Living Apart or Together: Effect of Social Benefits

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Abstract

In most European countries, poor cohabiting adults are eligible to lower per capita social assistance benefits than poor adults living alone, as they are supposed to benefit from economies of scale in household expenses as housing, heating costs, etc. In this paper, we show that this aspect of social assistance varies strongly within Europe and use this variation to identify a possible causality of social assistance scheme parameters on cohabitation decisions. Our statistical analysis suggests that high benefits for cohabitants decrease the number of poor one-person households significantly. We discuss the consequences of this result on government expenditures and touch upon externalities that strengthen the case for higher cohabitant amounts in countries with strongly differentiated rates.

Keywords: Guaranteed Minimum Income, Cohabitation, Divorce, Public transfers
JEL: J12, J18

1. Introduction

Social assistance, or the provision of resources to households that cannot make ends meet, represents an important last resort "safety net" in most of European countries. Such assistance is often conditioned on strict means-tests that aim at verifying that those households cannot sustain themselves either by working, resorting to savings or relying on relatives. On the contrary of social insurance, having contributed previously is not a condition to receive social assistance.

This assistance can take the form of general-purpose transfers or specific allowances. General-purpose transfers are not meant to cover particular expenses and are paid in cash. Those general-purpose transfers are often accompanied by specific allowances to support access to goods and services considered as essential (food, heating, health, travelling, housing, culture, etc.). Those allowances can be provided

in-kind, i.e. through a direct provision of those goods and services (either free or at reduced price), or through a reimbursement of proven expenses.

In most countries, social assistance benefit levels depend on household structure. Households are typically categorized as parents, single parents, couples without children or singles without children as needs and means can vary substantially across those categories. Larger households are supposed to benefit from economies of scale in their expenses, for example heating or housing costs, and therefore usually receive lower per capita benefits. On the other hand, families with children have additional needs for the raising of children and often more difficulties to combine work and household duties, justifying a more generous support. In addition, handicapped and elderly people often receive additional support to compensate a lower autonomy and productivity.

A large literature aims at identifying so-called *equivalence scales*, which answer the question: "How much income does a household with characteristics z need to reach the same level of well-being as a reference household?". Equivalence scales, whether being "normative" scales set by experts based on minimum baskets of goods, or developed by social science based on consumption data or direct welfare measurement, help policy-makers in defining the parameters of social assistance programmes. Despite the commonly held perception that differentiated benefits are an efficient way to fight poverty, there is significant variation in equivalence scales implied by social assistance programmes across the European Union (EU).

We illustrate this for childless adults, who are the focus of our analysis. Figure 1 depicts the maximum (per capita) levels of general-purpose social assistance for single and cohabiting individuals in the EU.[1] The ratios between cohabitant and single amounts are given in Figure 2. From those figures one can observe that assistance is

[1]Note that some countries are excluded from the analysis, due to lack of data: Italy, where national measures against poverty and social exclusion are in place only since 2018 (Reddito di inclusione REI, replaced by the Reddito di Cittadinanza in 2019). Before those programmes, only experimental programmes where implemented in specific municipalities. The same holds for Greece where it was only in 2017, after two pilot programmes, that a significant nation-wide guaranteed minimum income scheme was introduced. In Spain, a national minimum income scheme only exists since 2020. Before, minimum income schemes were determined at local level, in the 17 Autonomous Communities, but the variance of the policy parameters was limited. We thus build a country-level value by taking the average of the four main regions (Madrid, Catalonia, Andalusia, Valencia), which represent about 60% of the population.

higher in northern and western European countries, and that the ratio of cohabitant amount to single amount varies across Europe, from 0.52 in Malta to 1 in Denmark and Latvia, with numerous countries at 0.75 and 0.9, reflecting the significant variation in the equivalence scales used.[2]

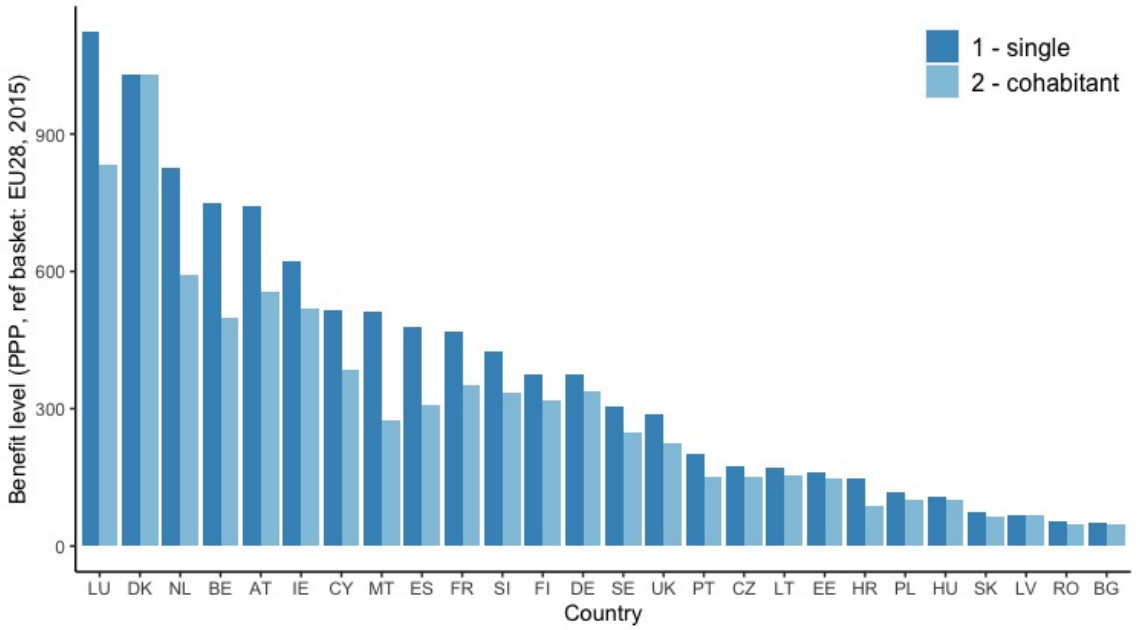

Figure 1: Benefits levels in PPP EUR
Source: Euromod country reports, own calculations

Notwithstanding the fact that economies of scale allow cohabitants to reduce their expenses, criticisms have been voiced against benefits too strongly differentiated according to household size. Strong differences might, according to those, prevent people in need to naturally join forces by sharing costs of living, creating "loneliness traps". Worse, they could have destructive effects on poor couples and families, who prefer to live separately to not see their financial means decrease too much.[3] This

[2]2007 data for Croatia is missing, as Croatia was not yet member of EU.

[3]See Appendix A for a detailed description and field reports discussing those issues in Belgium. In the Netherlands, the *kostendelersnorm* is also criticized for pushing young adults into homelessness, preventing cohabitation and preventing the care of dependent adults (See e.g. García et al. (2021)). The reason is that the level of per capita benefits is inversely related to the number of adults cohabiting. When young adults become 21, socially assisted parents thus see their benefits

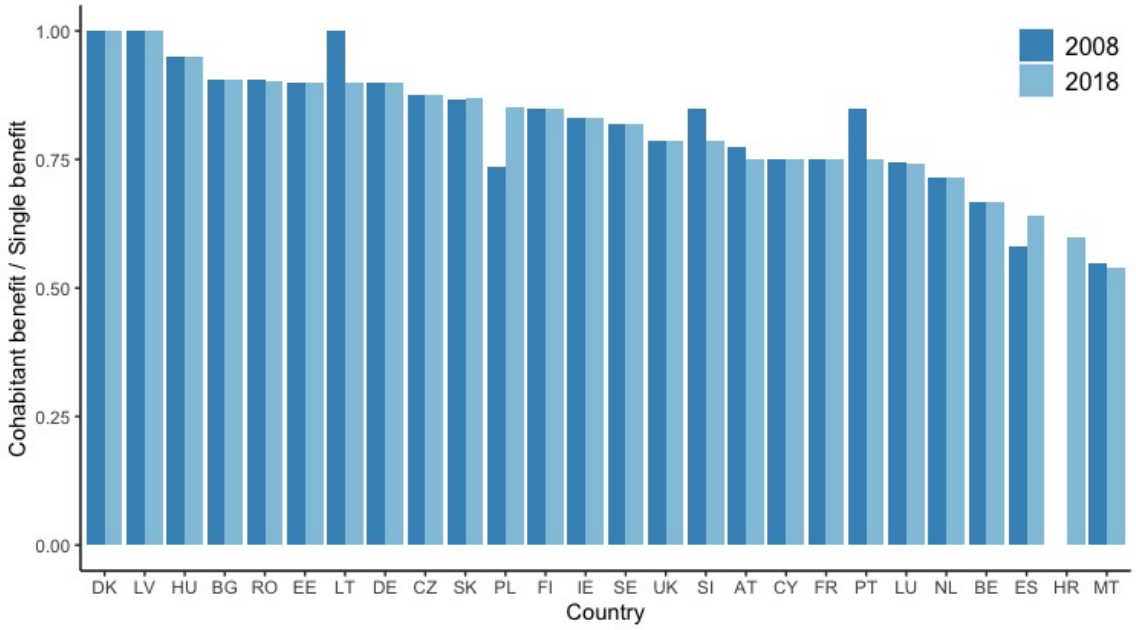

Figure 2: Ratio of cohabitant amount to single amount
Source: Euromod country reports, own calculations

in turn leads to additional adverse effects as a reduction of available housing space and an underitilization of scarce material resources as energy and household appliances. Another series of criticisms concern the administrative cost and difficulty of controlling household structure and the invasion of privacy implied: marriages don't last as long as in the past and are often de facto dissolved before they are formally dissolved, unregistered cohabitation has become far more prevalent, ... (Van Parijs and Vanderborght (2017)). Those elements have lead to some arguments in favour of universal systems where benefits for adults are fully individualized (and thus do not depend on household composition).

