetary benefit decreases the probability of being considered a winner, especially when talking about retirees. On the contrary, an increased decile, or being under 18, increases the probability of being a winner when the UBI is applied.

When the UBI replaces all economic benefits except retirement pensions, the previous results are similar, but in this case however, being a recipient of unemployment benefit is what decreases the probability of being a winner the most, and the marked significance can be seen in the following results:

Table 15. Probit regression (UBIP scenario)

Winner	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Retired	-.4413993***	.0504643	-77.99	0.000	-403.479	-3.836.973
Survivor	-.5804556***	.0547823	-59.40	0.000	-3.361.534	-3.146.792
Unemployed	-2.086347***	.0303091	-61.38	0.000	-1.919.776	-1.800.966
Handicapped	-.5855769***	.0867532	-41.48	0.000	-37.683	-3.428.233
Decile	.0361164***	.0054201	12.69	0.000	.0581561	.0794025
Youth	1.152369***	.1817866	10.38	0.000	1.531.086	2.243.676
_cons	1.038545***	.0397432	38.34	0.000	144.604	160.183
Log likelihood = -11146.758				Number of obs = 32301		
LR chi2(6) = 9773.39				Prob> chi2 = 0.0000		
Pseudo R2 = 0,3048						

Note: *** represents statistical significance at 1% confidence level.

The analysis using probit models, confirms that retirees are the main losers in the two scenarios considered, when all monetary benefits are substituted and the recipients of unemployment benefits, if retirement pensions are maintained.

Two linear regression models have also been used to explain the amount of the gains based on the same variables that were used for the probit models, but with the substitution of the qualitative variable containing the decile (decile) for the amount of the initial income (ils_origy0). The results obtained indicate that the amount of earnings follows the same explanatory pattern as the winner, being retired in the UBI model and receiving unemployment benefits in the UBIP model.

Table 16. Linear regression (UBI scenario)

Winner	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Retired	-1080.599***	5.611787	-192.56	0.000	-1091.598	-1069.6
Survivor	-524.4155 ***	7.893537	-66.44	0.000	-539.8871	-508.9438
Unemployed	-292.715***	6.163678	-47.49	0.000	-304.7961	-280.634
Handicapped	-894.7723***	11.84322	-75.55	0.000	-917.9855	-871.5592
ils_origy0	-.0142984***	.0015085	-9.48	0.000	-.0172551	-.0113417
Youth	53.17013***	5.38017	9.88	0.000	42.62479	63.71546
_cons	239.6147***	3.250263	73.72	0.000	233.2441	245.9854
Number of obs = 32301						
Prob> F = 0.0000						
Adj R2 = 0,6261						

Note: *** represents statistical significance at 1% confidence level.

Table 17. Linear regression (UBIP scenario)

Winner	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Retired	-54.80357***	3.418833	-16.03	0.000	-61.50461	-48.10253
Survivor	-80.01482***	4.808929	-16.64	0.000	-89.4405	-70.58914
Unemployed	-321.0604***	3.755058	-85.50	0.000	-328.4204	-313.7003
Handicapped	-100.992***	7.215171	-14.00	0.000	-115.1341	-86.85014
ils_origy0	-.0025152***	.000919	-2.74	0.006	-.0043165	-.0007139
Youth	27.52299***	3.277726	8.40	0.000	21.09852	33.94746
_cons	48.38236***	1.980137	24.43	0.000	44.50121	52.2635
Number of obs = 32301						
Prob> F = 0.0000						
Adj R2 = 0.2104						

Note: *** represents statistical significance at 1% confidence level.

5.5. Effects on welfare

The two UBI scenarios analysed lead to a great change in the distribution of income, especially in groups determined by the characteristic of being a recipient of a monetary benefit (which is negatively correlated but not determined exclusively by the level of income). At the same time, the redistribution indices do not show radical changes between the application of the tax-benefit system of 2015, and the two simulated cases of a UBI. For this reason, and in order to analyse the results in greater depth, welfare is measured in this section.

