European Commission

Overcoming the Inactivity Trap in Spain: The Work Incentive Reform of the *Ingreso Mínimo Vital*

JRC Working Papers on Taxation and Structural Reforms No 11/2024

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2024

Joint Research Centre

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JRC139944

Seville: European Commission, 2024

How to cite this report: European Commission, Joint Research Centre, Cruces, H., Hernández, A. and Narazani, E., *Overcoming the Inactivity Trap in Spain: The Work Incentive Reform of the Ingreso Mínimo Vital*, European Commission, Seville, 2024, JRC139944.

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Abstract

The *Ingreso Mínimo Vital* (Minimum Vital Income), Spain's nationwide minimum income scheme introduced in 2020, offers beneficiaries a unique national guaranteed income as a last-resort benefit. However, the scheme's design featured a lack of work incentives for low earners, potentially leading to inactivity traps. To address this flaw the Spanish government introduced an earnings disregard in 2022, enabling beneficiaries to keep all or part of the benefit when their earnings increase up to a certain limit. This paper provides an *ex ante* assessment of this reform, looking into its expected fiscal, distributional and labour market effects using the tax–benefit microsimulation model EUROMOD, and the behavioural labour supply model EUROLAB. Our results show that the reform has the potential to incentivise work for very low earners, particularly lone parents, mainly by promoting part-time employment. The reform and its subsequent employment effects are also expected to slightly reduce inequality and poverty. While this is a step in the right direction, we discuss some avenues for improvement.

Acknowledgements

The results presented here are based on EUROMOD version I6.39+. Originally maintained, developed and managed by the Institute for Social and Economic Research, since 2021 EUROMOD is maintained, developed and managed by the Joint Research Centre of the European Commission, in collaboration with Eurostat and national teams from the EU Member States. We are indebted to the many people who have contributed to the development of EUROMOD. The results and their interpretation are the authors' responsibility. We wish to acknowledge the valuable insights provided by Fidel Picos and by the participants in the 31st Meeting on Public Economics.

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Executive summary

This study assesses the impact of the work incentive reform introduced to amend Spain's nationwide Minimum Income (MI) scheme in late 2022. The reform aims to strike a balance between alleviating poverty and maintaining work incentives for low-income earners, by allowing beneficiaries to keep all or part of the benefit when their earnings increase up to a certain limit. This is particularly important given Spain's labour market dysfunctionalities, including high (long-term) unemployment, elevated rate of fixed-term contracts, involuntary part-time jobs and in-work poverty – all regularly standing above the Euro Area average. The study uses microdata representative of Spain's population, taken from the 2022 EU Statistics on Income and Living Conditions, along with the tax–benefit microsimulation model EUROMOD and the behavioural labour supply model EUROLAB, in order to estimate the reform's fiscal, distributional and labour supply effects.

We find that the reform is expected to trigger positive labour supply reactions, concentrated at the lower end of the income distribution. Women's labour supply reactions are expected to be larger than those of men, with lone parents, especially lone mothers, experiencing considerable increases in employment and working hours. The reform mainly promotes part-time employment, as full-time jobs typically do not qualify for the earnings disregard, given their relatively high salaries. Taking the labour demand side into account moderates the employment effects, since not all the increase in labour supply may be matched by the jobs available in the labour market. Positive employment effects would lead to a slight increase in government revenue (0.04 %), compared with the pre-reform scenario, due to the beneficiary households paying more in terms of direct taxes and social insurance contributions. However, this revenue boost is not enough to offset the rise in expenditure, leading to a 0.54 % decrease in budget, compared with the pre-reform scenario. The reform is expected to lead to modest reductions in inequality and (extreme) poverty, evidenced by a decrease in the Gini coefficient and the at-risk-of-poverty rate. This effect is most pronounced when the poverty threshold is set at 40 % of the median equivalised disposable income, as Spain's nationwide guaranteed MI levels specifically aim to address extreme poverty.

The study's estimates should be interpreted as upper bounds, given the existing high non-take-up rate of the nationwide MI scheme, and that we assume full take-up in our modelling. Moreover, due to data limitations we calculate the benefit amount based on income during the same year, whereas Spain's nationwide MI scheme and the earnings disregard are determined based on income from previous years. This means that in practice MI beneficiaries need to anticipate the future impact of the reform in response to today's increased labour supply, because the effects will become noticeable only after several months. Our modelling assumes informed, rational reactions and planning by households in that regard. In addition, by design the work incentive ends after two years, and yet this study only estimates the immediate effect, namely the effect in the roll-out year. The two-year time

frame may be considered relatively short, with some individuals potentially returning to their initial pre-work-incentive situations if their integration into the labour market is not fully achieved in that time frame. Our analysis does not deal with potential long-term effects.

Overall, our study provides valuable insights into the design of MI schemes to help avoid inactivity traps and presents useful lessons for implementing similar mechanisms in other EU Member States. We believe the work incentive reform of Spain's nationwide MI scheme is a step in the right direction, eliminating the existing 100 % marginal effective tax rates in some situations. However, the reform's design should be improved to better target the needs of specific segments of the population who are not benefiting from the reform. Extending the work incentive to all potential low-income workers, beyond current MI beneficiaries, may broaden the coverage of MI protection and further reduce in-work poverty. Moreover, additional policies, such as active labour market policies, are needed to ensure that beneficiaries fully integrate into the labour market and avoid stagnation in low-quality employment.

1. Introduction

Minimum Income (MI) protection is widely implemented across the European Union (EU). All EU Member States provide some sort of MI scheme to help guarantee households' living standards, with an income floor – commonly referred to as guaranteed MI – in place to meet the most basic economic needs (Coady et al., 2021). Despite their heterogeneous effects across Member States, MI schemes help alleviate the intensity and severity of poverty (Almeida et al., 2022; Figari et al., 2013) and complement other automatic stabilizers in cushioning the effects of abrupt negative income shocks (Eichhorst et al., 2023), such as the one experienced during the COVID-19 crisis (Gasior et al., 2024). In supporting households' income, however, MI schemes may create financial disincentives to take up jobs or to increase the number of hours worked, just like other out-of-work benefits. Although labour supply elasticities have often been estimated to be relatively small on average, they may still be fairly large for certain population groups, such as low-income individuals (Bargain et al., 2014), secondary earners (Eissa and Hoynes, 2004) or households with children (Mastrogiacomo et al., 2017). Designing social benefits to adequately enable the combination of work and benefit receipt can help diminish potential negative labour supply responses. The labour supply disincentives potentially introduced by MI schemes are the economic problem on which this paper focuses, by examining a reform of the Spanish MI scheme that aims to incentivize work.

In Spain, a key policy response to mitigate economic vulnerability, particularly during the COVID-19 crisis, was the introduction in 2020 of the *Ingreso Mínimo Vital* (Minimum Vital Income), a nationwide MI scheme. In keeping with the objectives of similar schemes in the rest of the EU, Spain's nationwide MI serves as a last-resort benefit or safety net, offering beneficiaries a unique national guaranteed MI. This scheme was designed to, among other purposes, address the shortcomings of pre-existing regional MI schemes managed by the different Autonomous Communities in Spain, which implemented diverse regulations and administrative practices resulting in very different poverty-reducing results among Spanish regions (Hernández et al., 2022). Despite its importance as a part of Spain's social safety net, the nationwide scheme's design had shortcomings (Ayala et al., 2022). Among them was the lack of work incentives for low earners, leading to potential inactivity traps (Bargain and Doorley, 2011; Christl and De Poli, 2021). To address this flaw, the Spanish government revised the MI scheme in September 2022 by introducing an earnings disregard. Before the introduction of the new measure, MI beneficiaries faced a marginal effective tax rate of 100 % up to the guaranteed MI. This means that for every additional euro earned by the beneficiary, whether as an employee or a self-employed person, an equivalent amount would be deducted from the benefit. However, the 2022 reform tapers the benefit withdrawal, allowing beneficiaries who increase their labour earnings up to a certain threshold to keep all or part of the benefit amount. Similar mechanisms to mitigate potential labour supply disincentives exist in many EU MI schemes, including

those of Belgium, Estonia, Greece, Italy and Finland (Coady et al., 2021). A simulation of Spain's earnings disregard using hypothetical data on families with predefined characteristics indicates that the reform decreases participation tax rates, particularly for taking up part-time jobs (OECD, 2023).

In this paper, we use individual microdata representative of Spain's population to provide an *ex ante* assessment of the Spanish nationwide MI reform, examining its fiscal, distributional and labour supply effects. The reform aligns with the principles of 'make work pay' policies, aiming to strike a balance between alleviating poverty and maintaining work incentives (Bargain and Orsini, 2006; Immervoll and Pearson, 2009). This goal is particularly important given Spain's labour market dysfunctionalities (Dolado et al., 2021), including high (long-term) unemployment, elevated rate of fixed-term contracts, involuntary part-time jobs and in-work poverty (Halleröd et al., 2015), all regularly standing above the Euro Area average ([1]). Moreover, Spanish workers contend with a high rate of atypical jobs, surpassed in the EU only by the rate in Greece (Jara Tamayo and Tumino, 2021). In this context, non-contributory types of social protection such as MI schemes gain importance for sheltering individuals with low attachment to the labour market, compared with unemployment insurance benefits that typically require contribution periods. Overall, the ability of the MI protection to offer a generous safety net while maintaining employment incentives depends on balancing labour market integration with the receipt of MI benefits.