Knowing to what extent cohabitation decisions are affected by social assistance benefit schemes is a crucial question for policy-makers. On one hand, from an economic point of view, as it will impact the government expenses and thus the overall efficiency of a policy. On the other hand from an ethical point of view, as important private decisions of households could be influenced by policy parameters.

decrease, sometimes creating untenable family situations.

The goal of this paper is therefore to estimate statistically if and to what extent social assistance benefit schemes affect cohabitation, by using cross-country and time variation of social assistance benefits in Europe. We focus on households without children, and run a regression analysis to test whether the ratio of the maximum per capita level of the social assistance benefits one receives when living with an other person (hereafter "cohabitant amount") to the level of social assistance benefits one receives when living alone (hereafter "single amount") has an impact on household composition. We find that when cohabitant amounts are low compared to single amounts, socially assisted individuals indeed more often live alone. The effect of an increase of this ratio by 1 percentage point (following an increase in the cohabitant amount), increases the share of cohabiting socially assisted individuals by 0.70 to 0.72 percentage points on average. This estimate is then used to compute the budgetary impact of increasing the cohabitant amounts. As will be seen, a significant part of the direct cost is recovered by the fact some socially assisted singles will start cohabiting and hence receive lower per capita benefits.

In section 2, we go through related research. In section 3, we introduce a simple theoretical framework to develop the possible effects of social assistance scheme parameters on cohabitation decisions. In section 4, we present the results of our statistical analysis aiming at estimating the relationship between social assistance scheme parameters and household composition. Section 5 discusses policy implications and 6 concludes. An analysis of Belgian social assistance benefits, that strongly disadvantage cohabitants, is provided in Appendix A.

2. Literature review

The reasons to marry or cohabit that are identified in the economic literature could be split into 3 categories. The first one, and probably the most important one, directly relates to the well-being increases related to family life: companionship, love, children, ... (the non-marketable household-produced commodities in Becker (1973)). The second one relates to consumption aspects: when two individuals start cohabiting, they not only benefit from economies of scales by the consumption of public (or family) commodities, but also, they can specialize in the production of goods in which they have a comparative advantage. In this way, a partner could devote more time to labour supply, while the other could focus on household production and childcare. Partners could also coordinate investment activities, e.g. by investing in human capital of the most able one, to maximize lifetime earnings. Thirdly, marriage

provides security as spouses provide insurance to each other through intra-household transfers.[4]

The importance of the second and third determinants of marriage, related to consumption (or purchasing power) and insurance, clearly can vary after a change in social security programmes. In Becker (1973) and Becker (1974) seminal analytical framework of marriage and divorce, divorce is predicted to increase with (expected) social security transfers to divorced individuals/families, as those transfers reduce the financial costs of divorce and thus the disutility of being single. Moreover, social security transfers reduce the incentive to cohabiting as a means to smooth consumption shocks through income-pooling.

A line of research endeavoured to estimate to what extent social assistance programmes, by affecting the utility levels one could expect when being single versus married, impacted divorce rates of families with children. Many researches, to which T. Paul Schultz, Robert A. Moffitt and Anne E. Winkler contributed significantly[5], for example investigated the effect of the Aid To Families with Dependent Children (AFDC) programme on household structure in the US. The AFDC programme, originally created to support single mothers, was criticized for creating a disincentive for (re-)marriage because women who married faced the reduction or loss of their AFDC benefits. It is generally estimated that AFDC had a negative impact on marriage probabilities, however this result is relatively fragile. The Temporary Assistance for Needy Families (TANF) programme was created out of the pre-existing AFDC programme to end needy parents' dependence on governmental benefits, and with the frequently expressed goal to strengthen the institution of marriage. The impact of this reform on marriage has been studied among others by Bitler et al. (2004), who concludes that the welfare reform is not "pro-marriage" on balance, as it may have actually decreased the incentives to be married by giving women greater financial independence via the program's new emphasis on work. In Canada, a study by Lefebvre and Merrigan (1998) shows that more generous welfare policies intended for couples with children could push single mothers to marriage and cohabitation and thus decrease the amount of public spending to single mothers on welfare.

A related line of research focused on how social security benefits affect the marriage market by being a substitute to income-insurance implicitly provided by

[4]See for example Rosenzweig and Stark (1989) or Hess (2004).

[5]See Grossbard-Shechtman (2003) for a discussion of this literature.

marriage through intra-household transfers. Kotlikoff and Spivak (1981) showed that individuals have economic incentives to establish relationships which provide risk-mitigating opportunities, in a context of uncertain life duration. They suggested that the growth in pension and social security payments could explain to some extent the increased instability in marriage arrangements. Anderberg (2007) constructs a simple model to explore the interaction between partnership formation/dissolution and welfare-state policy. He shows that publicly provided earnings insurance can reduce the steady-state marriage rate and the financial cooperation (or intra-household transfers) between partners. Public insurance is also predicted to increase the "turnover" rate in the marriage market. Potoms and Rosenberg (2021) build on this model and estimate the effect of Affordable Care Act's Medicaid expansion on marital outcomes. They show both theoretically and empirically that while Medicaid expansion does decrease the marriage rate, it also reduces the divorce rate of new marriages. As individuals have lower incentives to marry to insure each other against shocks, their model predicts that in order to enter or stay in marriage, the match quality has to increase. They moreover estimate that, even tough the expansion is mainly targeted at lower-income individuals, it may also affect the behaviour of those individuals who have low absolute likelihoods of ever gaining coverage, by changing the perceived risk of marrying an individual of a particular income-group. Lastly, Low et al. (2018) show that limitations in time of welfare receipt, introduced by the US welfare reform of 1996, could increase marriage stability by worsening the outside option associated with getting divorced.

In Europe, research is scarcer and has primarily focused on families with children. For example Tjøtta and Vaage (2008) analyze whether public transfers to divorced families induces marital instability, and finds that the level of transfers has a positive effect on the probability to divorce. Closely related, Walker and Zhu (2006) investigate the effect of child support liabilities on partnership dissolution in the UK and find that an increase in child support liabilities significantly reduce the dissolution risk. Regarding insurance aspects, Persson (2020) shows that marital behaviour is a component of couples' strategies to plan for financial security in old age, by analyzing a reform of the survivor's insurance in Sweden. The question of the impact of welfare on cohabitation of childless adults has to the best of our knowledge not been studied yet.

While the literature generally uses the term "marriage" to identify adults living together, it is progressively becoming obsolete due to the growing share of individuals living together outside a formal marital relationship. We will therefore use the term

"cohabitation" to designate adults living together in a consensual union and being either in marital, registered or unregistered partnership. In a context of welfare policies, it seems particularly adequate as the factual situation of a household is usually taken in to account for the determination of the assistance that will be provided.

3. A theoretical model

The simple model presented here allows to develop formally the different effects on cohabitation and government expenses that can be expected when changing parameters of social assistance schemes. In subsection 3.1, we present the building blocks of our model, in which a simple social assistance scheme is modeled. In subsection 3.2 we predict the effects of changing the different policy parameters singly or jointly. In subsection 3.3 we extend our model to include or discuss respectively risk (and insurance), intra-household transfers and in-kind social assistance.