The application of the UBI has proven to generate a profit for the majority at the expense of smaller groups. Therefore, using social welfare functions that present an aversion to inequality, welfare will be calculated in the different scenarios and for different groups. In addition, the Atkinson indices of gross and different net income will be obtained to verify the contribution to the improvement in welfare in each scenario.

The first calculation made, is the obtaining of social welfare as an arithmetic mean of the utility of the individual income (not equivalent). The utility function used to introduce aversion to inequality is the square root of income, so the *W* (social welfare) from each *i* (income) considered up to *N*, can be written as:

$$W = \frac{\sum_{i=1}^{N} \sqrt{x_i}}{N} \qquad [2]$$

The following table shows the value of welfare for the total population or, for each of the selected subgroups, according to whether they receive a retirement pension, unemployment benefit, disability allowance or survival benefit.

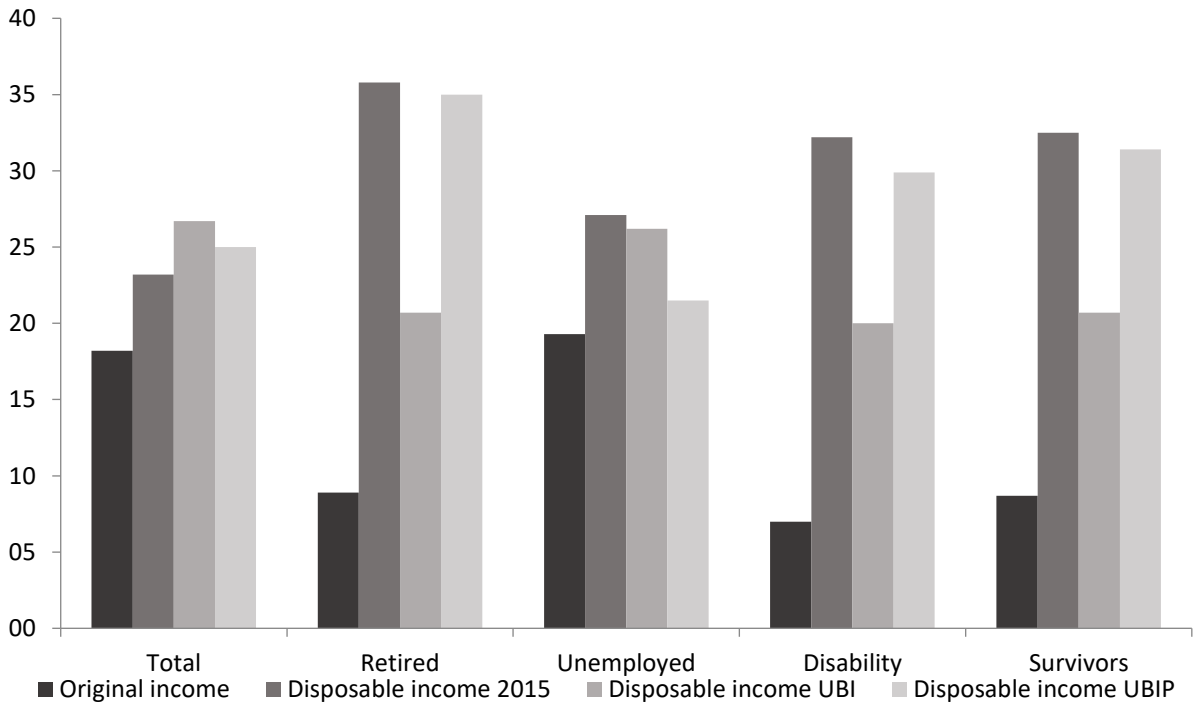
Table 18. Value of welfare calculated using [1] for the total population and different sub-group recipients of different monetary benefits.

Welfare	Total	Retired	Unemployed	Disability	Survivors
Original income	18.2	8.9	19.3	7.0	8.7
Disposable income 2015	23.2	35.8	27.1	32.2	32.5
Disposable incomeBI	26.7	20.7	26.2	20.0	20.7
Disposable incomeUBIP	25.0	35.0	21.5	29.9	31.4

The differences between the total population, and the subgroups of recipients of different monetary benefits, can be appreciated more clearly in the graph 6.