How may MI schemes impact recipients' labour supply decisions? Non-working MI recipients face a two-stage labour supply choice that affects their MI eligibility: first, whether to accept a job offer (extensive margin), and, once accepted, how many hours to work (intensive margin). In this paper, we employ the tax–benefit microsimulation model EUROMOD (Sutherland and Figari, 2013), in combination with the behavioural labour supply model EUROLAB (Narazani et al., 2023), to quantify labour supply responses at both these margins. EUROMOD enables the simulation of tax–benefit reforms for all Member States and the assessment of static and non-behavioural effects of simulated policy changes, often referred to as first-order effects ([2]). EUROLAB allows us to estimate individual changes in labour market participation and hours of work in response to a reform, often referred to as second-order effects. EUROLAB relies on EUROMOD to simulate the budget constraint sets for different labour supply alternatives, following the literature on discrete choice labour supply modelling (Aaberge et al., 1995; van Soest, 1995), with the aim of estimating a set of behavioural parameters. In addition, EUROLAB allows us to factor in labour demand, which depending on its elasticity would lead to different employment levels and wage rates at the equilibrium. Both models run on EU Statistics on Income and Living Conditions (EU-SILC) data, which include detailed

([1]) Table 11 in Annex A shows the changes in a set of labour market indicators for Spain and the Euro Area between 2003 and 2023.
([2]) The EUROMOD model is maintained and developed by the European Commission's Joint Research Centre. For further details on the model, visit https://euromod-web.jrc.ec.europa.eu/ and see Sutherland and Figari (2013).

information on sociodemographic characteristics of individuals and households, enabling us to study labour supply responses and distributional effects across different population groups.

Our results show that the work incentive reform is expected to trigger positive labour supply reactions, concentrated at the lower end of the income distribution. The labour supply effects at the level of the total population are on average modest, taking into consideration that the earnings disregard only applies to existing MI beneficiaries, who are a small target group. However, certain population groups particularly benefit, namely lone parents, given the favourable treatment embedded within the reform. We emphasise that most labour supply responses are concentrated in part-time work, as full-time employment typically does not qualify workers for the earnings disregard (salaries are too high). Taking labour demand into account moderates the employment effects. While the positive employment effects result in a small revenue increase through slightly higher taxes and social insurance contributions, this increase does not fully counterbalance the expenditure increase. The reform also slightly reduces inequality and poverty. Nonetheless, our estimates should be interpreted as upper bounds, given the existing high non-take-up rate of the nationwide MI scheme, and reflect short-term effects, as the earnings disregard ends two years after its first application.

The paper makes three main contributions. First, to our knowledge, it is the first to provide an (*ex ante*) assessment of Spain's earnings disregard in the nationwide MI scheme, taking into consideration its expected fiscal, distributional and labour supply effects using individual microdata representative of Spain's population. Thus, our paper adds to the results of OECD (2023) obtained with hypothetical data by using real information on Spanish households from the EU-SILC to capture heterogeneous behavioural responses. In meeting this objective, this paper adds to the literature contributing to a better understanding of tax–benefit mechanisms for preserving work incentives, similarly in essence to existing studies on Spain (Ayala and Paniagua, 2019; Fuenmayor et al., 2024; Labeaga et al., 2008; Oliver and Spadaro, 2017) and on other Member States (Collado et al., 2016; Colombino et al., 2010). Second, our modelling provides updated estimates of labour supply elasticities for different groups of the Spanish population, estimates that can be used by researchers to calibrate parameters for other policy reforms or in a general equilibrium modelling context. To our knowledge, the most recent labour supply elasticity estimates for Spain available in the literature were produced several years ago (Bargain et al., 2014; Labeaga et al., 2008; Oliver and Spadaro, 2017) and refer to rather old data (e.g. 2006 EU-SILC data, as in Oliver and Spadaro (2017)). Third, our results can guide policymakers to improve the design of work incentive mechanisms to better target the needs of specific segments of the population who are not benefiting from the reform, but who are likely to be more responsive to it.

The text is organised as follows. After the introduction, Section 2 briefly reviews the related literature on the potential work disincentives associated with MI protection. Section 3 describes in detail how

the Spanish nationwide MI scheme and earnings disregard work. Section 4 explains the modelling tools used to simulate the fiscal, distributional and labour supply effects of the new reform. Section 5 presents the results and Section 6 concludes.

2. Related literature

Economists have long been intrigued by how tax–benefit policies affect individuals' decisions to work. An ample body of literature explores the labour supply effects of a large variety of tax–benefit policies, most notably in-work benefits, in light of a growing interest since the early 2000s in 'make work pay' policies (Pearson and Scarpetta, 2000) ([3]). The interest in work-conditional policies stems from the aim to limit design-embedded disincentives created by tax–benefit policies and, ultimately, to reduce unemployment and in-work poverty (Immervoll and Pearson, 2009). In this context, MI schemes, similarly to other out-of-work policies, are sometimes criticised for generating work disincentives, potentially influencing reservation wages and thereby affecting labour supply decisions.

A strand of studies indicates that MI protection can create work disincentives, with tax–benefit microsimulation and structural labour supply modelling revealing that MI schemes often lead to negative labour supply effects (Aaberge and Colombino, 2014). In Italy, Colombino and Narazani (2013) found that a guaranteed MI would cause modest negative labour supply responses and underperform in welfare terms compared with non-means-tested schemes, like basic income. In Austria, Christl and De Poli (2021) examined a 2019 reform proposal that reduced MI benefits for families with children and migrants, finding that the cuts would slightly increase labour supply, especially among migrants, despite their lower job-finding likelihood due to labour demand bias. In France, Gurgand and Margolis (2008) showed that, while MI beneficiaries would generally be better off employed, their income gains and work incentives would be minimal.

Other studies, however, find more mixed results, often indicating non-significant or low negative employment effects of MI protection. These studies, using *ex post* experimental or quasi-experimental methodological approaches, typically consider both labour supply and demand effects, as well as other factors affecting MI beneficiaries' employment decisions, such as job seeking clauses or activation policies. For instance, Maitino et al. (2024) found that the MI scheme in Tuscany, Italy, implemented in 2019, did not significantly disincentivise labour supply due to activation measures. Similarly, Busilacchi and Fabbri (2023) reported non-significant employment effects on average for the same scheme, with some negative effects in provinces with weak labour demand. In France, Bargain and Doorley (2011) found modest negative employment effects for uneducated single males under the MI scheme, but no significant effects for more educated individuals.

In response to potential design-embedded monetary disincentives, in-work mechanisms have often been embedded within MI schemes to allow combining work and benefit receipt. Hiilamo and Kautto (2008) found that introducing an earnings disregard in Finland's social assistance increased job-taking incentives, with recipients reporting higher work income post-reform, though the effects were

([3]) See Laun (2019) for a recent literature review.

smaller than expected, possibly due to labour demand shortages. Similarly, Palviainen (2023) observed no significant employment effects on average from the same policy reform but noted positive outcomes for women. In the Netherlands, Knoef and van Ours (2016) reported that an earnings disregard aimed at encouraging single mothers' participation boosted employment among single immigrant mothers, a group facing particularly weak labour market attachment and rarely targeted by activation policies compared with single native mothers.

Regarding the situation in Spain, to our knowledge, studies using individual microlevel data to estimate the employment effects of Spain's MI schemes are scarce. One exception is De la Rica and Gorjón (2019), who, using an *ex post* approach, show that the regional MI scheme of the Basque Country does not delay entry into employment on average, although it does so for specific groups such as young and less educated individuals. Notably, the Basque Country's MI scheme is recognised as one of the most developed regional MI schemes in Spain, incorporating mechanisms that allow benefit and earnings receipt (Zalakaín, 2014). More broadly, other studies have assessed the potential labour supply effects of work-conditional policy proposals in Spain. Labeaga et al. (2008) explore the impact of several personal income tax reforms, including hypothetical simulations of a basic income–flat tax design, finding modest effects on labour supply due to relatively small labour supply elasticities. Oliver and Spadaro (2017) examine a reform expanding the coverage of an in-work tax credit for mothers with children, finding a significant increase in female labour supply, particularly among low-income earners. In a similar vein, Ayala and Paniagua (2019) show that introducing an in-work tax credit, inspired by Saez's (2002) optimal design of an earned income tax credit, would induce positive labour supply responses, particularly among non-working mothers at the extensive margin, although it would also reduce work intensity from full-time to part-time work. Fuenmayor et al. (2024) explore replacing several non-contributory benefits with a negative income tax in a budget-neutral manner, finding a slight average increase in labour supply and positive distributional consequences.

3. The Spanish Minimum Income Scheme

The tax–benefit system in Spain is largely decentralised, with many benefits and taxes overseen by the regional governments. When the Spanish national MI scheme was introduced, several regional MI programmes already existed (the *Rentas Mínimas de Inserción*, in Spanish). Looking to strengthen the social safety net of the country in a homogeneous way, the central government implemented the national MI scheme in 2020, also aiming to overcome the limitations of the existing regional schemes (Hernández et al., 2022). In line with the goal of similar schemes in the EU (Almeida et al., 2022; Coady et al., 2021; Figari et al., 2013), Spain's nationwide MI scheme is a last-resort benefit that provides beneficiaries with a unique national guaranteed MI to cover their most basic economic needs.

