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Labour supply responses to a negative income tax in Spain

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Abstract

One of the major drawbacks of a Basic Income proposal is that it could induce people to reduce their labour supply. The main aim of this paper is to put forward a financially viable alternative to the current Spanish system of social protection, based on a Negative Income Tax proposal and introducing several changes in the social protection system. Using EUROMOD, the labour behavioural responses to these new conditions are studied in detail, using a structural model of labour supply.

The main result is that a reform as the one described in this work will not make people to abandon the labour market, as usually argued for Basic Income proposals. Under this scheme, on the contrary, we can observe a slightly increase in labour supply. This finding has strong implications for policy. Modifying the tax-benefit system, bringing it closer to a Basic Income scheme, will produce significant improvements in inequality and poverty without a significant change in labour supply.

JEL Classifications: C8; H24; I38

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1. Introduction

One alternative to the current benefit system in developed countries is a Basic Income scheme. A Basic Income (hereinafter, BI) consists of a universal and unconditional benefit to be paid to every citizen, regardless the income level. This scheme could be implemented through a periodic, monetary, and personal transfer; or using the Tax Administration through a Negative Income Tax (hereinafter, NIT).

Although these two alternatives are theoretically equivalent, NIT manages to combine the tax system and the public benefit system into a single mechanism. Under this scheme, an individual earning enough money will pay a positive tax, but if her income is under a certain level, she will receive a net transfer. NIT has three advantages over the benefit scheme: it would avoid revenue and expenditure inconsistencies, the progressivity of the whole tax-benefit system would be ensured, and it would simplify the management of the system, favouring its transparency and support among citizens (Sanzo & Pinilla, 2004).

A progressive income tax has a significant redistributive effect, far above social contributions, indirect taxes and even greater than many public benefits (Poterba, 2007; Cantó, 2013). However, this effect does not affect people who do not pay any tax because their income is below the minimum exempted. However, a NIT would also consider these citizens, regardless of whether their income is below the minimum, because they will receive a public benefit in the form of BI.

Approaches to NIT have varied radically over time. Originally defended from liberalism, the arguments of redistributive justice are much more relevant today. Regardless of the reasons given to justify it, NIT is a useful mechanism to introduce a BI scheme, since it allows tax and social policies to be combined into a single system.

These BI/NIT schemes present two main criticisms. The first one is the unbearable cost for society associated with a universal benefit for everyone, regardless the level of income. For this reason, we will design a NIT proposal to be revenue neutral, in order not to impose this cost to society in aggregated terms.

The second one is the trade-off between equity and efficiency. No one doubts that these schemes produce dramatic improvements in terms of poverty and inequality. Nevertheless, some authors claim that these are obtained at the expense of efficiency, as it will have negative effects on labour supply. The literature emphasises an important equity-efficiency trade-off in different countries: the introduction of a BI scheme implies a clear improvement on inequality and poverty, but people will tend to leave the labour market or reduce the number of working hours (Clavet et al., 2013; Colombino & Islam, 2018; Duncan, 2014: Horstschräer et al., 2010; Kesselman, 2018; Paulus & Peichl, 2009; Scutella, 2004; or Yunker, 2013). However, this trade-off is not always detected (De Jager et al., 1996). More recent literature, as stated by Coda Moscarola et al. (2020) or Magnani and Piccoli (2020), confirms the first idea that there would be an improvement on poverty and inequality, but rejects the idea that there would be a strong labour market response. Coda Moscarola et al. (2020) study the effect of a tax shifting from labour to property for Italy, reinforcing the idea that some kinds of reforms can boost both efficiency and equity. Magnani and Piccoli (2020) analyse the consequences of introducing a BI scheme in France, replacing the personal income tax with a flat tax. "The tax reform induces a limited effect on labour supply which, coupled with the positive effect on the labour demand, significantly reduces unemployment" (p. 237). In both cases, they found a significant increase in aggregate demand, which translates into greater demand in the labour market. Nevertheless, other studies found the opposite results, as La (2023) for Korea or Caamal-Olvera et al. (2022) for Mexico. In the Spanish case, there are works studying the effects on poverty and inequality (Granell & Fuenmayor, 2019), but we have not found any labour response

analysis. The main goal of this paper will be to check the labour behavioural responses to a NIT proposal in Spain.