A conclusion pertaining to any of the groups considered regarding how it contributes to a change in welfare, is that the application of the tax-benefit system, be it the one in force in 2015 or any of the simulated UBI alternatives, always increases welfare. However, for the whole collective, welfare achieved after applying the UBI is maximum, followed by the application of the UBIP and thirdly, the 2015 reference. For the groups that received monetary benefits however, the application of the 2015 regulations always generates more welfare than any of the UBI options.

Graph 6. Value of welfare calculated using [1] for the total population and different sub-groups according to the receipt of different monetary benefits.

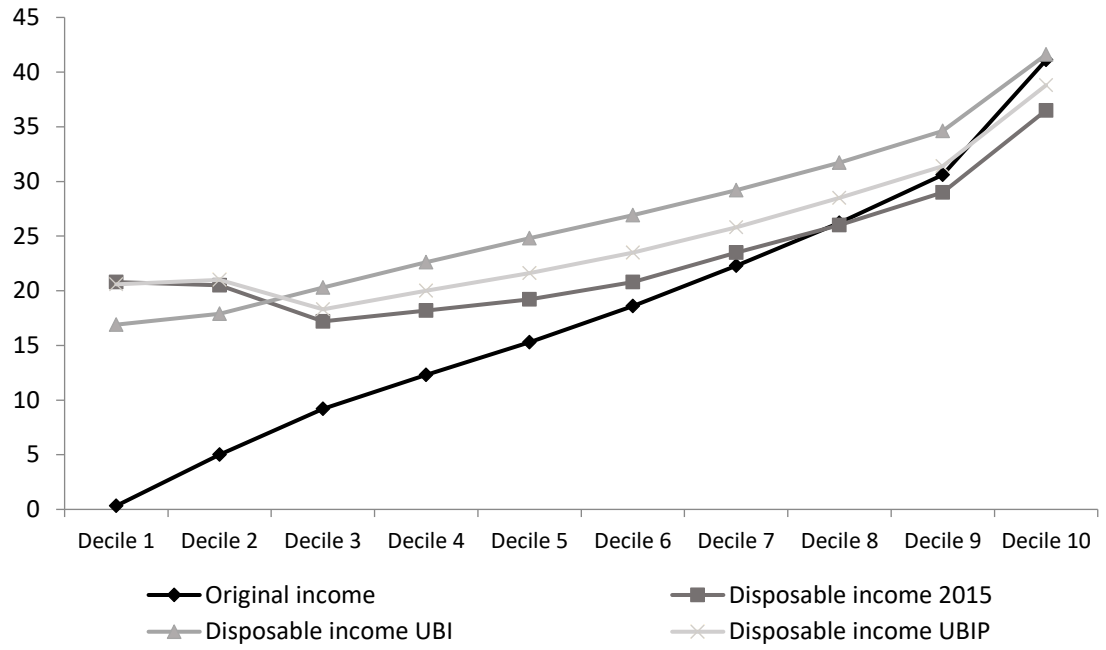


It is also interesting to see how welfare is altered in each of the scenarios by deciles. Although the income considered for the calculation of welfare is non-equivalent income, the income deciles are constructed by equivalent income to be able to compare individuals in the real economic context in which they live.

Table 19. Value of welfare calculated according to [1] the deciles of equivalent income.

Deciles of equivalent income	1	2	3	4	5	6	7	8	9	10
Original income	0.33	5	9.2	12.3	15.3	18.6	22.3	26.2	30.6	41.1
Disposable income 2015	20.8	20.5	17.2	18.2	19.2	20.8	23.5	26	29	36.5
Disposable income UBI	16.9	17.9	20.3	22.6	24.8	26.9	29.2	31.7	34.6	41.6
Disposable income UBIP	20.6	21	18.3	20	21.6	23.5	25.8	28.5	31.4	38.8

Graph 7. Value of welfare calculated according to [1] the deciles of equivalent income



The application of any of the tax-benefit systems always increases welfare up to the eighth decile. In addition, the increase is higher the lower the decile, and thus the level of welfare at the start. The application of the 2015 regulations worsens deciles 8, 9 and 10 and improves the rest in terms of welfare, while the application of any of the simulated UBI scenarios improves the welfare of all deciles with respect to the original income (except the last decile in UBIP).