The national MI scheme is a non-contributory means-tested benefit, and works as a top-up to the level of the guaranteed MI, taking into account the total income of the assessment unit before the benefit. The assessment unit is defined as a subgroup of the household linked by family relationships. Beneficiaries receive a benefit amount equal to the difference between the guaranteed MI amount and their income. The income considered for the means test is the disposable income of the assessment unit, excluding amounts received from regional MI schemes (the nationwide MI was introduced to complement, rather than replace, regional schemes) and dependency, housing and educational benefits. The guaranteed MI is updated yearly, and in 2023 the amount for a one-person household stood at EUR 6 784.44 per year, increasing with each additional member and for lone parents. The assessment unit's assets are also taken into account, and the upper threshold of asset value for benefit eligibility is equal to three times the yearly guaranteed MI amount for a one-person household (increasing with each additional member), excluding the value of the main residence. For the calculation of the benefit in year t, the means test considers the income and assets of the assessment unit in year $t-1$. Other eligibility criteria include a minimum age requirement, legal residence in the country for at least a year, a minimum period living independently and mandatory application to all other benefits to which the potential beneficiary is entitled, and more ([4]).

The initial design of the MI scheme had shortcomings (Ayala et al., 2022), one of which is the focus of this paper: the labour supply disincentive for low-income earners. In particular, the marginal effective tax rate of a MI scheme beneficiary was 100 % up to the guaranteed MI – that is, each additional euro that beneficiaries gained as an employee or self-employed person would be subtracted from the benefit amount. To correct this, in September 2022 the Spanish government introduced an earnings disregard (by means of Royal Decree 789/2022) to allow beneficiaries who increase their labour earnings up to a certain threshold to retain all or part of the benefit amount, up

([4]) For the full description of eligibility criteria and other details of the MI, see EUROMOD's Country eport of Spain: https://euromod-web.jrc.ec.europa.eu/resources/country-reports (accessed 7 October 2024).

to two years after the increase. The spirit of this reform is in line with the available evidence discussed in Sections 1 and 0.

The mechanism works as follows ([5]). Let us define *u* as the assessment unit, *g* as the guaranteed MI, *y* as the total means-tested income, *e* as earnings, *d* as the share of earnings to be disregarded, *m* as the final MI benefit and, finally, *t* as the year of the earnings. The MI level *m* in year *t* for assessment unit *u* is then calculated as:

$$m_{ut} = g_{ut} - y_{ut-1} + d(e_{ut-1} - e_{ut-3}) \quad (1)$$

Moreover, the share of earnings to be disregarded, *d*, varies as follows:

$$d = \begin{cases} 100\,\%, \text{if } (e_{ut-1} - e_{ut-3}) / g_{ut} < 60\,\% \\ \alpha, \text{if } 60\,\% \leq (e_{ut-1} - e_{ut-3}) / g_{ut} < 100\,\% \\ 0\,\%, \text{if } (e_{ut-1} - e_{ut-3}) / g_{ut} \geq 100\,\% \end{cases} \quad (2)$$

In particular, MI recipients fully benefit from the earnings disregard if their increase in earnings between *t – 1* (the income assessment year of the scheme) and *t – 3* remains below 60 % of the guaranteed MI. Recipients do not benefit at all if said increase surpasses 100 % of the guaranteed MI, and the disregard is applied partially if the increase in earnings falls between 60 % and 100 % of the guaranteed MI. In the latter case, the composition of the assessment unit determines the proportion of the earnings disregard, denoted as α. Three main elements define α: 1) whether household members were working before the earnings increase, in *t – 2*; 2) the presence of children; and 3) if there are children, whether they are looked after by a couple or a lone parent. Table 1 summarises how α varies according to these elements.

Table 1: The values of the proportion of earnings disregard α

	$e_{t-2} = 0$ (not working before the earnings increase)	$e_{t-2} > 0$ (working before the earnings increase)
No children	α = 30 %	α = 20 %
Parents in a couple	α = 35 %	α = 25 %
Lone parents	α = 40 %	α = 30 %

Source: Authors' own creation based on Royal Decree 789/2022.

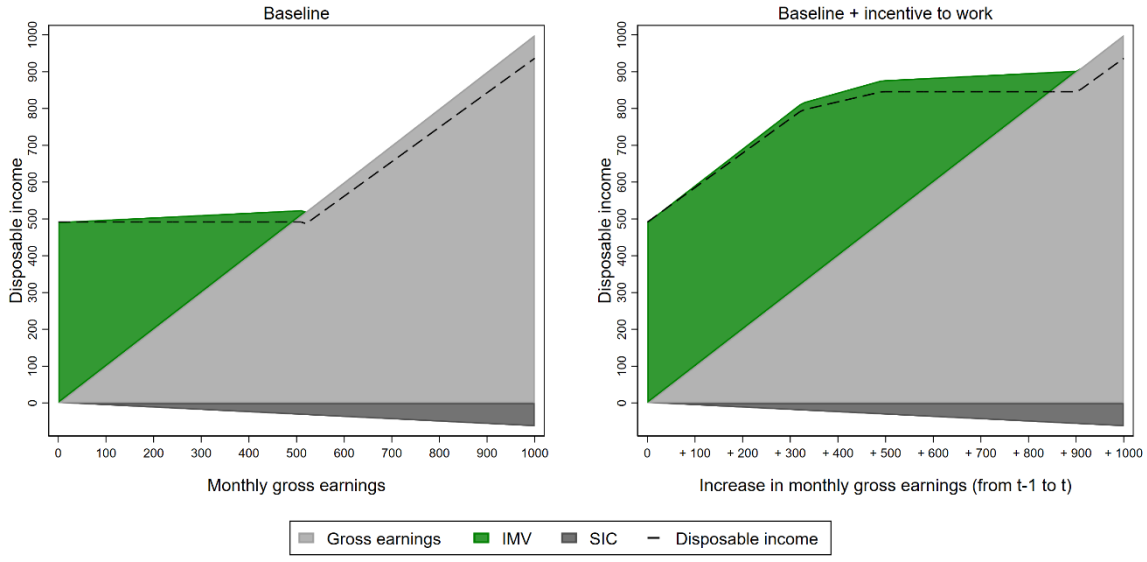
Notably, two years after the first increase in earnings, $d = 0$, and thus Equation (1) simply turns into:

$$m_{ut+3} = g_{ut+3} - y_{ut+2} \quad (3)$$

([5]) We have benefited from reading the following article: https://policy.fedea.net/los-incentivos-al-trabajo-en-el-ingreso-minimo-vital/ (accessed 7 October 2024).

In Section 4.1, we discuss the modelling of the MI scheme and the earnings disregard reform in EUROMOD, including limitations and caveats. In the rest of this section, we illustrate the reform using the EUROMOD Hypothetical Household Tool (Hufkens et al., 2019). This extension of EUROMOD enables us to assess the effects of a reform based on synthetic data on households with predefined characteristics. This tool helps, on the one hand, to verify that the modelling works as intended and, on the other hand, to provide an intuitive representation of the work incentive. Figure 1 depicts a single-adult household receiving the nationwide MI scheme with no earnings before the reform. The left-hand panel shows the pre-reform monthly disposable income, while the right-hand panel shows the situation after the reform. Specifically, the incentive to work removes the existing 100 % marginal effective tax rate up to approximately EUR 500 per month of disposable income. Post-reform, the rate varies from 0 % (up to about EUR 800 per month) to 100 % (at around EUR 840 per month), with an intermediate step of 70 %. Figure 1 helps us to grasp the mechanics of the reform, which eliminates the potential work disincentive for very low earners but also retains some disincentive at higher income levels. The intermediate transition step featuring a marginal tax rate of 70 % spans a short range of about EUR 40 per month.

Figure 1: Net monthly disposable income of a single adult before and after the reform



Note: the left (right) hand panel represents the situation of a single adult household with no labour income before (after) the reform is implemented. Amounts are expressed in monthly terms. IMV stands for *Ingreso Mínimo Vital*; SIC for Social Insurance Contributions.
Source: Authors' own creation based on EUROMOD I6.39+.

4. Modelling approach

The empirical strategy used in this study involves two steps: (1) modelling the reform in the tax–benefit microsimulation model EUROMOD; and (2) assessing the labour supply effects using the behavioural model EUROLAB. Both models run on the EU-SILC as underlying data. These steps and data are described in the following subsections.

4.1. EU Statistics on Income and Living Conditions data

The policy simulations of EUROMOD and EUROLAB are based on EU-SILC data, which are produced by the National Statistical Institutes of each participating country, alongside Eurostat. This is a harmonised dataset with a cross-sectional and longitudinal structure; it deals with income, social exclusion and living conditions, covering all Member States, and is extensively used for the study of poverty and inequality. It is an annual survey that collects information at the individual and household levels about income – wages, social contributions, taxes, pensions and other social transfers – and living conditions – housing, material deprivation, health status and more. The EU-SILC also includes individuals' demographic and socioeconomic characteristics such as gender, age, marital status and parenthood, education and labour market status ([6]). In this paper we use the 2022 EU-SILC cross-sectional dataset on Spain (with 2021 as the income reference period), adapted to be used with EUROMOD.