We merely consider the supply side of the labour market, and we do not expect a significant effect on labour demand given that the Spanish labour market has special characteristics. The unemployment rate in Spain is very high (11.6% in January 2024, according to EUROSTAT), much higher than the EU27 average (6.0%). Although the introduction of the NIT led to a reduction in the labour supply, it cannot be thought that this would translate into a shortage of workers.

The results offered by the present study can be of interest as policy recommendations. If a NIT scheme as the one proposed in this paper is revenue neutral for government and does not produce significant changes in the labour market, its feasibility will allow decision-maker to make movements in this direction. In fact, we think that this path has already begun.

Following this introduction, in section two we simulate with EUROMOD a revenue-neutral NIT proposal, which will take the current Spanish Personal Income Tax (PIT) as a base scenario. In section three, we calculate the labour responses of the NIT proposal, comparing the employment situation of the baseline scenario with that resulting from the NIT proposal. This comparison is made separately for one-earner and two-earner couples as their behaviour differs. Finally, the fourth section presents the main conclusions and policy implications. The main results are summarized, an explanation of them is offered and some policy recommendations are introduced.

2. Simulating a Negative Income Tax for Spain

In this section, we will first shortly describe the base scenario, the 2018 Spanish Income tax, and use EUROMOD[1] to simulate the whole tax-benefit Spanish system. After this, we will design a revenue-neutral reform mainly composed by a Negative Income Tax, accompanied by the elimination of several non-contributory benefits.

The introduction of a Basic Income (in the form of a NIT), constrained to a revenue neutral system, requires extra funds. These will come from a deep reform of the current Income Tax and from the removal of unnecessary benefits.

The Spanish Personal Income Tax is a direct, personal, and progressive tax (in 2018, marginal tax rates ranged from 19% to 45% in the case of general tax base, and from 19% to 23% to be applied for property income). It is designed to be performed by individuals, but couples can opt for joint filing. There are also many exemptions, deductions (joint filing, contributions to pension plans, for labour income, housing rental deduction), and tax credits (donations, maternity, large families, disability). According to AIReF (2020), the associated cost of this tax benefit amounted to €13,745 million in 2018.

The proposed new tax is a Negative Income Tax, characterised by its simplicity. We propose the elimination of joint taxation, allowing only for individual filing; the use of a single tax base, instead of the current dual tax; and the removal of all deductions from tax base and tax credits. All these measures will generate a significant increase in tax collection.

The NIT is simply a way to implement a BI scheme. Its functioning can be represented by this formula:

$$BI = ME \cdot TR \tag{1}$$

[1] Institute for Social and Economic Research, University of Essex; Joint Research Centre, European Commission, EUROMOD: Version G4.0 + [software], December 2016. Sutherland and Figari (2013).

Where *BI* represents the Basic Income amount to be paid; *ME* the Minimum Exemption, the amount of income not taxed; and *TR* the Tax Rate. As can be seen in the formula, these three parameters are closely related.

The amount of BI is the core of the whole system, and it is implicit in the design of the NIT. This amount will be identical for all residents in Spain. We will not consider differences in income, age, personal or family circumstances. The only exception, as has been proposed in other works, concerns minors. In this paper, following previous works (Sanzo & Pinilla, 2004; Gimeno, 2015) and the most used and accepted equivalence scale, the OECD scale, we propose a percentage of 30% of BI for minors.

The BI should be of a sufficient amount to meet basic needs. Although it is difficult to reach a consensus on this amount, it could be based on a generally accepted poverty threshold. As the NIT is going to replace the non-contributory benefits of the current system, the necessary condition is that the NIT is always above the minimum non-contributory Social Security pension in 2018 (€5321.40). This amount is close to 40% of the median equivalent income. With this amount, we can conclude that the NIT would ensure that only a very basic level of needs is met. We have set this amount at €5550, which is also the level established for the Personal Minimum in the current income tax.

The proposal is undoubtedly simple. This is a NIT as defined by Friedman (Friedman, 1962; Friedman & Friedman, 1980), with a single tax rate (*TR*) of 50%, both for positive and for negative parts.[2] As a result, the general *ME* in formula (1) will be €11,100. The minimum exemption for adults would mean that only those with an income higher than €11,100 would be taxed, while those with a lower income would receive a benefit that could reach a maximum of €5550 per year (slightly above the current non-contributory pension). Minors who did not obtain any income could receive €1665 per year from the NIT.