If we compare the existing tax-benefit system in 2015 to the simulated alternatives of UBI, the UBI generates an improvement for all deciles from the third one upwards, but worsens the first two. The UBIP alternative improves welfare in all deciles except the first, which slightly worsens.

Another way to discriminate by characteristics when checking changes to welfare is to distinguish between those who win, and those who lose. The groups of UBI and UBIP winners have been used, and welfare has been calculated for these groups from the initial income

starting point, and then the net income with the application of the 2015 regulations and corresponding basic income in each case (UBI or UBIP).

If we separate by groups of winners and losers, and compare what happens with their average welfare based on original income to the net income obtained by the 2015 structure or any of the two simulated UBI alternatives, we obtain the following:

Table 20. Welfare calculated according to [1] the groups of winners and losers with application of the UBI.

UBI	Original income	Disposable income 2015	Disposable income UBI
Winners	20.7	19.5	28.4
Losers	10.7	33.5	21.6

The welfare of the initial income, before the application of any tax-benefits in the group of winners using the UBI policy, is twice that of the losers (20.7 versus 10.7). The application of the 2015 regulations would reverse the situation of these groups, since the welfare of the group of losers, with 33.5, is above the 19.5 of the winners. If the UBI were applied, the welfare levels would be more equal, with 28.4 and 21.6 respectively, and with a considerable change in both groups with respect to the application of the 2015 regulations: the winners obtain almost ten additional points of welfare, at the expense of almost twelve points from the losers.

Table 21. Welfare calculated according to [1] for the group of winners and losers with the application of UBIP.

UBIP	Original income	Disposable income 2015	Disposable income UBIP
Winners	18.3	21.6	25.3
Losers	17.7	29.6	23.6

When group discrimination is carried out by taking into account who wins, and applying the UBIP policy with respect to the regulations in force in 2015, the results show less extreme changes. The difference in the starting-point welfare is not so great: 18.3 in the winner's group compared to 17.7 in the loser's group. The 2015 system once again changes the relative situations of both groups with 29.6 of welfare in the group of losers, compared to 21.6 in the winner's group. The application of the UBIP would provide more equal levels: 25.3 and 23.6, and it can be seen that the winners increase by almost four points compared to a decrease of six points in the loser's group, with respect to the 2015 scenario.

The latest calculations made to characterize the change in welfare, refer to the Atkinson index which incorporates considerations of both efficiency and equity. The idea of this index is to

compare the equivalent income distributed equally (x_e) to the average income (μ) through the expression:

$$A = 1 - \frac{x_e}{\mu} \qquad [2]$$

Evenly distributed equivalent income represents the amount of income that when given equally to all individuals, would generate the same level of welfare as the currently existing distribution. If that amount is lower than the average, then part of the income could be sacrificed, and the same amount could be given to everyone, thereby achieving the same level of welfare as the existing one. This sacrifice of a portion of the pie for the benefit of a more egalitarian distribution is what measures the existing inequality. If nothing can be sacrificed, then x_e = μ and inequality would be zero. Inequality could also be null if the aversion to inequality incorporated in the social welfare function was also null, even though a non-uniform distribution existed.