4.2. EUROMOD

EUROMOD is the tax–benefit microsimulation model for the EU. EUROMOD simulates the main direct taxes and benefits in place for households in all Member States, enabling us to simulate the potential impact of policy reforms on household incomes. EUROMOD is a static, non-behavioural model. 'Static' means that demographic and socioeconomic characteristics are not adapted over time, which applies for instance to age, education or number of children ([7]). 'Non-behavioural' means that the reactions of agents to a given reform are not simulated, and only 'morning-after' effects are produced by the model ([8]). This prevents us from estimating labour market reactions to a given reform, and to that end we also utilise the behavioural labour supply–demand model EUROLAB, which we describe in Section 4.3.

To simulate the work incentive reform of the Spanish MI scheme, we use EUROMOD in conjunction with the EU-SILC and EUROLAB. For that, we first need to simulate the MI scheme, and then the

([6]) For more information, see https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions/ (accessed 7 October 2024).

([7]) Monetary variables, however, are uprated by different indices in accordance with the nature of each variable to account for the time discrepancy between the year of the income data and the year of the policy simulations.

([8]) For a comprehensive description of EUROMOD see https://euromod-web.jrc.ec.europa.eu/overview/what-is-euromod (accessed 7 October 2024).

reform. We will now describe the modelling of the MI scheme and will continue with the reform in the following section. The public version of EUROMOD includes the simulation of the nationwide MI scheme ([9]) but faces four main limitations. First, due to insufficient information in EUROMOD's EU-SILC-based microdata, some eligibility conditions cannot be simulated. For instance, legal residence duration, independent living status for individuals under 30 years of age, and benefit application status are missing from the data. Second, the EU-SILC lacks assets data, which is necessary to simulate the assets test. To address this, EUROMOD capitalises investment and rental income – which are reported in the survey – with the average monthly interest rate of deposits and the average return of property rental, respectively ([10]). Third, the income and assets tests of the MI in year t are performed on the value of these variables in $t-1$, as mentioned in Section 3, but the EU-SILC also lacks information on individuals' past income (and assets). Consequently, the calculations occur contemporaneously, meaning that the MI for an assessment unit u in t is computed based on the relevant income received in the same year. Third, a substantial proportion of eligible households did not claim the MI - a non-take-up share of 56 % according to the Independent Authority for Fiscal Responsibility (2024). Unfortunately, we lack information on the households that did not claim. While calibrating EUROMOD to match the total simulated beneficiaries with official statistics is feasible (and it is actually the default in the model), this is achieved by selecting a random share of eligible units as final beneficiaries to match official statistics. For this paper we assume full take-up to avoid randomising subsequent labour supply responses by selecting only a subgroup of beneficiaries. The likely impact of the first, second and third limitations is the overestimation of the effects of the MI, both in terms of the number of beneficiaries and the total expenditure. Additionally, the responses to the work incentive reform introduced in 2022 will be overestimated too. However, the sign of the effect of the third limitation – regarding the contemporaneous calculations – is unclear but likely to be small. Overall, we believe that these caveats do not prevent us from estimating the labour supply response to the MI reform, since the direction of the estimate will not be affected, only its magnitude ([11]). Therefore, our estimates are to be interpreted as upper bounds, providing informative insights on potential effects in the case of the full implementation of the MI scheme.

Additionally, modelling the work incentive reform in EUROMOD requires further information on one key factor: potential income. To estimate the potential rise in earnings for MI beneficiaries if they increase their labour supply following the reform, we turn to EUROLAB. Section 4.3 describes in detail

([9]) The regional MI schemes are simulated too, but we do not describe their modelling here given that it will have no direct effect on our simulations of the nationwide scheme's reform.

([10]) The corresponding data are obtained from the European Central Bank and the Bank of Spain, respectively. Capitalising incomes is arguably insufficient, as it does not account for assets without explicit returns, like non-rented properties.

([11]) We have carried out an alternative simulation with a random non-take-up adjustment and found that, as expected, the sign of the effect remains unchanged and only the magnitude is reduced. In Section 5.4 we discuss these alternative results.

how the EUROLAB model serves this purpose and others in the study, and Section 4.4 describes the modelling of the reform.

4.3. EUROLAB

The behavioural labour supply–demand model EUROLAB, as fully explained in Narazani et al. (2023), relies on a large body of literature on discrete choice modelling (Aaberge et al., 1995; van Soest, 1995). Under the principle of random utility maximisation (McFadden, 1974), discrete choice analysis assumes that households choose the option with the maximum utility for them from a set of mutually exclusive and collectively exhaustive alternatives. Specifically, households are assumed to face a range of alternatives that include market jobs (employment) and non-market activities (non-participation). The EUROLAB model uses EUROMOD to construct the counterfactual budget constraint for each alternative of the choice set.

Formally, households choose within a set of alternatives Ω, where each alternative is characterised by a number of working hours and wage rates (H, w). When the alternative is a market job, then H can take four possible values in the ranges $(6–18)$, $(19–31)$, $(32–44)$ and $(44–57)$. If the alternative is a non-market activity (non-participation), then $H = w = 0$. In what follows, we use the index j to identify the different types of alternatives. The utility attained by household i when choosing the alternative j is assumed to be the sum of deterministic part $V(.)$ and an unexplained component ε_{ij}, where $\varepsilon \sim \mathrm{Gumbel}(0,1)$ is a random variable that represents unobserved factors affecting utility. The assumption of the Gumbel distribution for the random component ε_{ij} leads to the following probability that household i is willing to accept an alternative of type j (Aaberge et al., 1995):

$$P_{ik} = \frac{exp\{V(C_{ik}, T - h_k; \gamma_i) + D'_{ik}\delta_i\}}{\sum_{j \in \Omega} exp\{V(C_{ij}, T - h_j; \gamma_i) + D'_{ij}\delta_i\}} \quad (4)$$

$V(.)$ depends on disposable income C, leisure $T - h$ and a set of parameters that represent the preferences of the household. More specifically, the following statements hold.

$C_{ij} = \tau(w_{ij}h_j, I_i)$ = net available income computed according to the tax–benefit rule τ as a function of labour income $w_{ij}h_j$ and other exogenous income I_i.

T = total available time; $T - h$ = leisure.

γ_i = vector of parameters that characterise the preferences of the household.

D'_{ij} = vectors of $(0, 1)$ dummy variables. Their elements are associated with specific types of alternatives. The standard interpretation is that they capture the effects of unobserved features of (some of) the alternatives j. The starting assumption is that the different types of alternatives are in general not equally available.

δ_i = vector of parameters related to D'_{ij} dummy variables.

For $V(.)$, EUROLAB uses a quadratic specification in income and leisure, where the preference parameters assigned to linear terms, such as income and leisure, are allowed to differ by certain individual and household characteristics. These characteristics include age (age), the number of children aged 0–3 years ($numch_3$), the number of children aged 3–6 years ($numch_6$), the total number of children ($numch$) and household size ($hhsize$). Leisure is also interacted with two dummy variables: one indicating whether the decision-making unit is a migrant ($migrant$) to take into account labour market integration constraints, and another one indicating whether the unit holds a mortgage liability ($mortgage$) to control for financial constraints. The deterministic part of the utility function is then expressed as follows:

$$V(C, T - h; \gamma) = \gamma_C C + \gamma_{CC} C^2 + \gamma_F (T - h_F) + \gamma_{FF}(T - h_F)^2 + \gamma_M (T - h_{MM}) + \gamma_{MM}(T - h_M)^2 + \gamma_{FM}(T - h_F)(T - h_M) \quad (5)$$

where:

$$\gamma_C = \beta_C hhsize \quad (6)$$

$$\gamma_M = \beta_{M1} numch_3 + \beta_{M2} numch_6 + \beta_{M3} numch + \beta_{M4} age + \beta_{M5} age^2 + \beta_{M6} migrant + \beta_{M7} mortgage \quad (7)$$

$$\gamma_F = \beta_{F1} numch_3 + \beta_{F2} numch_6 + \beta_{F3} numch + \beta_{F4} age + \beta_{F5} age^2 + \beta_{F6} migrant + \beta_{F7} mortgage \quad (8)$$

4.4. Simulation of the work incentive reform

To simulate the work incentive reform, we tailor EUROLAB in two ways: first, we include an additional interaction with leisure for MI beneficiaries. This adjustment helps to capture beneficiaries' preferences for leisure before the reform is implemented. Second, we exploit the variation in estimated earnings for different labour supply choices to allow the simulation of the earnings disregard. Leveraging the EUROLAB model, which constructs counterfactual budget constraints for different labour supply alternatives, we can estimate the potential income gains of MI beneficiaries and thereby trigger the simulation of the earnings disregard.

Specifically, consider an individual who reported no earnings in the previous year. When simulating the counterfactual choice of a non-market job (equivalent to zero hours of work), the model computes the same MI level before and after the earnings disregard. However, when for the same individual the model simulates a counterfactual choice related to market jobs (e.g. part-time or full-time employment), the MI amount may change in the presence of the earnings disregard, compared with the situation where no earnings disregard is in place (whether it changes, and to what extent, will

depend on the level of income attained now by this individual). Specifically, the MI amount may not diminish (or may do so only partially) with the earnings disregard, and so the disposable income may increase.