Unfortunately, these changes in income tax are not enough to obtain a revenue-neutral scheme. Additional resources will be required. To achieve this financial sufficiency, we can count on the elimination of non-contributory public benefits, which will not be needed after the introduction of the NIT. So, we simulate the removal of these non-contributory benefits: old-age pension, unemployment assistance, child benefits, birth/adoption benefits, regional child benefits, and regional minimum income.[3]

Such a NIT proposal implies a huge improvement in inequality. Considering the whole system, a NIT like the one described here will improve the Gini index from 0.336 to 0.249. This scheme will improve the redistributive effect of the system by 0.087 points. Similar results can be obtained concerning poverty. A NIT proposal will dramatically improve poverty results, ten additional percentage points of poverty ratio reduction, especially when considering severe poverty level (Granell & Fuenmayor, 2019).

3. Changes in labour force participation

After designing the NIT proposal, we proceed to calculate the changes in labour force participation. To do so, several steps must be followed. Firstly, we need to estimate wages for

[2] In other works (Fuenmayor & Granell, 2017), essayed different proposals, trying to introduce progressive tax rates. Nevertheless, the reduction of tax rates for the first tax bracket implied a huge increase in the remaining brackets. Differences in terms of redistribution were very weak.

[3] In addition, despite not being official non-contributory benefits, we also decided to remove the minimum supplement to pensions and the widow-widower's pension supplement. In our opinion, this amount seeks to ensure a vital minimum that would already be covered by the NIT.

every person of working age, regardless of whether they effectively work or not. After this, we will perform a model of labour supply. This model will tell us what people do when tax-benefit parameters change. Finally, we will measure the changes in labour behaviour after the reform of the tax-benefit system.

3.1. Introduction: estimation of wages

As mentioned above, before the estimation of the labour supply model, wages of people who are able to work are needed. The EUROMOD database provides information on the hours that each person works and the hourly wage rate of people who are currently working. The main problem is that the data do not show the wage rate of people who are not currently working. To obtain this value for these potential workers, we estimate their wage rates considering men and women separately, because their participation and wage rates are different in Spain. These estimated wages will be used as proper values of their unobserved wages.

The easiest way to estimate the wage rates is OLS, considering the individual variables that can have an effect on the wage. The main objection of this technique is the self-selection problem because the selection of people who currently work is sometimes biased. To avoid self-selection, we use the two-step Heckman selection model (Heckman, 1979). In the first step, this model estimates the probability of labour participation for each person using a probit regression with a set of explanatory variables (age, education, marital status, number of children, partner's income, region, and the condition of migrant). The estimated model is used to obtain the inverse Mills ratio. If this ratio is significant, it means that self-selection is an important problem, and we have to include this ratio in the second step of the model. The second equation estimates wage rates by OLS considering some explanatory variables (experience, education, region) and the inverse Mills ratio obtained in the first step (if it is significant). The results of our estimations for women and men are presented in Table 1.

These results are consistent with recent studies on labour participation and wages in Spain (Paniagua, 2015; Oliver & Spadaro, 2017). The second part of Table 1 presents the participation equation for men and women (Heckman's first step). Labour participation is positively related with age and negatively with squared age, therefore its function is convex. As we can expect, education is positively related and significant both for men and women. However, the behaviour of each gender is different considering other variables. Men are more willing to work if they are married and if their wives obtain high wages, but the number of children does not have a significant effect on their participation decision. Conversely, married women with high-salary husbands are less willing to work and the number of children also has a negative effect on their labour participation.

The first part of Table 1 shows the estimation of the wage equation, considering as a variable the Mills Ratio (Lambda) obtained in the previous step. All the variables considered have a clear impact on the wage rate, and the sign is the same for both genders. Level of education and experience at work have a positive effect on wages, but in the second case, the function is convex.

3.2. Labour responses

Having estimated wages for men and women, and using their hours of work, we can now analyse labour responses, performing a structural labour supply model. This model considers labour supply as a discrete choice problem, considering family as a unitary agent. We follow the methodology used, among others, by Aaberge et al. (1995), Van Soest (1995), Creedy and Kalb (2005), Sommer (2016), Paniagua (2015), and Oliver and Spadaro (2017).

Table 1
Estimation of wage rates with Heckman two-step method.