3.1. Model assumptions

Let's suppose a population of N utility-maximizing adult individuals that have an exogenous[6] labour status and income. Their income is equal to 0 if they are unemployed and in the interval $[w_{min}, \infty[$ if they work, where w_{min} is the minimum wage.[7] Those individuals all form fixed pairs (we call this set of pairs the fixed matching M), that can decide to cohabit or live separately. Cohabitation is a joint decision, and thus will only occur if both individuals of a pair prefer that option. On the contrary, pairs will live separately if at least one of them prefers living alone. Pairs can be classified in 3 categories, depending on their incomes: low-income pairs (both individuals having an income of 0), mixed-income pairs (one having an income 0, and the other an income greater than w_{min}), and high-income pairs (both earning more than w_{min}). Those pairs are represented on Figure 3. There are no taxes in the model and poor households receive social assistance benefits lifting their income

[6]This assumption implies that labour market decisions are independent of the cohabitation decision. While this last assumption is certainly unrealistic in a setting with households having children, where sometimes marriage or cohabitation has an influence on labour supply (and thus income) of one of the partners that specializes in household production, it seems more reasonable to consider labour decisions as exogenous to the cohabitation status when considering only childless adults.

[7]We do not consider individuals working part-time and earning an income in $]0, w_{min}[$.

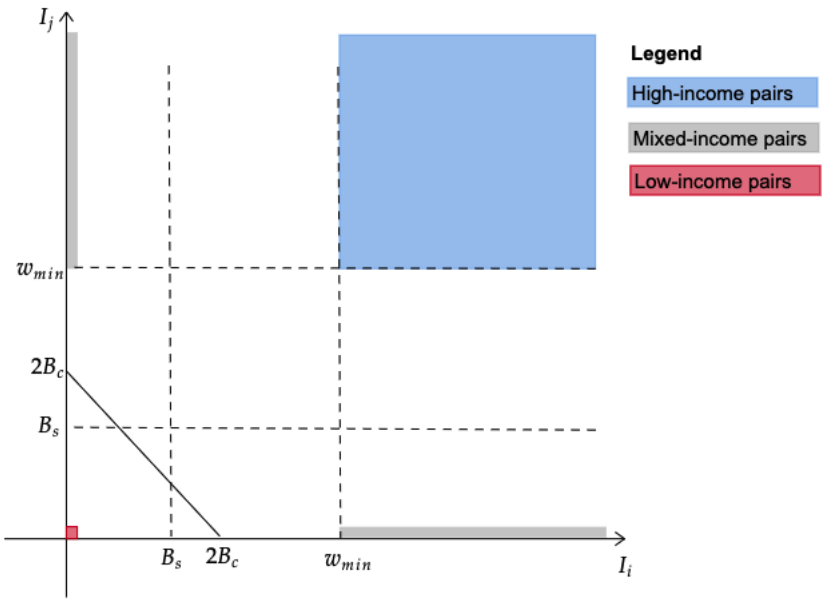

Figure 3: Possible pairs, given the assumptions on the income distribution.

to a determined guaranteed minimum income. Those different aspects are detailed hereafter.

Social assistance We assume a means-tested social assistance scheme that is such that if the income of a single is strictly lower than B_s or if the per capita household income of cohabitants is strictly lower than B_c, benefits are given to them by the government to make up for the difference: a single receives benefits amounting to $B_s - I_i$ and cohabitants receive benefits amounting to $2.B_c - I_i - I_j$. We assume that the level of those social assistance benefits is such that $0 \leq B_c \leq B_s \leq 2B_c << w_{min}$.

This scheme is comparable to most social assistance schemes in Europe, as those usually include a means-test and where the income of the cohabiting partner is taken into account in the means-test (such that someone not working but having a partner earning a salary will not be eligible to social assistance, for example). Moreover, it has the feature that cohabitants receive a lower per capita benefit than singles, and that those benefits are significantly lower than minimum wages.[8] Individuals

[8]See Table C4 in Appendix C for actual figures regarding the ratio of social assistance benefits

in low-income pairs in our model are thus eligible to social assistance regardless of their cohabitation status. Only the unemployed individual in mixed-income pairs will eligible to social assistance if he lives alone, and will lose this benefit if he cohabits. Individuals in high-income pairs are not eligible to social assistance benefits, regardless of their cohabitation status.

Utility function We assume individuals' utility level is the sum of two terms: one reflecting their material well-being, and one reflecting non-material well-being or match quality.

Their material well-being, denoted $g(q, Q)$, depends on their consumption of a private good q and of a public (or family) good Q that is used by both cohabitants (e.g. housing). We assume that $g(q, Q)$ is homothetic, increasing in both arguments and concave. This implies that, given the prices of the private and public goods, individuals' utilities are the highest when their consumption of the private good relative to the public good corresponds to a fixed ratio $\alpha = \frac{q}{Q}$. We moreover assume a unitary household model where cohabitants pool their income, jointly determine their spending on the public good, and split the remaining budget evenly. Singles will thus spend a fraction $\frac{1}{1+\alpha}$ of their income on the public good and $\frac{\alpha}{1+\alpha}$ on the private good, and cohabitants will spend a fraction $\frac{1}{1+2\alpha}$ of their total income on the public good, and $\frac{\alpha}{1+2\alpha}$ of their total income on the private good each.

Match quality, denoted γ_{ij}, enters utility as a finite (negative or positive) utility shift when cohabiting. This utility shift is assumed heterogeneous across pairs, and encompasses all non-financial elements that could influence the desire to cohabit: emotional and physical attraction, family projects, socio-cultural influences, ...

Given the social assistance scheme described above, utility of an individual is thus given by (where δ_{ij} is a dummy indicating whether the pair i and j cohabits):

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to minimum wages in the EU.

$$U_i(I_i, I_j, \gamma_{ij}, \delta_{ij}) = \begin{cases} g\left(\frac{\alpha B_s}{1+\alpha}, \frac{B_s}{1+\alpha}\right) & : \delta_{ij} = 0, I_i < B_s \quad (1a) \\ g\left(\frac{\alpha I_i}{1+\alpha}, \frac{I_i}{1+\alpha}\right) & : \delta_{ij} = 0, I_i \geq B_s \quad (1b) \\ g\left(\frac{\alpha 2B_c}{1+2\alpha}, \frac{2B_c}{1+2\alpha}\right) + \gamma_{ij} & : \delta_{ij} = 1, I_i + I_j < 2.B_c \quad (1c) \\ g\left(\frac{\alpha(I_i+I_j)}{1+2\alpha}, \frac{I_i+I_j}{1+2\alpha}\right) + \gamma_{ij} & : \delta_{ij} = 1, I_i + I_j \geq 2.B_c \quad (1d) \end{cases}$$

One can see from Equations (1b) and (1d) that an individual living alone and earning an income $I > B_s$ attains a level of material well-being equal to $g\left(\frac{\alpha I}{1+\alpha}, \frac{I}{1+\alpha}\right)$, which is the same level as cohabitants that each earn $\frac{1+2\alpha}{2(1+\alpha)}I$. This amount is located between $0.5I$ and I, since α is located between 0 and $+\infty$. In other words, cohabitation allows individuals to attain a given level of material comfort with a lower per capita income, by sharing public goods. How bigger the share of public goods in the consumption basket, how stronger will be the material well-being increase when individuals start cohabiting.

Let's now define E, the *equivalence elasticity* (see Buhmann et al. (1988)), as the value that allows to transform the incomes of households of different sizes into a comparable measure of material well-being, the *equivalent income*, in the following way:

$$I^{eq} = \frac{I_{tot}}{H^E} \quad (2)$$

where I_{tot} denotes total household disposable income and H the household size. In other words, a single earning I attains the same level of material well-being as a pair of cohabitants having a total income of $2^E I$. In our setting, this gives

$$g\left(\frac{\alpha 2^E I}{1+2\alpha}, \frac{2^E I}{1+2\alpha}\right) = g\left(\frac{\alpha I}{1+\alpha}, \frac{I}{1+\alpha}\right) \quad (3)$$

where E can be isolated as

$$E = \frac{log\left(\frac{1+2\alpha}{1+\alpha}\right)}{log(2)} \quad (4)$$

The equivalent income thus depends on the income and the cohabitation status

in the following way:

$$I_i^{eq} = \begin{cases} B_s & : \delta_{ij} = 0, I_i < B_s \\ I_i & : \delta_{ij} = 0, I_i \geq B_s \\ \frac{2.B_c}{2^E} & : \delta_{ij} = 1, I_i + I_j < 2.B_c \\ \frac{I_i + I_j}{2^E} & : \delta_{ij} = 1, I_i + I_j \geq 2.B_c \end{cases} \tag{5}$$

In fact, E reflects the economies of scale cohabiting individuals experience, and from Eq. 4 one can see that E is located between 0 and 1. At one extreme, where $E = 0$, all goods are common ($\alpha = 0$) and an individual's equivalent income is thus equal to the total household income. The incentives to cohabit are strong. At the other extreme, $E = 1$. There are thus no public goods ($\alpha = +\infty$) and economies of scale are such that the equivalent income equals the total income divided by the household size.