Formally, the work incentive reform introduced in the MI scheme leads to a new tax-transfer rule τ^1 and, therefore, a new household disposable income $C_{ij} = \tau^1(w_{ij}h_j, I_i)$. This change in household disposable income affects the probability of taking a job, leading to what is often referred to as the second-round effect, which represents pure changes in the desired number of working hours and the activity/inactivity status. The number of people willing to work (the labour supply) will change. The new aggregate labour supply AS^1 can be computed as follows:

$$AS^1 = \sum_i \sum_h P\left(\tau^1(w_{ij}h_j, I_i), T - h_j; \gamma, \delta\right) \quad (9)$$

However, the second-round labour supply effects do not consider the demand side of the labour market, which plays a crucial role in determining employment levels. Depending on the elasticity of the labour demand, changes in labour supply may translate into a different employment level when the labour market reaches a new equilibrium. Market equilibrium requires that the number of available jobs be equal to the new desired labour supply, and therefore the number of available jobs will also have to change.

To take into account labour demand, the EUROLAB model adopts a partial equilibrium model, proposed by Colombino (2013) and recently revised by Narazani and Colombino (2021). It exploits the link between the dummies' coefficients and the number of jobs available on the market in order to take labour market equilibrium conditions into account. Colombino (2013) shows that the coefficient related to the participation dummy can be expressed as a function of the total number of jobs, $\delta = lnJ + a$ where J = the total number of market jobs (corresponding to $D_1 = 1$) available in the opportunity set, and a is a constant that represents other unobserved factors affecting the relative desirability of the participation alternative. Assuming that the EU-SILC data represent a labour market equilibrium, that is, the number of employed people is equal to the number of available market jobs (J), and further assuming that the total number of jobs changes proportionally by e^v, leading to a new labour demand $J(v) = Je^v$, where v is a parameter to be determined in equilibrium, we can write $\delta(v)$ as the new corresponding value of δ:

$$\delta(v) = ln(Je^v) + A = lnJ + a + v = \delta + v \quad (10)$$

We further assume a constant-elasticity labour demand $J = Kw^{-\eta}$ where w is the mean of the wage rates distribution, K is a constant and η is the (absolute) elasticity of labour demand, equal to 0.5. Using Equation (10) we get the new value of the mean wage as a function of pre-reform mean wage w:

$$w(v) \;=\; K^{1/\eta}(Je^{v})^{-\,1/\eta} \;=\; K^{1/\eta}J^{-\,1/\eta}e^{-\,v/\eta} \;=\; we^{-\,v/\eta} \qquad (11)$$

The new values of $\delta(v)$, given in Equation 10, and $w(v)$, given in Equation (11), determine the new values of income:

$$C_{ij}(v) \;=\; \tau\big(w_{ij}(v)h_j, s_j, e_j, I_i\big)$$

and the new choice probabilities:

$$P_{ik}\,(v) \;=\; \frac{exp\{V(C_{ik}(v), T \;-\; h_k; \gamma_i) \;+\; D'_{ik}\delta_i(v)\}}{\sum_{j\in\Omega} exp\big\{V\big(C_{ij}(v), T \;-\; h_j; \gamma_i\big) \;+\; D'_{ij}\delta_i(v)\big\}}$$

Given these new choice probabilities, the desired labour supply AS^2 under the policy rule τ^1 and the adjustment parameter *v* can be given as $AS^2 \;=\; \sum_i \sum_h P\left(\tau^1\big(w_{ij}(v)h_j, I_i\big), T \;-\; h_j;\; \gamma, \delta(v)\right)$ ([12]).

Then the equilibrium value v^* is such that:

$$AS^2 \;=\; \sum_i \sum_h P\left(\tau^1\big(w_{ij}(v)h_j, I_i\big), T \;-\; h_j;\; \gamma, \delta(v)\right) \;=\; J(v^*) \quad (12)$$

where the left-hand side (AS^2) represents the total desired labour supply in terms of the number of jobs that households are willing to accept. The right-hand side ($J(v^*)$) represents the available jobs, or labour demand. Note that the adjustment to the number of jobs through a change in the level of the wage rates is a movement along the labour demand curve. The equilibrium simulation requires finding (typically through an iterative procedure) the value v^* that satisfies Equation (12).

([12]) $w_i(v)$ denotes the wage rate of household *i* in the distribution with mean $w(v)$.

5. Results

In this section, we report our main results. First, we describe the characteristics of the labour supply sample (Section 5.1). Then, we show our estimation of the utility and job opportunities parameters (Section 5.2), as well as the estimated labour supply elasticities of households (Section 5.3). These parameters describe how households might respond to changes in the tax–benefit system and the underlying factors driving the households' behaviour. Next, we report and discuss the labour supply responses to the introduction of the earnings disregard (Section 5.4), as well as its budgetary and distributional effects (Section 5.5).

5.1. Summary statistics of the labour supply sample

The sample selected for the examination of potential labour supply changes is detailed in Table 2. It consists of households headed by either partners in couples or single individuals, all aged between 20 and 65 years. Moreover, we include employed and non-employed individuals, excluding from the latter category those who are non-employed because they are students or pensioners. As a result of the selection criteria, the sample consists of 20 069 individuals, comprising 10 226 individuals in couples and 9 843 single women and men. Out of this sample, 950 observations (approximately 5 % of the total labour supply sample) are identified as eligible to receive Spain's nationwide MI scheme ([13]).

Table 2: Labour supply sample distribution across household types

	All individuals		MI beneficiaries	
	Obs.	Weighted	Obs.	Weighted
Couples	10 226	8 001 575	224	196 301
Single women	5 063	3 700 055	414	322 355
Single men	4 780	4 071 588	312	261 389
Total	20 069	15 773 218	950	780 046

Note: The 'single' categories also include coupled individuals whose partners are excluded from the endogenous labour supply sample because they fall into the categories of retirees, pensioners or students. Obs. refers to observations.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

Table 3 illustrates some sociodemographic characteristics of the labour supply sample. The left-hand column shows the main summary statistics for MI beneficiaries, while the right-hand column does so for the remaining individuals in the sample. The composition of MI beneficiaries in terms of gender, age and number of children is relatively similar to that of the remainder of the sample, although there is a slightly lower presence of children in MI beneficiaries' households. This is also reflected in the average household size, which is relatively small for MI beneficiaries (2.58) compared with the

([13]) The sample of MI beneficiaries may be deemed small, particularly when disaggregating by certain characteristics. For that reason, our estimates should be treated cautiously. Future research may wish to consider the availability and use of administrative microdata.

rest of the sample (2.99). In addition, the average number of migrants is slightly lower among MI beneficiaries than among the other individuals.

The most notable differences, however, concern MI beneficiaries' work patterns and education levels. Some 70 % of MI beneficiaries experience very low work intensity, as opposed to only 1 % of the remainder of the sample, and the average working hours of MI beneficiaries are only 9 hours per week, compared with 34 hours per week for the rest of the sample. Furthermore, only 30 % of MI beneficiaries are considered employed, as opposed to 89 % of the rest of the sample. It is also evident that MI beneficiaries typically have lower education levels, with 62 % showing low educational attainment compared with 29 % of the remainder of the sample. These work and education patterns are reflected in the location of MI beneficiaries in the income distribution, with MI beneficiaries predominantly placed in the first decile, while the remaining individuals are on average located around the sixth decile.

Table 3: Sociodemographic characteristics of the labour supply sample

		MI beneficiaries	Remainder of the sample
Number of children	0	0.52	0.48
	1	0.23	0.24
	2	0.16	0.24
	3+	0.09	0.04
Gender	Female	0.55	0.5
Age	Less than 24 years	0.03	0.01
	24–40 years	0.25	0.26
	41–65 years	0.72	0.73
Work	Average working hours (per week)	9.13	34.27
	Employment rate	29 %	89 %
Work intensity	Very low	0.70	0.08
	Low	0.08	0.02
	Medium	0.04	0.08
	High	0.09	0.13
	Very high	0.09	0.69
Household	Size	2.58	2.99
	Income decile	1.19	6.37
	Migration status (1: migrant; 2: native)	1.76	1.94
Education level	Low	0.62	0.28
	Middle	0.23	0.23
	High	0.14	0.49

Notes: The employment rate is defined as the share of individuals reporting positive working hours and positive employment income with respect to the sample. Work intensity is measured as the ratio of the total number of months that all working-age household members have worked during the income year and the total number of months the same household members theoretically could have worked in the same period. Education levels are defined as 'low' (primary education or less), medium (secondary education) and high (tertiary education). Income deciles are constructed based on disposable household income equivalised using the OECD equivalence scale. Migration status is defined based on information on country of birth reported in the EU-SILC data.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

5.2. Estimated behavioural and job opportunities parameters

First we use EUROLAB to estimate the parameters characterising preferences for labour and income among households based on their sociodemographic characteristics, as well as the parameters related to existing job opportunities. These parameters are estimated separately for three types of households – couples, single women and single men – and are reported in Table 4.

The first set of parameters, related to job opportunities density, indicates that full-time jobs dominate the labour market while part-time jobs have limited uptake, reflecting the structure of the Spanish labour market. In particular, the share of part-time employment out of total employment in Spain stood at approximately 13 % in 2023, substantially below the Euro Area average of 20 %. However, the share of involuntary part-time employment relative to total part-time employment is among the highest in the EU (49.3 % in 2023) ([14]). The presence of undesired part-time work and, more generally, a low number of hours worked may have medium- to long-term negative consequences for individuals' work careers (Gorjón et al., 2021).