Ln Wage Rate Equation (OLS)		
	Women	Men
Experience	0.0529393 * **	0. 0278306 * **
Experience^2/100	-0.0643393 * **	-0. 0111569 * *
Education (< Primary as reference)		
Primary	0.1193719	0. 1168879 * **
Secondary	0.0729114	0. 1302139 * **
Secondary+	0.2566916 * *	0. 1306699 * *
Post-Secondary	0.1283973	0. 4483846 * *
Higher Education	0.7338344 * **	0. 1465729 * *
Region (Galicia as reference)	…	…
Constant	0.9371978 * **	1.994635 * **
Participation Equation (Probit)		
	Women	Men
Age	0.1115461 * **	0.1149692 * **
Age^2/100	-0.1453415 * **	-0. 1412149 * **
Income of the partner	-0,00000615	0. 0000999 * **
Number of children	-0.0655665 * *	0.017160
Education (Primary or less as reference)		
Post-Secondary	0.419810 * **	0.4169121 * **
Higher Education	1.156756 * **	0. 8165719 * **
Migrant	-0.585827 * **	-0. 5865955 * **
Region (Galicia as reference)	…	….
Constant	-2.11018 * **	-1. 657727 * **
Mills Ratio (Lambda)	-0.102821 * **	-1.302445 * **
Chi^2	550.36	221.74
N	5831	4468

*p < 0.1; * *p < 0.05; * **p < 0.01
Source: Own calculations

We focus our analysis on families rather than households. We use the Spanish tax definition of a family because households sometimes have a very complex structure, including different decision units.

For individuals, we consider three categories, regardless of whether they are male or female: no work (if they work less than 8 h per week), part-time work (9 or more hours, and less than 30 h), and full-time work (more than 30 h of work per week). We follow the proposal of Paniagua (2015), considering the distribution of the population's working hours. We have actual data of one of these options but need to obtain values for the alternatives. Considering couples as a decision unit, we allow for nine different possibilities, allowing each member to be in one of the three categories described for individuals.

Now we expand the database, repeating the data for each individual three-fold (nine for two-worker households). In each of these cases, the working-age individual will be in a different situation (working full-time, part-time, or not working). One of these situations is real, and the other two are simulated. For each case, we have the working hours (and also the corresponding leisure) and employment income (hourly wage times number of hours). All taxes and benefits

that each individual and family will enjoy under any circumstance can be calculated by running EUROMOD. With all this information, the labour supply can be estimated.

Starting from the actual decision, the net income for individuals and couples is calculated, assuming a quadratic utility function (Keane & Moffitt, 1998), depending on leisure (h) and income (y), as follows:

$$U = \beta_y y + \beta_h h + \alpha_y y^2 + \alpha_h h^2 + \alpha_{yh} yh \tag{2}$$

U is the deterministic part of the utility function, from which an error term v is added, in order to form:

$$U^* = \beta_y y + \beta_h h + \alpha_y y^2 + \alpha_h h^2 + \alpha_{yh} yh + v \tag{3}$$

We assume that the distribution of v is described by the following density function:

$$f(v) = e^{-v} e^{-e^{-v}} \tag{4}$$

This is known as an extreme value type I distribution, and it is very common in this literature. This model can be estimated using a likelihood function. In doing so, we try to find the parameter values that would produce the highest probability of observing the actual hour values (Creedy & Kalb, 2005). As a result, the long-likelihood function will be:

$$logL = \sum_{k=1}^{M} \left[U_{ik,k} - log\left(\sum_{j=1}^{n} e^{U_{j,k}} \right) \right] \tag{5}$$

In the case of couples, the utility function considers the leisure time for both individuals:

$$U = \beta_y y + \beta_{h_f} h_f + \beta_{h_m} h_m + \alpha_y y^2 + \alpha_{h_f} {h_f}^2 + \alpha_{h_m} {h_m}^2 + \alpha_{yh_f} y h_f + \alpha_{yh_m} y h_m + \alpha_{h_f h_m} h_f h_m \tag{6}$$

Using our data, we calculate net income from individuals and families under the current 2018 Spanish Income Tax and estimate the parameters of the utility function by maximum likelihood. The results of this estimation can be found in Table 2.

The estimators are as expected: utility increases with income (Y_d) and decreases with hours of work (W), but both functions are convex. We use these estimators to calculate utilities for each individual in the dataset, using net income and leisure under each situation (non-working, full-time, part-time) and the remaining variables (age and gender) to learn more about the actual behaviour of this individual.

Table 2
Estimation of Labour Supply.