As material well-being only depends on equivalent income and cohabitation status, one can rewrite Eq. 1 by this simple expression:

$$U_i(I_i, I_j, \gamma_{ij}, \delta_{ij}) = f(I^{eq}) + \delta_{ij}\gamma_{ij} \tag{6}$$

where $f(I^{eq}) = g\left(\frac{\alpha I^{eq}}{1+\alpha}, \frac{I^{eq}}{1+\alpha}\right)$

Cohabitation decision As explained in the introduction of this section, we assume that all individuals have a fixed (potential) cohabitant. Looked at differently, the population is made of pairs, that either live separately, either cohabit. Those living separately could decide to move in together if the circumstances become more favourable to cohabitation (for example, an increase in social assistance benefits cohabitants receive).[9] Every individual i is thus characterized by an income I_i, a potential cohabitant j (which has an income I_j) and a match quality γ_{ij}. Using Eq. 6, one can write the utility of an individual when single and when cohabiting respectively by:

$$U_i(I_i, I_j, \gamma_{ij}, 0) = f\left(max(I_i, B_s)\right) \tag{7}$$

[9]While it would be possible, following Becker (1973), to render the matching process more realistic, by assuming that individuals can change partners and that singles have multiple matching possibilities, it is superfluous in our model, that focuses on the cohabitation decision. It would also be possible to add singles who have no potential cohabitation partner, or hardened bachelors, but those would never cohabit and not change our results.

and

$$U_i(I_i, I_j, \gamma_{ij}, 1) = f\left(\frac{max(I_i + I_j, 2B_c)}{2^E}\right) + \gamma_{ij} \tag{8}$$

As cohabitation is a joint decision that needs bilateral approval, the set of cohabitants C will be composed of individuals belonging to pairs of the fixed matching M, for which both individuals' utilities of cohabiting exceed utilities of living alone. The set of singles S will be given by the subset of individuals belonging to a pair where at least one individuals has a higher utility when living alone. Using the utility function, it can be written by:

$$\begin{aligned} C = \{i \in N | (i,j) \in M, f\left(max(I_i, B_s)\right) \leq f\left(\frac{max(I_i + I_j, 2B_c)}{2^E}\right) + \gamma_{ij} \\ \wedge f\left(max(I_j, B_s)\right) \leq f\left(\frac{max(I_i + I_j, 2B_c)}{2^E}\right) + \gamma_{ij}\} \end{aligned} \tag{9}$$

$$\begin{aligned} S = \{i \in N | (i,j) \in M, (f\left(max(I_i, B_s)\right) > f\left(\frac{max(I_i + I_j, 2B_c)}{2^E}\right) + \gamma_{ij} \\ \vee f\left(max(I_j, B_s)\right) > f\left(\frac{max(I_i + I_j, 2B_c)}{2^E}\right) + \gamma_{ij})\} \end{aligned} \tag{10}$$

It is clear from Equations 9 and 10 that social assistance will interfere in the cohabitation decisions of the poor pairs of individuals: the propensity to cohabit will increase with the relative value of B_c over B_s. The outside-option of the poor individual in mixed-income pairs will increase with B_s, also predicting higher separation rates when social assistance benefits for singles increase. Those intuitions are formalized in next section.

3.2. Model predictions and comparative statics

We analyze here how changes in the social assistance policy parameters will impact the number of socially assisted, the share of cohabitants amongst them and the government expenses. Before looking at those questions formally, let's define some sets of individuals. Remembering there are 3 types of pairs (low-income, mixed-income and high-income), one can split the set of singles and cohabitants accordingly. The number of individuals in each subset are given by:

$$S_L = |\{i \in S | (i,j) \in M, I_i = I_j = 0\}| \tag{11}$$

$$S_M = |\{i \in S | (i,j) \in M, (I_i = 0, I_j \geq w_{min}) \vee (I_j = 0, I_i \geq w_{min})\}| \tag{12}$$

$$S_H = |\{i \in S | (i,j) \in M, I_i \geq w_{min}, I_j \geq w_{min}\}| \tag{13}$$

$$C_L = |\{i \in C | (i,j) \in M, I_i = I_j = 0\}| \tag{14}$$

$$C_M = |\{i \in C | (i,j) \in M, (I_i = 0, I_j \geq w_{min}) \vee (I_j = 0, I_i \geq w_{min})\}| \tag{15}$$

$$C_H = |\{i \in C | (i,j) \in M, I_i \geq w_{min}, I_j \geq w_{min}\}| \tag{16}$$

The total number of socially assisted individuals is denoted A, and is the sum of the number of socially assisted singles A_s and the socially assisted cohabitants A_c. As all singles in S_L and half of the singles in S_M (only the individual having the low income) receive social assistance, $A_s = 0.5S_M + S_L$. Moreover, only cohabitants in C_L receive social assistance, thus $A_c = C_L$. Mixed-income and high-income cohabitants are not eligible to social assistance as their joint income exceeds $2B_c$. Lastly, let R denote the share of socially assisted individuals that cohabit, and G the government expenses in social assistance.[10] Our three metrics of interest are thus calculated as:

$$A = A_s + A_c = 0.5S_M + S_L + C_L \tag{17}$$

$$R = A_c/(A_s + A_c) = C_L/(0.5S_M + S_L + C_L) \tag{18}$$

$$G = A_s.B_s + A_c.B_c = (0.5S_M + S_L).B_s + C_L.B_c \tag{19}$$

Comparative statics

Proposition 1. *If B_s increases (ceteris paribus), the number of socially assisted singles A_s will increase and the set of socially assisted cohabitants A_c will decrease, with a positive net change on total number of socially assisted:*

$$\frac{\partial A_s}{\partial B_s} \geq -\frac{\partial A_c}{\partial B_s} \geq 0 \text{ and } \frac{\partial A}{\partial B_s} \geq 0 \tag{20}$$

If B_c increases (ceteris paribus), the number of socially assisted singles A_s will decrease and the set of socially assisted cohabitants A_c will increase, with no net change

[10] Note that A, R and C depend on B_s and B_c. For readability we do not write this dependence explicitly.

on total number of socially assisted:

$$\frac{\partial A_s}{\partial B_c} = -\frac{\partial A_c}{\partial B_c} \leq 0 \text{ and } \frac{\partial A}{\partial B_c} = 0 \tag{21}$$

The proof of this first proposition is quite intuitive and straightforward. From Eq. 10 and 11, one sees that an increase in B_s will increase S_L, the set of singles coming from low-income pairs, and decrease the set of low-income cohabitants C_L by the same individuals. From Eq. 10 and 12, one sees that the set of singles coming from mixed-income pairs will increase, and the set of mixed-income cohabitants will decrease by the same individuals. Lastly, from Eq. 10 and 13 one knows that S_H and C_H will remain unchanged, as the social assistance parameters do not intervene in the cohabitation decision of high-income pairs. As $A = 0.5S_M + S_L + C_L$, A will increase. In other words, the net increase in the number of socially assisted individuals comes from the fact some mixed-income cohabitants will split, as the poor member of the pair will opt for the increased social assistance benefits.

Then, from Eq. 9 and 10, one can predict that the consequences of an increase in B_c are that some singles will start cohabiting. Those singles come from S_L and will move to C_L, given low-income pairs are the only one affected by B_c. Mixed- and high-income pairs are not affected. As the set individuals in low-income pairs does not change, or $S_L + C_L$ is constant, A will not change.

Proposition 2. *If B_s increases (ceteris paribus), the ratio of cohabitants amongst socially assisted individuals will decrease*

$$\frac{\partial R}{\partial B_s} \leq 0 \tag{22}$$

while if B_c increases (ceteris paribus), the ratio of cohabitants amongst socially assisted individuals will increase

$$\frac{\partial R}{\partial B_c} \geq 0 \tag{23}$$

This result follows immediately from proposition 1 and the definition of R. In the case of an increase in B_s, the numerator of Eq. 18, A_c, will decrease. The denominator will increase as $S_L + C_L$ does not change while S_M increases, resulting in a decrease of R. In the case of an increase in B_c, the numerator of Eq. 18 will increase, while the denominator will not change, resulting in an increase of R. Quite intuitively, poor adults will thus be more (less) likely to cohabit if the benefits they

receive as cohabitant (single) are more generous.