The second set of parameters pertains to individuals' preferences for leisure, suggesting a preference for leisure among both men and women. Specifically, the positive linear term and the negative quadratic term associated with leisure are both statistically significant, indicating that the utility function is concave with respect to leisure. In addition, we find the interaction of leisure with the total number of children to be significant and negative for men, which indicates that fathers work more than childless men. However, for women, only the interaction with the number of children under three years old is significant (and positive), while the interaction with the total number of children is not. Consistent with the data, women with young children in Spain experience substantially lower labour force participation rates than women without children. Despite Spain's efforts to increase formal childcare provision (Hupkau and Ruiz-Valenzuela, 2022) for children under three years old (reaching 55.74 % in 2023 ([15]) and surpassing the recommended 45 % of the Barcelona target), challenges in the labour market persist for women with young children. The situation is particularly severe for women with children under 15 years of age; in Spain they are 7.5 times more likely than men (with children of the same age) to work part-time and twice as likely to be unemployed (Hupkau and Ruiz-Valenzuela, 2022). Furthermore, the interaction between leisure and the dummy variable representing whether households are MI beneficiaries is significantly positive for both men and women. This indicates that MI beneficiary households have a relatively higher preference for leisure than the remaining households. In addition, having financial constraints, such as a mortgage, appears to enhance the preference for work for both single men and single women, but for couples this effect is

([14]) See also Table 11 in Annex A.

([15]) Eurostat (dataset ilc_caindform25), https://ec.europa.eu/eurostat/databrowser/bookmark/4fc3c81e-49d9-4589-9886-49119826c872?lang=en (accessed 7 October 2024).

not statistically significant. Couples exhibit a preference for spending leisure time together, as suggested by the positive sign of the interaction between leisure terms within couples.

The final set of parameters characterises utility in relation to household net income. The linear term shows a significant positive effect only for couples, while net income's interaction with leisure is significantly positive across all subgroups, indicating a complementarity relationship between these two goods. The interaction between net income and household size is significantly negative, indicating a negative relationship between the utility of income and the household size. The intuition behind this finding is that at a given level of income, in households with more members income per capita is lower, resulting in a decrease in utility.

Table 4: Estimated utility and job opportunities parameters

	Couples	Single women	Single men
Job opportunities parameters			
In-work dummy – male	– 5.276***		– 5.327***
	(– 11.51)		(– 14.00)
Part-time dummy – male	– 0.867***		– 0.835***
	(– 5.21)		(– 5.41)
Full-time dummy – male	1.465***		1.357***
	(15.45)		(12.89)
In-work dummy – female	– 3.938***	– 4.272***	
	(– 13.15)	(– 13.93)	
Part-time dummy – female	– 0.110	– 0.181	
	(– 0.83)	(– 1.36)	
Full-time dummy – female	0.981***	0.943***	
	(8.95)	(8.74)	
Leisure parameters – male			
Leisure	0.304***		0.274***
	(5.06)		(6.04)
Leisure^2	– 0.00325***		– 0.00307***
	(– 8.74)		(– 7.83)
Leisure × age	– 0.00473*		– 0.00400***
	(– 2.35)		(– 3.47)
Leisure × age^2	0.0000631**		0.0000528***
	(2.97)		(4.13)
Leisure × no of children < 3 years	– 0.00868		– 0.00436
	(– 1.26)		(– 0.59)
Leisure × no of children	– 0.00843**		– 0.00486*
	(– 3.10)		(– 1.98)
Leisure × MI beneficiary	0.0822***		0.0735***
	(8.43)		(12.10)
Leisure × migrant	0.0173*		– 0.0158*
	(2.50)		(– 2.18)
Leisure × mortgage	0.0000417		– 0.00100***
	(0.23)		(– 4.17)
Leisure parameters – female			
Leisure	0.344***	0.480***	
	(5.27)	(9.26)	
Leisure^2	– 0.00459***	– 0.00421***	
	(– 10.29)	(– 9.46)	
Leisure × age	0.00352	– 0.00601***	
	(1.75)	(– 5.26)	
Leisure × age^2	– 0.0000263	0.0000786***	
	(– 1.24)	(6.27)	
Leisure × no of children < 3 years	0.0121*	0.0129*	
	(2.28)	(2.43)	
Leisure × no of children	– 0.00213	0.00287	
	(– 1.01)	(1.29)	
Leisure × MI beneficiary	0.0665***	0.0729***	
	(5.41)	(14.23)	
Leisure × migrant	– 0.00233	– 0.0176**	
	(– 0.40)	(– 3.00)	
Leisure × mortgage	– 0.000207	– 0.000408**	
	(– 1.43)	(– 2.70)	
Leisure male × leisure female	0.000587***		
	(3.86)		
Income parameters			
Net income × household size	– 0.000578**	– 0.000517*	0.000222
	(– 3.22)	(– 2.31)	(1.21)
Net income	0.00414**	0.000101	– 0.00179
	(3.18)	(0.09)	(– 1.18)
Net income^2	0.000000911**	0.00000301***	0.00000205***
	(2.80)	(6.64)	(3.43)
Net income × leisure – male	0.0000627***		0.0000795***
	(6.90)		(5.62)
Net income × leisure – female	0.0000168*	0.0000720***	
	(2.34)	(8.14)	
Observations	5 113	5 063	4 780
Likelihood	– 7 438 092.6	– 4 061 337.3	– 3 512 133.6
R^2	0.422	0.318	0.464

Notes: In table, *t*-statistics are in parentheses. Significance levels are denoted as *p < 0.05; **p < 0.01; ***p < 0.001.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

5.3. Labour supply elasticities

Based on the previously estimated parameters, we compute the wage elasticities by increasing gross wages by 1 %, calculating the probability of each labour supply choice and aggregating the labour supply responses. Tables 5 and 6 present the elasticities of total working hours and participation for men and women, categorised by household type. Total working hours elasticities reflect the overall responsiveness of labour supply to wage changes, while participation elasticities, or extensive margin elasticities, measure how likely individuals are to participate in the labour market. The difference between these two measures is the intensive margin elasticity, which captures changes in working hours for those already participating in the labour market. Notably, in Table 5, we consider two types of elasticities for couples: direct elasticities and cross-elasticities. The direct values pertain to individuals' labour supply changes in response to wage changes, while cross-values pertain to individuals' labour supply changes based on their partners' wage changes. In Table 6, we also split the elasticities depending on the presence of children in the household.

The average total elasticity is 0.188, with women typically showing higher values than men (0.233 versus 0.145), a result that aligns with most existing evidence (see Bargain and Peichl (2016) for a review). The small difference between total elasticities and participation elasticities suggests that most labour supply adjustments in Spain occur at the extensive margin, meaning that changes in labour force participation are more responsive to wage changes than to changes in working hours. This finding also aligns with existing evidence suggesting that the extensive margin dominates the intensive one (Bargain et al., 2014). For couples, both men and women exhibit positive direct elasticities (0.152 for men, 0.241 for women). In addition, men's working hours and participation are negatively affected by their partners' wages, although only slightly, while women's working hours and participation are minimally but positively affected by their partners' wages. This finding is in line with the cross-elasticities reported for Spain in Oliver and Spadaro (2017). In contrast, singles (both men and women) have slightly lower labour supply elasticities (0.138 for men, 0.224 for women). Overall, singles are less responsive in terms of working hours than couples, a similar finding to that of Labeaga et al. (2008).

Among couples, men with children have a lower total elasticity (0.120) than men without children (0.206). Women without children have the highest total elasticity (0.255) among all groups. For singles, the pattern is similar: men with children (0.112) and women with children (0.149) have lower elasticities than those without children (0.216 for men, 0.228 for women). Overall, parents tend to have lower elasticities, indicating that the presence of children reduces responsiveness to wage changes. This result, however, is in contrast to existing studies that estimate elasticities for women with children to be higher than those for women and men without children (Bargain and Peichl, 2016; Mastrogiacomo et al., 2017). One explanation for that may be that the parents included in our analysis

are observed to work more than their counterparts without children (see Table 8, column 'Baseline'), a variable that is used as a denominator in the elasticity formula. On the other hand, the presence of children and the responsibility to spend care hours with them leave less time available and, consequently, lead to less responsiveness to wage increases.

Note, however, that our estimates based on 2022 EU-SILC data may not directly align with earlier research by Bargain and Peichl (2016) or García and Suárez (2003), which used data collected before 2010 and in 1994, respectively. As Bargain and Peichl (2016) emphasise, it is essential to consider temporal changes and broader contextual factors when analysing labour supply elasticities. In the Spanish context, our results are generally consistent with those of Labeaga et al. (2008) and Oliver and Spadaro (2017), despite their studies using data from the 1990s and 2006, respectively. More recent studies focusing on the labour supply effects of tax–benefit reforms in Spain (Ayala and Paniagua, 2019; Fuenmayor et al., 2024) unfortunately do not report specific elasticity values for comparison.