Modelling deterministic utility	
Disposable Income (Yd)	0. 0047734 * **
Yd x Yd	-3.88e-07 * **
Yd x L	-.000029 * **
Working hours (W)	-.2334928 * **
W x age	0.0013593 * **
W x gender	0. 0195699 * **
W x W	0. 002002 * **
N	22623

Source: Own calculations

The next step consists of the calibration process. In order to consider non-observable heterogeneity, 100 draws from the extreme value distribution for each unit are extracted to be added to the estimated utility function in order to obtain U* , in equation (3). Draws are only kept if the resulting hours derived by maximising U* are the same as the observed hours being the optimal choice for each one. We perform 100 'good' draws for each case. These results will produce our *Baseline Scenario,* showing the individual's behaviour before the intervention.

Now is the time to perform the NIT proposal. Using EUROMOD, all variables under the new tax-benefit scheme are calculated. Having the same market income, we re-calculate the disposable income for every unit, considering the new NIT and removing prior benefits as described in section 2. We use the labour supply model for estimating the utility of units under the new scheme. Having data (net income and utility) under their current behaviour, now we calculate their disposable income and utility after the reform. This will produce the deterministic utility. We have extracted 100 draws for each individual to be added to this deterministic utility in the *Baseline Scenario*. Now we use the same draw for each individual in the *Counterfactual Scenario* that have been used before, in order to compare them with the baseline. Under these new circumstances, from the NIT scheme (disposable income, hours of work, taxes, and subsidies), we allow units to choose the new best working option among the available possibilities. Finally, we compare what people do before and after the reform.

3.3. Main results concerning the labour market

In this section, we compare the labour behaviour under the current tax-benefit system (2018 Tax-Benefit system) and the responses if a NIT is introduced, and some benefits are removed, as explained previously. In fact, we will record 100 different versions of each household after the reform, considering the different draws extracted previously. The aforementioned procedure provides a lot of information about changes in labour behaviour. What can be more difficult is drawing clear conclusions from all this information. With this in mind, we have developed a novel method that allows us to distil this vast amount of information into a few indexes. Our aim is to be able to answer a complex question about changing work behaviour in a simple way. We will consider separately households with just one working person and households with two working people separately.

3.3.1. Households with one worker

The most graphical way of analysing how people change their behaviour is through a transition matrix, as represented in Table 3. It shows the transition matrix for individuals as a whole (Panel a), females (Panel b) and males (Panel c). The diagonal displays people remaining in the same category before and after the reform. Figures over the diagonal show people increasing their working time, while under this line represents people reducing their labour behaviour. Working changes clearly show an increase in the extensive and intensive margin, as the north-east movements are bigger than south-west movements. In general, these movements are stronger in the case of males, and the opposite movements can be found for women.

Even so, the observation of the transition matrices does not provide us a conclusive result. In order to obtain a clear measure that reflects labour movements, we have borrowed some indexes that are very common in inequality literature when measuring income mobility. We propose the use of several indexes that take profit from transition matrices for measuring income mobility. Shorrocks (1978) proposed the following mobility index:

$$\hat{M}_S(P) = \frac{n - trace\ P}{n - 1} \tag{7}$$

Table 3
Transition matrix of working hours (single-worker households) before and after the NIT reform.

a) EVERYONE		Individual working hours after NIT			Total
		0	20	40	
Current individual working hours	0	88.39%	0.54%	11.07%	100.0%
	20	5.56%	82.68%	11.76%	100.0%
	40	9.85%	1.93%	88.22%	100.0%
	Total	103.80%	85.14%	111.06%	
b) FEMALES		Individual working hours after NIT			Total
		0	20	40	
Current individual working hours	0	95.75%	0.42%	3.84%	100.0%
	20	7.79%	87.30%	4.91%	100.0%
	40	13.83%	2.67%	83.50%	100.0%
	Total	117.37%	90.38%	92.25%	
c) MALES		Individual working hours after NIT			Total
		0	20	40	
Current individual working hours	0	69.02%	0.86%	30.12%	100.0%
	20	1.14%	73.53%	25.33%	100.0%
	40	5.44%	1.11%	93.45%	100.0%
	Total	75.61%	75.50%	148.90%	

Source: own calculations

where n is the number of states (in this case, 3) in matrix P. For these cases $\hat{M}_S(P) = 0$ means zero mobility, and $\hat{M}_S(P) = 1.5$ implies maximum mobility.