Table 22. Atkinson index according to different degrees of aversion to inequality. Percentage changes with respect to the situation without intervention (Original income)

Atkinson index				
Inequality aversion	**0.2**	**0.5**	**0.9**	**2**
Original income	0.216045	0.564219	0.992538	0.987685
Disposable income 2015	0.132863	0.385727	0.952649	0.958381
	(-39%)	(-32%)	(-4%)	(-3%)
Disposable income UBI	0.079051	0.185574	0.302379	0.468986
	(-63%)	(-67%)	(-70%)	(-53%)
Disposable income UBIP	0.112868	0.284246	0.495521	0.781117
	(-48%)	(-50%)	(-50%)	(-21%)

We can draw many conclusions from the results of this table. On the one hand, any of the tax-benefit scenarios considered, reduces the inequality measured by the Atkinson index, there by indicating that the performance of the public sector is, in any case, redistributive. Given the same distributions, and by considering a greater aversion to inequality, this also results in a greater inequality measurement, since it is given more importance. If we analyse the decrease percentages, we can conclude that the application of a UBI achieves the greatest inequality decrease, no matter the level of aversion considered, and the application of a UBIP would be in second place. The application of the current regulations is the one that reduces inequality the least, as measured by the Atkinson index. This achieves very small decreases when the aversion to inequality is high (4% and 3% for values of the aversion parameter of 0.9 and 2 respectively).

6. Conclusions

This paper has carried out an in-depth analysis of the effects produced by the implementation of two simulated UBI alternatives. The analysis focuses on the redistributive effects, progressivity, poverty, winners, losers and welfare. Since the objective is not to analyse a reform that is expected to be implemented, but instead to discuss an issue that is under increasing debate (such as the UBI), two alternative scenarios have been chosen. The first of these, called the UBI, implies the substitution of all monetary benefits in force in 2015 for a UBI. The amount to be distributed (€295 per month) is obtained by the simple distribution of the total amount of monetary benefits eliminated among the total number of people, regardless of age. The second scenario is much less radical, since it would maintain retirement pensions and eliminate the other monetary benefits, giving rise to a UBI of €80 per month. This scenario has been called the UBIP. In any of the simulated scenarios, the PIT regulations of 2015 regarding modified income, and the social contributions of 2015, apply.

It is surprising how a radical change in the system can lead to distributive effects very similar to those achieved with the system in place in 2015. The UBI scenarios that we have proposed, involve a small reordering in the distribution of income, compared to that achieved by the benefits system established for additional income needs. The UBI, unlike current benefits, is no longer received based on conditions of necessity, or by the level of income. Instead, the values of redistribution, progressivity and poverty reduction achieved by the tax-benefit system in the 2015 and simulated scenarios, differ very little.

To summarize the effects of simulated UBI alternatives, our main conclusions are presented below:

Using the Reynolds-Smolensky index to measure redistribution, the total effect is very similar in all scenarios: the 2015 reference scenario, the UBI scenario which would achieve 97% of the 2015 effect, and the UBIP scenario, which would achieve 94%. Progressivity, as measured by the Kakwani index, is very similar to the reference scenario when maintaining retirement pensions. However, if these were eliminated, progressivity would only be 60% of the effect achieved in 2015. The fact that the redistributive effect is very similar despite this difference is because the 2015 structure generates a great re-ranking, which would not happen with a UBI system. It must be stated that the redistributive analysis circumscribes the focus to the distribution of income. Money transfers exist for purposes other than income, and this has not been taken into account. This does not mean that the analysis is not valid, because the specific objective is to analyse the distribution of income and its changes. We are aware that there are many elements to consider simultaneously. On the other hand, previous studies (Badenes and Buenaventura, 2017) show that the real power of redistribution in our country, resides in policies that do not involve monetary transfers but instead, benefits in-kind, such as education or health.

The results presented here are not strictly comparable with other similar studies. For example, the OECD report (2017) justly states that the design of a basic income would need to lower benefits and raise taxation, which is exactly the opposite of what has been tried in this exercise: maintaining benefits without modifying the PIT, with the consequent decrease in collection. The simulations carried out for several countries replaced all, or a large part of the

monetary benefits for an unconditional basic income for low income levels. In this context, the results pointed to large losses for certain population groups, without spectacular reductions in poverty, which is in line with our results.