Proposition 3. *Let $\rho = \frac{B_c}{B_s}$ be the ratio of the cohabitant amount to the single amount. Increasing both B_s and B_c simultaneously by the same proportion, will have the following effects on household structures, for the different types of pairs:*

$$\begin{aligned}
\frac{\partial S_L}{\partial B_s} + \rho\frac{\partial S_L}{\partial B_c} &= -\left(\frac{\partial C_L}{\partial B_s} + \rho\frac{\partial C_L}{\partial B_c}\right) \geq 0 \text{ if } \rho \leq m(\rho) \\
\frac{\partial C_L}{\partial B_s} + \rho\frac{\partial C_L}{\partial B_c} &= -\left(\frac{\partial S_L}{\partial B_s} + \rho\frac{\partial S_L}{\partial B_c}\right) \geq 0 \text{ if } \rho \geq m(\rho) \\
\frac{\partial S_M}{\partial B_s} + \rho\frac{\partial S_M}{\partial B_c} &= -\left(\frac{\partial C_M}{\partial B_s} + \rho\frac{\partial C_M}{\partial B_c}\right) \geq 0 \\
\frac{\partial S_H}{\partial B_s} + \rho\frac{\partial S_H}{\partial B_c} &= -\left(\frac{\partial C_H}{\partial B_s} + \rho\frac{\partial C_H}{\partial B_c}\right) = 0
\end{aligned} \tag{24}$$

where $m(\rho) = 2^{E-1}.f'(B_s)/f'(\frac{\rho B_s}{2^{E-1}})$. At population level, one can thus predict that

$$\frac{\partial S}{\partial B_s} + \rho\frac{\partial S}{\partial B_c} = -\left(\frac{\partial C}{\partial B_s} + \rho\frac{\partial C}{\partial B_c}\right) \geq 0 \text{ if } \rho \leq m(\rho) \tag{25}$$

while the aggregate effect on household structure is undetermined if $\rho \geq m(\rho)$.

Proof: *See Appendix B*

This result shows that the effect of a change in the level of benefits on low-income pairs will depend on ρ. Intuitively, this can be understood as the result of two effects. If $\rho < 2^{E-1}$, the economies of scale are over-estimated by the policy-maker and two same-income cohabitants moving in together see their equivalent income decrease. This decrease is stronger (in absolute terms) for higher levels of social assistance benefits, and individuals will thus have less incentive to cohabit when the overall level of benefits increases. This effect can however be offset or even out-weighted by the fact marginal utility of income is (assumed to be) decreasing. Absolute differences in equivalent incomes are thus less important, when the level of benefits increases. This effect is found in $f'(B_s)/f'(\frac{2.\rho.B_s}{2^E})$. Overall, for low values of ρ and not too concave utility functions, increasing the level of benefits will thus have a negative impact on cohabitation, partly driven by the fact poor individuals in mixed-income pairs have a better outside option.

The next proposition regards government expenditures on social assistance, and is particularly important for policy-making. While at first sight one might expect higher benefits always increase the burden for the government, we show that reality is more nuanced, as increasing benefits for cohabitants leads to higher cohabitation rates, which in turn relieve government budgets.

Proposition 4. *Increasing B_s, while keeping B_c constant, will increase government expenditures:*

$$\frac{\partial G}{\partial B_s} = (B_s - B_c)\frac{\partial S_L}{\partial B_s} + 0.5\frac{\partial S_M}{\partial B_s}B_s + A_s \geq 0 \tag{26}$$

Increasing B_c while keeping B_s constant will have an undetermined net effect on government expenditures:

$$\frac{\partial G}{\partial B_c} = (B_s - B_c)\frac{\partial S_L}{\partial B_c} + A_c = (B_c - B_s)A\frac{\partial R}{\partial B_c} + A_c \tag{27}$$

Proof: *See Appendix B*

Proposition 4 thus highlights the fact that budgetary expenses can decrease following an increase in B_c, due to the fact some poor individuals will start cohabiting in order to receive those higher cohabitant benefits. When two socially assisted singles move in together, their per capita benefit decreases by $B_s - B_c$. The savings for the government will thus depend on $B_s - B_c$ and the number of singles moving in together following an increase in B_c: $A\frac{\partial R}{\partial B_c}$.

The main result of the model is on one hand that the share of socially assisted individuals cohabiting will depend on the relative value of B_c versus B_s, and on the other hand that government expenses do not necessarily increase linearly with the level of social assistance benefits, due to the fact that it has an influence on cohabitation.

3.3. Model extensions

3.3.1. Idiosyncratic income risk and insurance

As explained in introduction, an important literature considers that insurance against income shocks plays a role in marriage decisions. By sharing two independent sources of income, the probability to go broke is reduced. This literature therefore also predicts that more generous social assistance benefits for singles will reduce the probability to marry, even for people with high incomes, insofar they have a probability

to lose their income.

We assume in this extension that incomes are still drawn from the same distribution, but that after the cohabitation decision a random event occurs and each individual has an independent probability π to lose his income. Eligibility to social assistance is determined after the income shock. Moreover, we do the expected utility hypothesis. An individual will now compare his expected utility when single:

$$U(I_i, I_j, \gamma_{ij}, 0) = \pi.f(B_s) + (1-\pi).f\left(max(I_i, B_s)\right) \tag{28}$$

with his expected utility when cohabiting:

$$\begin{aligned} U(I_i, I_j, \gamma_{ij}, 1) = \pi^2.f\left(\frac{2B_c}{2^E}\right) + (1-\pi).\pi.f\left(\frac{max(I_i, 2B_c)}{2^E}\right) \\ +(1-\pi).\pi.f\left(\frac{max(I_j, 2B_c)}{2^E}\right) + (1-\pi)^2.f\left(\frac{max(I_i+I_j, 2B_c)}{2^E}\right) + \gamma_{ij} \end{aligned} \tag{29}$$

Obviously, for high-income pairs, the probability to end up socially assisted equals π when single, and only π^2 when cohabiting. If utility is sufficiently low when socially assisted, individuals will have a strong incentive to cohabit to minimize the risk of going broke. This reason to cohabit is less determinant when benefits one can apply for when losing one's job are higher. This is expressed in the following proposition:

Proposition 5. *The number of individuals in high-income pairs (earning $I \geq w_{min}$ with a probability $(1-\pi)$ and 0 with a probability π) living separately will increase with the level of benefits when $0 < \pi < 1$, if $\rho = 2^{1-E}$ (or $0 < \pi < \frac{2^{E-1}}{\rho} f'(B_s)/f'(\frac{2\rho B_s}{2^E})$ in the general case). Moreover, at a given B_s, their probability to live alone decreases with ρ.*

Proof: *See Appendix B*

Note that if one would add a "disutility" term of being socially assisted (due to fear of being stigmatized for example), this effect would be even stronger. Note also that cohabitation decisions of low-income pairs will not be affected if we introduce risk, as their income is 0 anyway, and that cohabitation decisions of mixed-income pairs will be affected in a direction that depends on the value of ρ and the shape of the utility function.[11]

[11]When $\pi > 0$, the poor individual's incentive to separate will increase less strongly with the

3.3.2. Intra-household transfers

Our model assumes that cohabitants pool their incomes, jointly determine the spending on the public good and then evenly share the remaining resources, so that they end up with the same private consumption. Given they have the same concave utility function, this maximizes the sum of their utilities. An important literature on household decisions[12] considers more complex intra-household allocations (or sharing rules of the marital surplus), as too strong assumptions might hide potential consequences of reforms.

In our setting, allowing cohabitants to split the cohabitation (or marital) surplus unevenly, will have an effect on cohabitation rates and stability of mixed-income pairs. Cohabitation rates could increase, as richer individuals would agree to cohabit with poorer individuals at the condition that they keep control on most of the household resources (and thus have a higher consumption of the private good). In case of an asymmetric match qualities[13], individuals eager to cohabit with their potential partner would agree to give up consumption power to find a common ground for cohabitation with the more reluctant individual. Redistribution of the surplus can also prevent the separation of cohabitants after a reform, insofar an improvement of the outside option of an individual can be counteracted by attributing a higher share of the surplus to that individual.

As an illustration, suppose a mixed-income pair, where the rich individual has a higher utility when single ($g\left(\frac{\alpha I}{1+\alpha}, \frac{I}{1+\alpha}\right)$) than when cohabiting ($g(\frac{\alpha I}{2^E(1+2\alpha)}, \frac{I}{2^E(1+2\alpha)})+\gamma$). The poor individual on the contrary has a lower utility when single ($g\left(\frac{\alpha B_s}{1+\alpha}, \frac{B_s}{1+\alpha}\right)$) than when cohabiting ($g(\frac{\alpha I}{2^E(1+2\alpha)}, \frac{I}{2^E(1+2\alpha)})+\gamma$). In this case, the poor could agree to a have a smaller private consumption to find a common ground for cohabitation. In other words, he would agree to renounce to a fraction $\frac{\epsilon}{1+2\alpha}$ of total income such that cohabitation becomes a win-win decision. The utilities of the poor and rich

level of the benefits as $\frac{\partial}{\partial B_s}(f(B_s) - f(\frac{I}{2^E})) > \frac{\partial}{\partial B_s}(f(B_s) - \pi f(\frac{2\rho B_s}{2^E}) - (1-\pi)f(\frac{I}{2^E}))$, while the reaction of the richer individual to an increase in benefits will depend on value of ρ. If $\rho < 2^{E-1}.f'(B_s)/f'(\frac{2.\rho.B_s}{2^E})$, the incentive to separate will increase more strongly with B_s than in the model without risk.