Table 5: Wage labour supply elasticities by household type and gender

			Total elasticity	Participation elasticity
Couples	Men	Direct	0.152	0.122
		Cross	– 0.028	– 0.019
	Women	Direct	0.241	0.164
		Cross	0.0082	0.0079
Singles	Men		0.138	0.120
	Women		0.224	0.166
Total			0.188	0.142

Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

Table 6: Wage labour supply elasticities by household type, gender and presence of children

			Total elasticity	Participation elasticity
Couples	Men	With children	0.120	0.091
		Without children	0.206	0.172
	Women	With children	0.232	0.155
		Without children	0.255	0.178
Singles	Men	With children	0.112	0.088
		Without children	0.149	0.133
	Women	With children	0.216	0.157
		Without children	0.228	0.171

Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

5.4. Estimated labour supply responses

Using the estimated behavioural and job opportunities parameters from Table 4, and after the validation and discussion of the corresponding labour supply elasticities, we compute the expected labour supply responses to the introduction of the earnings disregard. Table 7 shows these responses,

disaggregated by (equivalised disposable) income quintiles for the whole labour supply sample (i.e. not only for MI beneficiaries). Our results suggest that individuals at the lower end of the income distribution are the primary beneficiaries in terms of labour supply incentives. Specifically, women are expected to increase their labour market participation more than men are (by 2.61 % and 1.79 % respectively). The impact on working hours appears slightly lower, with hours increasing by 2.09 % and 1.58 % for women and men respectively. This concentrated response in the bottom quintile naturally aligns with the targeted approach of Spain's nationwide MI scheme.

Table 7: Estimated labour supply changes by gender and income quintiles, full labour supply sample

Gender	Quintile	Hours of work			Participation		
		Baseline	Reform	% change from baseline	Baseline	Reform	% change from baseline
Men	1	27.198	27.628	1.58	0.677	0.690	1.79
	2	36.065	36.065	0.00	0.887	0.887	0.00
	3	37.063	37.063	0.00	0.913	0.913	0.00
	4	37.400	37.400	0.00	0.920	0.920	0.00
	5	38.910	38.910	0.00	0.943	0.943	0.00
Women	1	21.009	21.449	2.09	0.612	0.628	2.61
	2	28.978	28.980	0.01	0.815	0.815	0.01
	3	30.893	30.893	0.00	0.862	0.862	0.00
	4	32.613	32.613	0.00	0.894	0.894	0.00
	5	35.053	35.053	0.00	0.928	0.928	0.00
All		33.292	33.357	0.20	0.862	0.864	0.24

Notes: Income quintiles are constructed based on equivalised disposable income under the baseline. The OECD-modified scale is used to equivalise income.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

We now look into labour supply responses by gender and household type for the whole labour supply sample, which we show in Table 8. We find positive outcomes across all household types considered, with lone mothers experiencing the most substantial increases in participation rates (2 %) and working hours (1.58 %). For lone fathers, the responses are more modest, with a 0.62 % increase in participation rate and a 0.55 % increase in working hours. Couples without children exhibit less pronounced reactions. These particularly substantial behavioural responses are understandable given the reform's specific features in aid of families with children, particularly lone parents (recall that the share of earnings disregard increases in such cases). Overall, both men and women with children tend to show greater changes in labour supply (both in terms of weekly hours and participation) than those without children, even though we estimated the labour supply elasticities of the former to be higher than those of the latter.

These labour supply changes can be considered relatively modest, which might be partially explained by the limited coverage of Spain's nationwide MI scheme, and therefore of the reform. Thus, we also

examine the behavioural responses in the limited sample of MI beneficiaries. Results are provided in Table 12 in Annex B. The increases in participation rates and working hours are quite substantial, reaching 29 % for fathers (whether in couples or single). Similarly, lone mothers are estimated to experience a high increase in labour participation (26 %) while mothers in couples show a more modest increase (12 %). However, note that these relative changes should be interpreted in light of the very low participation rates and working hours of MI beneficiaries before (and in fact still after) the reform.

Table 8: Estimated labour supply changes by gender and household type, full labour supply sample

Gender	Household type	Hours of work			Participation		
		Baseline	Reform	% change from baseline	Baseline	Reform	% change from baseline
Men	In couple – with children	37.450	37.564	0.31	0.913	0.916	0.34
	In couple – without children	35.216	35.230	0.04	0.869	0.870	0.05
	Single – with children	36.288	36.487	0.55	0.883	0.889	0.62
	Single – without children	34.035	34.061	0.08	0.842	0.843	0.11
	All	35.909	35.974	0.18	0.882	0.883	0.21
Women	In couple – with children	30.971	30.997	0.09	0.859	0.860	0.10
	In couple – without children	30.124	30.134	0.03	0.834	0.834	0.04
	Single – with children	27.933	28.374	1.58	0.761	0.776	2.00
	Single – without children	31.129	31.239	0.35	0.838	0.842	0.53
	All	30.548	30.614	0.22	0.841	0.843	0.29

Notes: Children are defined as the sons or daughters of the decision-making unit. They are not older than 18 years or, if older, they are in education.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

Another reason for the relatively modest labour supply responses shown in Table 8 is the employment type, in terms of weekly hours. Table 9 shows participation rates before and after the reform for different households, distinguishing by part- and full-time employment. Individuals display a higher preference for part-time work, compared with the situation prior to the reform, in order to avoid surpassing the threshold of the income test, which would render them non-eligible to receive the benefit. Single fathers and mothers working part-time show the strongest reaction, with 2.76 % and 5.34 % increases, respectively. Among other individuals working part-time, single women without children (1.90 %) and fathers in couples (1.67 %) show particularly pronounced responses. The fact that fathers in couples display a stronger reaction than women in couples could be explained by the intrahousehold allocation of tasks, with women typically bearing childcare responsibilities (García-Mainar et al., 2011). However, keep in mind that these increases are not substantial in absolute terms, given for instance the very low participation rates of men working part-time. Regarding individuals working full-time, we observe that single parents show the strongest reaction – a pattern we consistently observe for this type of household.

Table 9: Estimated labour supply changes by gender, household and employment type, full labour supply sample

Gender	Household type	Participation					
		Part-time employment			Full-time employment		
		Baseline	Reform	% change from baseline	Baseline	Reform	% change from baseline
Men	In couple – with children	0.035	0.035	1.67	0.878	0.881	0.29
	In couple – without children	0.041	0.041	0.55	0.828	0.828	0.03
	Single – with children	0.035	0.036	2.76	0.848	0.853	0.53
	Single – without children	0.048	0.048	0.90	0.795	0.795	0.06
	All	0.040	0.040	1.12	0.842	0.843	0.16
Women	In couple – with children	0.211	0.211	0.24	0.631	0.631	0.06
	In couple – without children	0.208	0.208	0.10	0.616	0.616	0.02
	Single – with children	0.170	0.179	5.34	0.578	0.584	1.03
	Single – without children	0.174	0.177	1.90	0.649	0.650	0.16
	All	0.200	0.201	0.77	0.627	0.627	0.13

Notes: Children are defined as the sons or daughters of the decision-making unit. They are not older than 18 years or, if older, they are in education.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

Furthermore, as explained in Section 4.2, it is important to note that our simulation of the reform assumes full implementation of the MI scheme, in particular in terms of a 100 % take-up of the benefit. However, official statistics estimate a 56 % non-take-up share (Independent Authority for Fiscal Responsibility, 2024), suggesting a rather limited implementation. In order to assess the effects of our assumption of full take-up, we have also run an alternative simulation with random calibration, meaning that we randomly pick beneficiaries from the set of eligible households until we reach 44 %. We resort to random calibration because we lack information on which households did not take up the benefit, and even though it is not ideal, random calibration should not be problematic at the aggregate level. Our results suggest that assuming full take-up does not prevent us from estimating the labour supply responses to the MI reform, given that the assumption only affects the magnitude of the response and not the direction. Specifically, in the alternative simulation, women in the first quintile of income increase labour market participation by 1.48 % (compared with 2.61 % in the full take-up model; see Table 7), and men in the same quintile do so by 0.91 % (1.79 % assuming full take-up). The impact on working hours is lower too; in the first quintile, women's hours increase by 1.18 % in the alternative simulation versus 2.09 % with full take-up, and men's hours increase by 0.81 % versus 1.58 % respectively. Therefore, we emphasise that our main results indicate the sign of the response but should be considered upper bounds, providing informative insights on potential effects in the case of full implementation of the MI scheme.

All the results thus far take a labour supply perspective. However, their impact ultimately depends on the availability of jobs in the labour market – this is, the extent to which supply is met by demand.

Using EUROLAB, we also measure potential changes in employment by considering the labour market's demand side. In short, we assume a labour demand elasticity of 0.5 (Lichter et al., 2015) and calculate the change in average wages that aligns with a new labour market equilibrium following the introduction of the MI scheme reform. As already shown, the reform is expected to increase the labour supply of MI beneficiaries, thus shifting the desired labour supply curve to the right and resulting in a 0.24 % increase in total employment (Table 7). However, to ensure consistency between available jobs and desired labour supply, adjustments are made along the demand curve and wage rate such that wages decrease slightly (by 0.44 %), reducing the final employment increase to 0.22 %.

5.5. Budgetary and distributional effects

In this subsection, we report the effects of the reform and the subsequent estimated labour supply changes in budgetary and distributional terms. In budgetary terms, our estimates indicate a slight increase in revenue (0.04 %), due to households paying more direct taxes and social insurance contributions in response to the positive employment effects. However, this revenue increase does not counterbalance the increase in expenditure, naturally leading to a decrease in net revenue of around – 0.54 % with respect to the baseline. In addition, we look at some distributional indicators, namely the Gini coefficient and the at-risk-of-poverty (AROP) rates and gaps, as reported in Table 10. The reform is expected to slightly decrease inequality, as measured through the Gini coefficient, and (in-work) poverty, as measured through the AROP rate and the AROP gap ([16]). Reductions in (in-work) AROP rates are more pronounced when the poverty threshold is set at 40 % of the median equivalised disposable income, in line with the fact that Spain's nationwide guaranteed MI levels are designed to address extreme poverty.