Another mobility measure was proposed by Bartholomew (1973):

$$\hat{M}_B(P) = \sum_{i=1}^{n} \sum_{j=1}^{n} r_{ij} \, |i - j| \, r_i \tag{8}$$

Where r_{ij} is the percentage in corresponding cell, r_i the accumulate percentage in row i, and $|i - j|$ the number of boundaries crossed over from initial position to final position. In our case, $\hat{M}_B(P) = 0$ means zero mobility. We propose decomposing the Bartholomew index into two parts, the first one indicating transitions to a situation where individuals work more (above the diagonal), and the opposite. But, instead of adding these two parts, we propose to take the negative part from the positive one. As a result, we can obtain a kind of net index, $\hat{M}_N(P)$:

$$\hat{M}_B(P) = \hat{M}_B(+) + \hat{M}_B(-) \tag{9}$$

$$\hat{M}_N(P) = \hat{M}_B(+) - \hat{M}_B(-) \tag{10}$$

The difference between these two parts of the Bartholomew index can be understood as an index of increasing the labour behaviour, if positive.

As can be seen in Table 4, the Shorrocks Index shows some degree of mobility, higher for males than for females. The same pattern can be seen using the Bartholomew Index (Bartholomew, 1973). However, what is more interesting is the net balance among the positive and the negative parts of Bartholomew Index. The behaviour is clearly different for men and women. Transitions to increase the hours of work are bigger for males than transitions for reducing the number of hours of work, so the net balance is positive for men. Therefore, we can conclude that, because of the reform proposed in this paper, men will ultimately work more.

Table 4
Mobility indexes of single-worker households as a consequence of the NIT reform.

	Female	Male	Total
Shorrocks index: $\hat{M}_S(P)$	0.16726	0.32004	0.20356
Bartholomew index: $\hat{M}_B(P)$	0.20679	0.22206	0.21296
Positive part: $\hat{M}_B(+)$	0.03278	0.13550	0.07432
Negative part: $\hat{M}_B(-)$	0.17401	0.08668	0.13864
Net Bartholomew Index: $\hat{M}_N(P)$	-0.14123	0.04893	-0.06432

Source: own calculations

The opposite can be stated for women: people reducing their working hours are more frequent than individuals working more. Consequently, the net balance is negative for women. Considering the total population, the final result is slightly negative. As a result, there are some people changing their labour behaviour, but they move in different directions. At the end, the net movements are very weak, positive for men and negative for women.

3.3.2. Households with two workers

We have performed a similar analysis now considering households with two active partners. We group households in the transition matrix according with the total number of hours offered by both partners. We are now interested in knowing if two-earner families work more or less after the NIT proposal is introduced. Five categories are presented: 0, 20, 40, 60 and 80 h of total family's work. The aggregated results are presented in Table 5. Many people remain in the same category before and after the reform, but there are also some households moving, some of whom to situations where the family's number of working hours increases (north-east movements), sometimes reducing the amount of a household's work (south-west transitions).

Households where nobody works are reduced because of the reform: 45.5% remain in the same situation but 54.5% move to combinations where the family works more. This category (non-working households) receives new members as a consequence of the NIT reform, coming from more active households (2.0% moves from working 20 h, and 1.3% for more intensive combinations). Reversely, almost all households where both partners work full-time remain in the same category, but they receive more families from other less-working situations. Similarly, as in the case of individuals, figures above the diagonal represent an increase in family working hours and figures below it imply a reduction in labour time.

Table 5
Transition matrix of total working hours (two-worker households) before and after the NIT reform.

		Household working hours after NIT					
		0	20	40	60	80	Total
Current total working hours	0	45.5%	0.0%	21.4%	6.6%	26.4%	100.0%
	20	2.0%	24.6%	24.5%	9.3%	39.6%	100.0%
	40	0.4%	0.1%	82.8%	1.9%	14.8%	100.0%
	60	0.8%	0.1%	6.1%	69.2%	23.8%	100.0%
	80	0.1%	0.0%	0.3%	0.0%	99.7%	100.0%
Total		48.8%	24.8%	135.2%	87.0%	204.3%	

Source: own calculations

Table 6
Mobility indexes of two-worker households as a consequence of the NIT reform.