[12] see for example Chiappori and Mazzocco (2017) for an overview

[13] In case the match quality experienced by i when cohabiting with j, is not equal to the match quality experience by j when cohabiting with i.

individuals would respectively be such that:

$$g\left(\frac{\alpha B_s}{1+\alpha}, \frac{B_s}{1+\alpha}\right) \leq g\left(\frac{(\alpha-\epsilon)I}{2^E(1+2\alpha)}, \frac{I}{2^E(1+2\alpha)}\right) + \gamma \tag{30}$$

$$g\left(\frac{\alpha I}{1+\alpha}, \frac{I}{1+\alpha}\right) \leq g\left(\frac{(\alpha+\epsilon)I}{2^E(1+2\alpha)}, \frac{I}{2^E(1+2\alpha)}\right) + \gamma \tag{31}$$

Note that when B_s increases, the outside option of the poor individual will improve, resulting in a decrease of the upper bound of ϵ.

3.3.3. In-kind benefits

A more accurate model of social assistance should include, besides general-purpose cash allowances, targeted in-kind benefits. In many countries, in-kind benefits can represent a significant share of the assistance provided to poor households. This can be modelled by letting the benefits B_s and B_c denote the total value of the benefits, granted partly in-kind, instead of only general-purpose cash allowances.

For simplicity, let's illustrate this by assuming that benefits are granted in cash, housing and food allowances, and that the per capita cash amounts and allowances can differ by household size. Suppose moreover that individuals spend their money exclusively on leisure, housing and food, and that their optimal expenditure levels are X^l, X^h and X^f. As in-kind allowances cannot be spent on other goods than the purposed good, one have $X^h \geq B^h$ and $X^f \geq B^f$. Moreover, assuming socially assisted individuals do not save money, $B_s = B_s^c + B_s^h + B_s^f = X_s^l + X_s^h + X_s^f$ and $B_c = B_c^c + B_c^h + B_c^f = X_c^l + X_c^h + X_c^f$. Economies of scale can be different for those different goods: for example, food expenses are likely to grow faster with the number of household members than housing expenses. Let E^l, E^h and E^f thus be the parameters that reflect those economies of scale, in a way that an individual spending X^l (resp. X^h, X^f) on leisure (resp. housing, food) attains a level of satisfaction considered equivalent to a couple spending $\frac{X^l}{2^{E^l}}$ (resp. $\frac{X^h}{2^{E^h}}$, $\frac{X^f}{2^{E^f}}$) in this particular dimension of well-being. The ratio's $\rho^c = \frac{B_c^c}{B_s^c}$ (resp. $\rho^h = \frac{B_c^h}{B_s^h}$, $\rho^f = \frac{B_c^f}{B_s^f}$) can be different in different places, depending on the local social assistance schemes. The values of ρ^h and ρ^f thus create, besides ρ^c, additional (dis-)incentives to cohabit, as cohabiting affects level of comfort attained in the corresponding dimension of well-being.

The predictions of our model however remains the same, insofar B_s and B_c represent the value of social assistance benefits including in-kind benefits and $\rho =$

$\frac{B_c^c+B_c^h+B_c^f}{B_s^c+B_s^h+B_s^f}$, at the condition that $X^h \geq B^h$ and $X^f \geq B^f$ are not binding. The implication for our statistical analysis will be that the ratio of general purpose allowances $\rho^c = \frac{B_c^c}{B_s^c}$ is only an approximation of ρ, and that the difference $\rho^\epsilon = \rho - \rho^c$ is unobserved. The potential consequences of this approximation will be discussed more in detail in section 4.4.

4. Statistical analysis

4.1. Data

We use the databases of the European Union Statistics on Income and Living Conditions survey (EU-SILC) for our statistical analysis. Those databases are representative for the national populations and contain information on income, socio-demographic situation and the reception of social assistance benefits. The fact we use the same survey for all European countries providing non-contributory means-tested social assistance benefits increases the likelihood that comparability is high. We use all the databases available since 2006 (and until 2018) and thus use the distribution of household structures at different places, at different times.

We filter the databases to keep only households with one or two adults that are less than 64 years old, not disabled, and do not live with dependent children[14]. We moreover construct a dummy variable, δ^a, equal to 1 for households that are eligible to general-purpose cash social assistance transfers and indeed declare to receive such benefits. For the first condition we test if disposable income excluding social assistance benefits is lower than the relevant (country, time and household size specific) guaranteed minimum income. For the second condition we check whether the variable containing "periodic payments to people with insufficient resource" is strictly positive. When those two conditions are satisfied, we set $\delta^a = 1$.[15] Some descriptive statistics of the resulting sub-sample are provided in Table 1.

For the guaranteed minimum income levels B_s and B_c, which are year- and country-specific, EUROMOD country reports[16] are used. In those reports, social

[14]We consider as children individuals younger than 18 or younger than 25 and studying.

[15]The details of the construction and country-comparability of this dummy are given in Appendix C.

[16]Publicly available at `https://euromod-web.jrc.ec.europa.eu/resources/country-reports` (Retrieved in December 2020)

	Total	δ^a	
	(*thousands*)	0	1
Number of observations	818.8	97.94%	2.06%
Household size			
- adults living alone	218.5	95.62 %	4.38%
- adults cohabiting	600.3	98.78 %	1.22%
Level of education			
- Primary or no education	72.2	94.41%	5.59%
- Secondary education	625.3	98.14%	1.86%
- High education	121.3	98.96%	1.04%
Gender			
- Man	396.7	97.77%	2.23%
- Woman	422.0	98.09%	1.91%

Table 1: Descriptive statistics - estimation sample

assistance schemes are detailed and maximum general-purpose social assistance benefit levels provided. Tables C1 and C2, in Appendix C, give an overview of those values. Those values are used to compute the ratio of the cohabitant amount to the single amount, $\rho = \frac{B_c}{B_s}$, used in the regression.

4.2. Estimation

We estimate the determinants of cohabitation, using a probit regression. 3 models, detailed below, are estimated. The results are summarized in subsection 4.3 and robustness checks are provided in subsection 4.4.

Model 1: In this model, we assume the parameters of the social assistance scheme, B_s and ρ ($=\frac{B_c}{B_s}$), only affect cohabitation decisions of those who are eligible to social assistance and declare to receive social assistance. A dummy captures the effect of being socially assisted on propensity to cohabit. This reduces possible endogeneity issues by allowing to capture the fact some individual characteristics likely influence both the probability to be socially assisted and single. For example bad temper can decrease the likelihood to find a cohabitant as well as a job. Low productivity too reduces the probability to find a work and, by having lower expected earnings, could reduce the probability to find a suitable cohabitation partner. Moreover, we add geographical- and year-dummies capturing variation of socio-cultural influences

on the propensity to cohabit. The geographical dummies[17] capture socio-cultural influences that are likely correlated amongst countries having a related historical or cultural background due to geographical proximity. This results in the following expression:

$$Cohab_{ict} = \Phi(\alpha_0 + \delta^a_{ict}.(\beta_0 + \beta_1.B_{s,ct} + \beta_2.\rho_{ct}) + \delta_g + \delta_t) \tag{32}$$

where δ_g and δ_t are the geographical and year dummies, and Φ the CDF of the standard normal distribution.

Model 2: In this model, we add some control variables that might influence cohabitation decisions: age and education. This results in the following equation:

$$Cohab_{ict} = \Phi(\alpha_0 + \delta^a_{ict}.(\beta_0 + \beta_1.B_{s,ct} + \beta_2.\rho_{ct}) + \gamma'.X_{ict} + \delta_g + \delta_t) \tag{33}$$

where γ is a vector of parameters and X a vector of covariates containing: age, age^2 and education level.[18]

Model 3: In this model, we allow the parameters of the social assistance scheme to influence cohabitation of individuals that are not socially assisted, to test the influence of social assistance benefits on individuals that are not receiving them.

$$Cohab_{ict} = \Phi(\alpha_0+\delta^a_{ict}.(\beta_0+\beta_1.B_{s,ct}+\beta_2.\rho_{ct})+(1-\delta^a_{ict}).(\beta_3.B_{s,ct}+\beta_4.\rho_{ct})+\gamma'.X_{ict}+\delta_g+\delta_t) \tag{34}$$

4.3. Results

First, it is clear from the regression that being socially assisted considerably reduce the probability to cohabit. This is consistent with the model, where a potential cohabitant takes into account his equivalent revenue change in the cohabitation decision. In other words, a person that has some income might be reluctant to cohabit with a poor individual, knowing incomes are pooled to some extent and that his material comfort might therefore decrease. The estimated parameter likely also reflects the fact some personality traits are appreciated both in a work environment and in

[17]The geographical dummies are based on a division of Europe according the the CIA World Factbook. A robustness test where country-dummies are used instead is proposed in Appendix F.