([16]) Note that the distributional indicators are already underestimated at baseline relative to EU-SILC data, mainly due to the assumption of full take-up.

Table 10: Estimated distributional effects

Indicator	Baseline	Reform	Diff. from baseline
Gini coefficient	0.313	0.311	– 0.002
AROP rate (%)			
60 % poverty threshold	19.304	19.105	– 0.199
40 % poverty threshold	6.078	5.769	– 0.309
In-work AROP rate (%)			
60 % poverty threshold	8.676	8.633	– 0.043
40 % poverty threshold	2.251	2.089	– 0.162
AROP gap (%)			
60 % poverty threshold	5.045	4.854	– 0.191
40 % poverty threshold	1.237	1.120	– 0.117
In-work AROP gap (%)			
60 % poverty threshold	3.730	3.554	– 0.176
40 % poverty threshold	2.251	2.089	– 0.162

Notes: The Gini coefficient measures inequality on a scale from 0 to 1, with higher values indicating greater inequality. The AROP rate measures poverty incidence, representing the share of the population with incomes below the poverty threshold. The AROP gap measures poverty intensity, showing the mean shortfall in income from the poverty threshold, as a percentage of the poverty threshold. Poverty thresholds are set at either 40 % or 60 % of the median equivalised disposable income and are anchored to the baseline. In-work poverty refers to individuals that are both employed and at risk of poverty. Diff., difference.

Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

6. Conclusions

This paper studies employment responses within the context of MI protection. The appropriate design of MI schemes is essential to minimise potential work disincentives and avoid inactivity traps while guaranteeing minimum living standards. We focus on Spain's nationwide MI scheme, which initially imposed a 100 % marginal effective tax rate on MI beneficiaries, potentially introducing a perverse incentive. To amend this, the Spanish government introduced a work incentive within the nationwide MI scheme. In practice, this incentive allows beneficiaries who increase their labour earnings to retain all or part of the MI benefit by disregarding these earnings when performing the MI income test. Notably, the reform features higher disregards for individuals transitioning from unemployment to employment, and for parents.

We provide an *ex ante* evaluation of this reform, focusing mainly on its potential labour supply effects. We use the tax–benefit microsimulation model EUROMOD, in combination with the behavioural labour supply discrete choice model EUROLAB, to set up a framework that enables us to estimate labour supply responses. We use the EU-SILC, which provides microdata representative of Spain's population, to estimate the parameters characterising the heterogeneous preferences for work and leisure among Spanish households and compute labour supply elasticities across different population groups. In line with the existing literature, we find relatively modest labour supply elasticities on average, with most labour supply adjustments occurring at the extensive margin. Women exhibit higher elasticities than men. Contrary to other studies, we do not find higher labour supply elasticities for parents than for individuals without children.

Regarding labour supply responses, we find positive effects, concentrated at the lowest part of the income distribution, consistent with the targets of the MI scheme. Our results suggest that women's labour supply reactions are larger than those of men, with lone parents, especially lone mothers, experiencing considerable increases in employment and working hours. In terms of increases in working hours, the reform reduces the incentive to not work at all mainly by encouraging part-time work. A possible reason for this is that full-time jobs could make workers surpass the threshold of the income test of the MI scheme, making them ineligible for the benefit (OECD, 2023). However, taking labour demand into account moderates the employment effects, given that the increase in supply may not be fully matched by the market. The positive employment effects trigger a small revenue increase due to slightly higher taxes and social insurance contributions, which nevertheless does not offset the expenditure increase brought on by the benefit. From a distributional perspective, the reform has positive but limited effects, slightly reducing inequality and poverty.

Our research naturally faces some limitations. First, MI schemes' eligibility rules are complex, involving several conditions that cannot be accurately simulated with survey data such as the EU-SILC (e.g. assets tests). While we effectively utilise the available data, we acknowledge that simulation

errors may lead to an overestimation of MI support and, therefore, of the effects of the work incentive. Moreover, high non-take-up rates impede an accurate identification of the real beneficiaries and also influence the magnitude of our estimations. Second, our calculations take place contemporaneously, whereas Spain's nationwide MI scheme and the earnings disregard are computed based on income from previous years. In practice, MI beneficiaries need to anticipate the expected effect of the reform in response to today's increased labour supply, and hence the effects will become noticeable only after some time. We are, however, not able to factor in considerations of a dynamic nature – meaning that we assume beneficiaries to rationally anticipate the effects of the work incentive. Third, by design the work incentive ends after two years, yet we only estimate the immediate effect, namely in the roll-out year. The two-year time frame may be considered relatively short, with some individuals potentially returning to their initial situations prior to the work incentive if their integration into the labour market is not fully achieved in that time frame. We do not deal with potential long-term effects in our analysis.

Nonetheless, we believe that important policy implications can be derived from our study. First, our results suggest that the work incentive reform is a step in the right direction, eliminating the existing 100 % marginal effective tax rates in some situations. The reform aligns with comparable mechanisms existing in other Member States and features specific rules to incentivise the labour supply of beneficiaries moving from unemployment to employment, and of families with children, particularly lone parents. However, our analysis also suggests positive reactions among individuals without children, for whom we estimate larger labour supply elasticities than for parents. We believe that the labour market activation of this group is also important and should be better addressed in the design of work incentives. Second, while the reform increases the labour supply of MI beneficiaries, it mainly does so through the promotion of part-time employment. This broadly occurs because the earnings disregard does not typically apply in the case of full-time work, given the remaining 100 % marginal effective tax rates for higher earnings. As long as working part-time is the preferred option for the beneficiaries (e.g. for childcare reasons), this might not be interpreted as a negative outcome. However, involuntary part-time work is considerably widespread in Spain, particularly among women, and transitions from part-time to full-time work do not always take place, especially when individuals accumulate long spells of part-time work (Kyyrä et al., 2019). Additional policies, namely active labour market policies, are needed to ensure that beneficiaries fully integrate into the labour market, increasing their chances of finding better jobs and avoiding stagnation in low-quality employment. Third, the scheme is only targeted at existing MI beneficiaries, although its coverage remains far from its full potential (Independent Authority for Fiscal Responsibility, 2024). Extending the work incentive to all potential low-income workers, regardless of their status as today's MI beneficiaries, might broaden the coverage of MI protection and further reduce in-work poverty.

Future work might consider the simulation of reforms that expand the current reach of the work incentive, for instance, by including other low-income earners beyond current MI beneficiaries, or by increasing the threshold of the earnings disregard. Additionally, as more recent income data encompassing information on MI beneficiaries become available, future research could evaluate the reform on an *ex post* basis, providing a comparison with our *ex ante* estimates. Ideally, *ex post* evaluations would also track MI beneficiaries over time (after the work incentive ends) to assess the long-term success of the reform in terms of labour market integration.

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List of tables and figures

Annexes

Annex A. Labour market indicators in Spain

Table 11: Comparison of selected labour market indicators, Spain and Euro Area, 2003, 2013 and 2023

	Spain			Euro area		
	2003	2013	2023	2003	2013	2023
Unemployment rate (% of population in the labour force)	11.5	26.1	12.2	9.0	12.0	6.6
Long-term unemployment rate (% of population in the labour force)	2.2 (a)	13.0	5.0	4.1 (a)	6.0	2.9
Temporary employees (% of total employees)	32.0	23.2	17.3	14.4	14.9	14.4
Involuntary part-time employment (% of the total part-time employment)	19.9	63.3	49.3	18.9	30.9	19.6
In-work AROP rate (% of total population)	10.6 (a)	10.6	11.3	7.3 (a)	8.7	8.1

(a) Initial year corresponds to 2005.
Source: Eurostat, Labour Force Survey and EU Statistics on Income and Living Conditions.

Annex B. Additional results

Table 12: Estimated labour supply changes by gender and household type, sample of MI beneficiaries

Gender	Household type	Hours of work			Participation		
		Baseline	Reform	% change from baseline	Baseline	Reform	% change from baseline
Men	In couple – with children	9.777	12.586	28.73	0.265	0.341	28.71
	In couple – without children	5.729	6.275	9.53	0.160	0.178	11.22
	Single – with children	10.317	13.379	29.67	0.285	0.369	29.39
	Single – without children	9.282	9.676	4.24	0.253	0.267	5.17
	All	8.935	10.390	16.28	0.244	0.285	16.79
Women	In couple – with children	6.882	7.732	12.35	0.248	0.277	11.59
	In couple – without children	6.737	7.166	6.38	0.246	0.262	6.27
	Single – with children	8.727	10.997	26.01	0.290	0.369	26.90
	Single – without children	10.311	11.358	10.16	0.338	0.380	12.49
	All	8.638	9.847	14.00	0.293	0.337	15.02
All		8.775	10.097	15.07	0.270	0.313	15.75

Notes: Children are defined as the sons or daughters of the decision-making unit. They are not older than 17 years or, if older, they are in education.
Source: Authors' own creation based on EUROMOD I6.39+ and EUROLAB in combination with EU-SILC data.

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— via the following form: european-union.europa.eu/contact-eu/write-us_en.

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EU law and related documents

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EU open data

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