In the specific case of Spain, and using the same micro-simulation tool EUROMOD, Fuenmayor and Granell (2017), calculate an alternative to the current system of social protection with a basic income instrumented through an income tax. The structure simulated in their work is not comparable to the exercise we have carried out, since the fiscal benefits of PIT are eliminated (we maintain the PIT structure), and all non-contributory benefits are eliminated (we eliminate all of them). The results of these authors point to declines not only in terms of poverty, but also in inequality.

The effects calculated on poverty indicate that the 2015 structure manages to reduce the incidence of poverty more than the application of UBI scenarios. If retirement pensions were eliminated, the gains would be better in terms of reducing intensity and inequality among the poor. The scenario in which retirement pensions would be eliminated would be maintained with intermediate values between the situation in 2015 and the application of a UBI. These results are obtained by taking 60% of the median income before taxes and transfers, as a poverty line. If one takes 60% of disposable income as a poverty line, the structure in place in 2015 is the one that reduces the incidence and intensity of poverty the most, although a UBI provides better results when considering inequality among the poor.

When analysing winners and losers, the application of a UBI leads to an average monetary gain of €4.4 per month, and the application of a UBIP, to an average monthly loss of €2.3. These aggregate figures could mask the winners and losers' gains and losses. There are three times as many winners as losers when applying the UBI, but those who lose (€670 per month on average), lose three times more than the winners. In the UBIP scenario, the winners quadruple the losers in number, but the average losses (€290 per month) are four times the average gains. When discriminating the behaviour of the gains and losses by different characteristics, it can be concluded that the main losers are retirees in the UBI scenario and the unemployed in the UBIP scenario. When discriminating by deciles of equivalent income, there are high percentages of winners in any of the UBI scenarios, although the figures are more favourable for the highest deciles, both in terms of percentages and amount of earnings.

In order to weigh the gains and losses, a function that evaluates the value of social welfare is used, including aversion to inequality (average of the square root of individual income), and this allows us to conclude that the application of any of the tax-benefit systems, either the 2015 reference scenario or those simulated with UBI, lead to an increase in welfare for the total population, or for the sub-groups of retired, disabled, unemployed or survivors who receive monetary benefits in the 2015 scenario. However, the results for sub-groups vary. The global collective increases their welfare to the maximum with the application of a UBI, followed by a UBIP and lastly, the 2015 regulations. However, for the groups that receive monetary benefits in the 2015 scenario, the application of UBI scenarios is worse than in the reference situation. When referring to deciles, if we compare the existing tax-benefit system in 2015 with the simulated alternatives of UBI, the UBI generates an improvement as from the third decile, but a worsening in the first two. The UBIP alternative improves the welfare of all deciles except the first, which slightly worsens.

Any of the tax-benefit scenarios considered, reduce inequality measured by the Atkinson index, which indicates that the performance of the public sector is, in any case, redistributive. The UBI application achieves the greatest decreases in inequality, regardless of the level of aversion considered, and the application of a UBIP would be in second place. The application of current regulations is the one that reduces inequality the least when measured by the Atkinson index, and achieves very small decreases when the aversion to inequality is high.

It is evident that, after the deep analysis carried out on two, very simple alternative designs of a UBI as a mere theoretical exercise, the evaluation of the results is very complex. If a reform were designed to put a UBI into practice, it would also be necessary to consider the political costs derived from the support and opposition, based on the distribution of winners and losers.

The results of this work show that the implementation of a UBI, even a very radical one that eliminates the existing benefits system (designed based on additional income needs), could be: economically sustainable; as redistributive as the current system; almost as poverty-reducing as the system in force (or more in some dimensions), and a generator of greater welfare. The problem is the acceptance required from the citizens regarding such a change in philosophy in the benefits scheme. They would have to accept the distribution of a benefit of equal amount for everyone without any necessity requirements, and losers would have to assume the costs, who although are less in number, still have to lose plenty for the majority to win. In addition, the incentive and disincentive effects have been left aside. It therefore opens a very interesting ground for debate, for which one must have plenty of evidence prepared to take along.

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