[18]Low: no or primary, middle: secondary, high: tertiary

	Model 1	Model 2	Model 3	Marg. Effect (range)
(Intercept)	0.53098***	2.24566***	2.58730***	
	(0.00020)	(0.00062)	(0.00089)	
δ^a	−2.39413***	−2.36977***	−2.66729***	-0.33093/-0.35490
	(0.00221)	(0.00223)	(0.00226)	
$\delta^a B_s$	−0.00015***	−0.00018***	−0.00030***	-0.00011/-0.00005
	(0.00000)	(0.00000)	(0.00000)	
$\delta^a \rho$	2.02472***	1.96131***	2.02540***	0.70008/0.72485
	(0.00272)	(0.00274)	(0.00278)	
age		−0.09460***	−0.09559***	*See Appendix E*
		(0.00003)	(0.00003)	
age^2		0.00118***	0.00119***	
		(0.00000)	(0.00000)	
$educ_L$		0.04242***	0.03841***	0.01414/0.01562
		(0.00019)	(0.00019)	
$educ_H$		−0.06618***	−0.06679***	-0.02507/-0.02486
		(0.00015)	(0.00015)	
$(1-\delta^a)B_s$			−0.00055***	-0.00020
			(0.00000)	
$(1-\delta^a)\rho$			−0.10126***	-0.03623
			(0.00083)	
Geo. dummies		*See Appendix D*		
Year dummies		*See Appendix D*		
Num. obs.	818750	818750	818750	
McFadden's R^2				
all	0.01447	0.02746	0.03083	
soc. assisted	0.266	0.274	0.273	

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 2: Determinants of cohabitation (Probit model)

a family context. This implies that individuals lacking those traits (for example reliability, cheerfulness, ...) will have a higher probability to be both single and workless.

Next, the probit regression shows that a higher ρ significantly increases the probability to cohabit, when socially assisted, again in line with our theoretical framework. This can be due to the higher number of couples that are eligible as to a number of socially assisted singles that start cohabiting. Increasing the overall level of benefits (both B_s and B_c) slightly decreases the probability to cohabit.

Model 2 estimates that age has a small but significant effect on probability to cohabit for childless individuals: a minimum is reached around 41 years. Moreover, individuals with the highest education levels have the lowest probability to cohabit. One possible explanation for this result is higher labour mobility, resulting in less stable relationships. One could also think about longer studies and time investment in career paths which postpones transition into marriage. Lastly, the model predicts that in recent years individuals have more and more chosen to live alone, and that cohabitation rates vary significantly across countries.

Model 3 indicates that social assistance schemes also have a small but significant effect on cohabitation of individuals that are not socially assisted. The level of benefits decreases the probability to cohabit, as predicted by Proposition 5. This suggests that the incentive to cohabit to insure against idiosyncratic income shocks decreases with the overall level of benefits. Note however that, in contradiction with the prediction of Proposition 5, ρ has a negative effect on cohabitation on individuals that are not socially assisted. This effect is however about 15 times smaller than the positive effect of ρ on socially assisted, and thus, despite being significant, quite small.

In all three models, the R^2 is low. This is easily understandable by the fact material aspects are not the main factors when deciding to cohabit, nor are our control variables as age, education level, etc. Instead, factors as love, companionship, family and parental projects, ... , in other words, what we all include in γ are likely to be determinant. Nonetheless, when measured only on the sub-sample of socially assisted individuals, the R^2 climbs to more than 0.26, indicating that social assistance scheme parameters represent are non-negligible determinant for this category of population.

4.4. Robustness

If there are measurement errors and biases in the data due to a different interpretation of (or compliance to) Eurostat guidelines, those are likely to be correlated amongst individuals from the same country, as EU-SILC data is collected by the national statistical offices. The consequence is that the error terms might be correlated with country-specific variables (the country-dummies but also possibly the social assistance scheme parameters). Observing the distribution of the estimates when removing countries one by one from the regression allows to verify if observations of one country are determinant for our results. Figure 4 shows this distribution for the main parameter of interest, $\hat{\beta}_2$. The sign and significance are robust, and one can therefore conclude that our results are not driven solely by observations of one country.

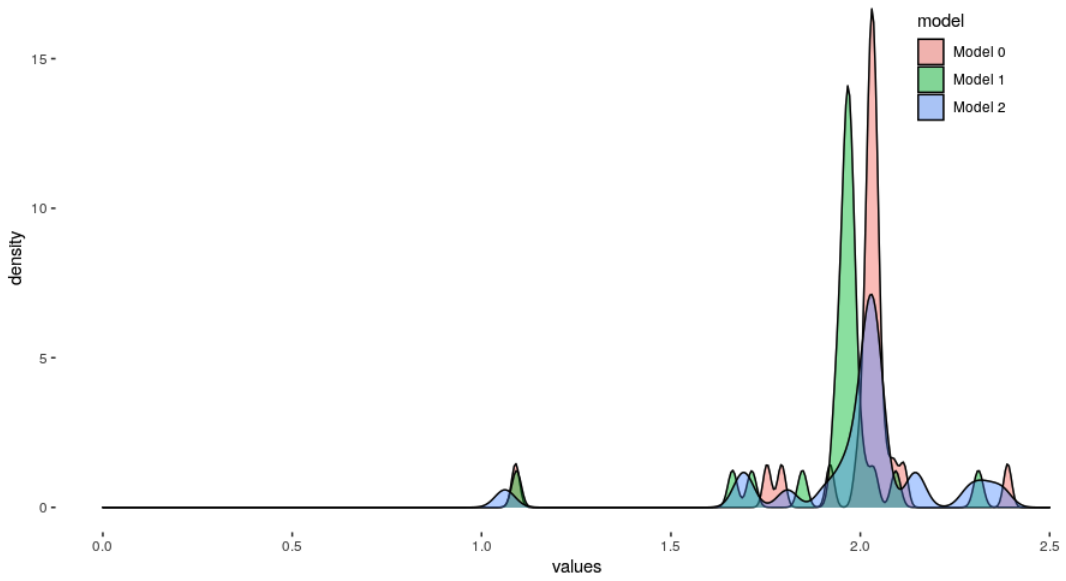

Figure 4: Distribution of $\hat{\beta}_2$ estimated on sub-samples of N-1 countries

We run a number of complementary robustness checks, of which some of the results are summarized in Appendix F. Our main result, that the ratio ρ significantly and positively affects cohabitation of socially assisted individuals, is robust to all the tests. The first test in appendix consists of assuming a linear model, instead of the probit model, to relax the normality assumption on the error terms. The second test consists of replacing the geographical dummies by country dummies.

One possible limitation of our analysis is that only cash benefits are considered. The provision of in-kind benefits, which could affect cohabitation decisions (see subsection 3.3.3), are however difficult to include, as those can take many forms and be granted either through a direct provision of those goods and services (free or at reduced price), or through a reimbursement of proven expenses, and are therefore not systematically and comparably included in national surveys. The omission of in-kind benefits could bias the results if the ρ of those in-kind benefits is correlated with the ρ of general-purpose cash benefits. A second potential source of bias is that individuals that are not socially assisted can have differing financial incentives to cohabit depending on the country (e.g. in some countries, social insurance benefits also depend on household composition).

4.5. Marginal effects and cost-recovery

The average marginal effect of increasing ρ by 0.01 (in other words, increasing the cohabitant benefit level B_c by $0.01B_s$) is an increase of the share of socially assisted individuals that cohabit of 0.70 to 0.72 (depending on the model) percentage points.[19] The variation of this effect is given for each country in Table 3. For example, in Belgium, increasing B_c by ρB_s, from 595.13 to 604.06, would increase the share of cohabiting socially assisted individuals from 21.51% to 22.11%.

As explained in Proposition 4, when the cohabitant amount is increased, the government expenses will be impacted in two ways: on one hand the government will have to pay more to all currently socially assisted cohabitants, and on the other hand, as some socially assisted singles will start cohabiting (and thus receive only B_c instead of B_s), the government transfers towards those will be lower. We define the *cost recovery rate* as the ratio of the savings resulting from socially assisted singles starting to cohabit on the direct cost of increasing B_c. Deriving Equation 19 by ρ (keeping B_s constant) allows to write the direct cost of the additional benefits to be paid to socially assisted cohabitants as $A_c B_s d\rho$, and the costs recovered as $(B_c - B_s)A\frac{\partial R}{\partial \rho}d\rho$. The cost recovery rate hence is computed as:

$$\phi = -\frac{(B_c - B_s)A\frac{\partial R}{\partial \rho}}{A_c B_s} = \frac{1-\rho}{R}.\frac{\partial R}{\partial \rho} \tag{35}$$

[19] For SILC-2018 (income year 2017), our latest available year in the database.