	Total
Shorrocks index: $\hat{M}_S(P)$	0.44551
Bartholomew index: $\hat{M}_B(P)$	0.10708
Positive part: $\hat{M}_B(+)$	0.09371
Negative part: $\hat{M}_B(-)$	0.01337
Net Bartholomew index: $\hat{M}_N(P)$	0.08034

Source: own calculations

We can measure these movements using the mobility indexes described above. They are displayed in Table 6. The Shorrocks Index shows a higher mobility in labour behaviour than in the case of single-earner households, as expected. There are more categories, so the percentage of people remaining in the same cell as before is necessarily lower. The Bartholomew Index displays a similar behaviour. Nevertheless, the most interesting part is the analysis of the Net index. It is positive, indicating that changes increasing working hours in households are bigger than movements reducing work.

If we consider both single-worker households and two-worker households, net movements are balanced. Almost 87% of households do not change their labour behaviour. Among households that change their working conditions, 7.9% tend to work more hours as a result of the NIT reform, while 5.5% reduce their labour supply. In net terms, we can say that 2.4% of households increase their labour supply. This result is very weak, but at least we can conclude that, in the case of Spain under the proposed reform, the effect on labour supply is not negative at all.

4. Conclusions and policy implications

In this paper, we have proposed an alternative to the existing social protection system in Spain. Instead of a system with multiple benefits managed by different administrations, we propose a universal Basic Income that guarantees all citizens a minimum standard of living. This Basic Income can be received in the form of a monetary benefit, but also through a refundable tax credit included in the Income Tax, which would thus become a Negative Income Tax (NIT).

These kind of BI/NIT schemes usually receive two types of criticism. On the one hand, the high cost it entails for society. To overcome this problem, we have put forward a NIT proposal with a tax collection equivalent to the 2018 Spanish Income Tax, with a single rate of 50% and a minimum exemption of €11,100. To obtain this amount, we consider the resources generated by the reformed income tax itself and also by the elimination of non-contributory benefits, which would no longer be necessary when a universal benefit is implemented. Every adult would have at least the minimum contributory pension, so that people who lost these benefits would not be harmed by the introduction of a negative tax. For children, we have established a benefit equivalent to 30% of the amount set for adults, according to the OECD equivalence scale.

The second criticism associated with the NIT proposal is the negative effects on the labour market. In order to check if this problem is present, we have carried out a simulation, using EUROMOD for the 2018 tax-benefit system and adapted the contained socio-economic

information to the current Personal Income Tax regulations, from which the new NIT will be derived. We have estimated changes in labour force participation and in working hours, performing a structural labour supply model. To interpret the large amount of information obtained, we have applied indexes that are popular in the literature of income mobility and rewritten them to give a clear answer to our questions. The main result is that a reform like the one described in this work will not make people abandon the labour market, as is usually argued against these types of Basic Income proposals. Under this scheme, on the contrary, we can observe a slight increase in labour supply, in addition to the indisputable improvement on poverty and inequality.

The main explanation for this result is derived from the proposed political reform. On the one hand, the introduction of a Basic Income scheme will induce some people not to work or to work fewer hours, due to the substitution effect. We do not expect this effect to be very important, as the level of subsidy is low. On the other hand, financing this benefit will suppose an increase in the final income tax paid by people nowadays earning higher salaries. To compensate this loss, they will try to rebuild their income level by working more hours, due to the income effect. In net terms, under the parameters used in this proposal, we detect very weak changes in labour supply.

Undoubtedly, this result has strong implications for policy. In recent decades, several proposals around the world have introduced general benefits for the poor, not having detected strong changes in labour supply. Therefore, we do not expect a clear change in labour demand, nor a contractive effect in aggregated terms. Minimum Income Benefits were introduced in many countries for poor people, or reimbursable tax credits for the working poor (Earned Income Tax Credit in the US; Working Tax Credit / Children Tax Credit in the UK; similar instruments in Germany, Italy, Belgium, or Quebec). All these policies did not imply a shocking effect on the labour market. A Basic Income scheme (or a Negative Income Tax) will probably become the next step of these kinds of policies.

In Spain, as in many countries, we enjoy a bunch of non-contributory benefits for aged people, for unemployed, for families in need, and so on. We also have a minimum income benefit for poor people. All these benefits have not produced a strong reduction in labour supply. The only difference between all present benefits and the Basic Income scheme presented here is universalism. Surely, it will imply more people receiving a benefit, but it also will sharply reduce administrative costs. Moreover, such a system will surely mean a dramatic reduction in poverty rates and inequality indexes.

Declaration of Competing Interest

None.

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