The numerator is computed using our estimated marginal effect of increasing ρ on cohabitation rates, and the difference in the single and cohabitant amounts. For A and A_c we use averages over the data-sets of the different years to compute the number of socially assisted individuals in a country, as in some countries few socially assisted individuals are observed each year. The computed cost recovery rates ϕ are given, by country, in the last column of Table 3.

From those calculations it seems that some countries have cost recovery rates above 50%: Austria, Belgium, Spain, Finland, France, Croatia, Malta, Netherlands and Sweden. This result is due to the fact that on one hand a relatively large share of socially assisted individuals in those countries live alone, and/or that the savings achieved when two of them start cohabiting are considerable. In Malta, the recovery rate even exceeds 100%, indicating that a Pareto improvement is attainable by increasing the cohabitant amount. In Denmark and Latvia, where socially assisted cohabitants receive the same benefits as singles, there is evidently no cost-recovery.

5. Discussion

The generosity of benefits towards cohabitants relatively to singles affects the government expenses, cohabitation decisions and poverty. Discussing the adequacy of this parameters therefore requires a normative framework, or value judgements about behaviour and outcomes. We list some approaches to tackle the question of an adequate ratio ρ between cohabitant benefits and single benefits:

1) Horizontal equity: Maybe the most natural argument to set an equivalence scale for a social policy, is that the policy should not treat individuals differently based on their cohabitation choice. Seen differently, a social policy should not interfere with private choices regarding household formation. Two different normative directions can however be taken at this stage: should material comfort be considered, or should a broader definition of well-being, taking into account the direct effect of family life, be used? According to Decancq et al. (2015), most authors studying equivalence scales argue that conditional cost functions, giving the minimum expenditures needed to reach a given utility level, conditional on household characteristics, are adequate for constructing scales for policy purposes. As it is generally accepted that a household should not be compensated e.g. for having a partner or not, focusing on incomes or material consumption only is thus more relevant than general well-being. In our simple model, one could define this horizontal equity as a situation

Variable	ρ (%)	R (%)	$\frac{\partial R}{\partial \rho}$	ϕ (%)
AT	75	27.99	60	**53.58**
BE	66.67	21.51	59.58	**92.36**
BG	90.41	58.28	77.66	**12.78**
CY	75	58.88	74.71	**31.72**
CZ	87.54	37.62	73.49	**24.35**
DE	89.98	37.18	73.25	**19.75**
DK	100	43.34	74.56	**0**
EE	90	21.5	78.18	**36.36**
ES	57.87	38.73	63.05	**68.59**
FI	85	16.16	70.47	**65.44**
FR	75	28.89	68.64	**59.41**
HR	60	37.9	70.47	**74.37**
HU	95	42.3	77.13	**9.12**
IE	83.19	54.84	78.18	**23.97**
LT	90	39.82	77.16	**19.38**
LU	74.09	35.28	61.95	**45.5**
LV	100	40.84	78.13	**0**
MT	53.95	19.01	60.12	**145.62**
NL	71.43	24.23	63.74	**75.15**
PL	85.1	30.5	74.07	**36.19**
PT	75	55.06	75.99	**34.51**
RO	90.11	52.22	77.83	**14.75**
SE	81.81	18.39	66.77	**66.06**
SI	78.5	28.84	65.65	**48.95**
SK	86.93	25	73.58	**38.47**
UK	78.56	42.93	72.93	**36.43**
Av.	**80.62**	**36.05**	**71.05**	**43.57**

Table 3: Cost-recovery estimates (Model 2, 2017)

where:

$$f(B_s) = f\left(\frac{2B_c}{2^E}\right) = f\left(\frac{2\rho B_s}{2^E}\right) \tag{36}$$

which implies the ratio

$$\rho = 2^{E-1} \tag{37}$$

The ratio ρ is thus such that the loss in benefits of cohabiting individuals exactly corresponds to the savings resulting from economies of scale in their expenses.

2) Vertical equity An other argument can be that socially assisted individuals should have the same financial incentives to cohabit as other members of society do. In our model, we can illustrate this simply by letting two workers earning both an income $I > B_s$ move in together. They benefit from economies of scale without losing revenues, and will therefore attain a higher equivalent income, equal to $\frac{2I}{2^E} = 2^{1-E}.I \geq I$. One interpretation of the vertical equity argument could be that socially assisted singles should obtain an increase of the same proportion in their equivalent incomes when starting to cohabit, leading to $\rho = 1$.

3) Budgetary stringency A last argument could be to strive for the most cost-efficient way to bring socially assisted individuals out of material deprivation, or more generally, above a certain equivalent income threshold. In our model, obviously, the single amount has to be set at that threshold (a lower rate would result in material deprivation, and a higher rate in inefficient use of resources according to our objective). For the same reason, the cohabitant amount will be located between $2^{E-1}.B_s$ (minimum level to be out of material deprivation), and B_s. The exact value of the optimal ρ depends on the relative amplitude of two opposing effects: reducing ρ will reduce government expenses per socially assisted cohabitant, but the consequential splitting of households could increase overall expenses, as more people will be eligible for the single amount.

According to any of those 3 approaches, the optimal ratio ρ will always be located between 2^{E-1} and 1. The closer to the lower bound, the lower will be the equivalent income change for two socially assisted individuals moving in together. At the upper side of this interval, socially assisted individuals will face the similar financial incentives to cohabit as the rest of the population. On that interval lies a point where budgetary expenses to bring poor individuals above a certain equivalent income threshold are minimized.

The value of E, that determines the lower bound of justifiable ratios, unfortunately is not straightforward to estimate, and economists have been working on this issue since more than a century.[20] This value could be based on baskets of goods for households of different sizes that are judged equivalent. But one immediately face the difficulty to define those baskets, in a world with agents having heterogeneous preferences, and a normative choice will have to be made regarding the determination

[20]See for example Chiappori (2016) for an overview.

of households' needs. An other option is to compare consumption data of households of different sizes. This however poses the difficulty of choosing a criteria to consider two different households as equally well-off. Moreover, as prices of goods and services vary, as well as weight of those goods in reference baskets, scales might thus differ by location and period. The currently most widely used equivalences scales, the OECD-modified scale and the square-root scale, imply respectively values of E equal to 0.585 and 0.5, placing the lower bound of ρ respectively at 0.75 and 0.71. From Figure 2 one can however see that respectively 6 and 4 countries have lower ratios.

Lastly, it is meaningful to add that cohabitation can engender externalities, which, in a thorough welfare evaluation, have to be taken into account. Most of the reported externalities are positive. Cohabitation reduces the use of a number of public goods. The most obvious one, is space (or housing). As cohabitants share a same dwelling, they use on average less space than if they lived in separate dwellings, which is of particular importance in cities, where public space and housing are scarce goods. Secondly, cohabitation implies a more efficient use of energy, due to for example a lower surface to be heated, resulting in less pollution. Lastly, one could cite (mental) health issues, which significantly more affect isolated individuals (Leigh-Hunt et al. (2017)).

The final ρ that will be chosen for a social policy thus can be influenced by 1) the methodology chosen to estimate economies of scale experienced by cohabitants, 2) a normative judgment about equity and 3) the possible inclusion of externalities in the balance.

6. Conclusion

Our data collection shows that social assistance schemes vary significantly throughout Europe, both in absolute levels as in relative levels of assistance cohabitants receive compared to individuals living alone. We calculated for example that the ratio of general-purpose per capita cash benefits when cohabiting to benefits when living alone varies from 0.52 to 1. In other words, two socially assisted individual moving in together lose between 0 and 48% of their general-purpose benefits, depending on the country in which they live.

This country-variation is used in our statistical analysis to show that this ratio has a significant impact on cohabitation. Our research suggests that strongly dif-

ferentiated rates as we observe in some countries (mainly Belgium, Spain, Croatia, Malta and Netherlands) are difficult to justify, as those hinder household formation and are unlikely to reflect actual economies of scale. Moreover, we estimate that increasing the cohabitant amount is much less costly than one might expect, as it will induce some single socially assisted individuals to move in together, resulting in lower per capita benefits to be distributed by the government. The cost recovery is estimated to average 43.57% in our most conservative model, and to be higher than 50% for 9 countries.

Lastly, it is important to note that other aspects not taken into account strengthen the case for less differentiated rates: first, if one considers space in cities as a public good, increasing ρ would incentivize people to make a more efficient use of space. This would not only bring individuals to cohabit effectively, but also reduce the situations where a couple member rents a cheap place to have an other address and benefit from the single amount, which particularly congests the lower segment of the housing market. Secondly, higher cohabitation rates would improve energy efficiency by reducing the number of dwellings to heat. Thirdly, cohabitation could reduce loneliness and associated health and mental health risks. Lastly, the costs related to the controlling of information provided by recipients of social assistance regarding their household status are likely to decrease or disappear, as fraud[21] should decrease. Explorations of those different topics are important paths for further research. Another important path for further research is the question of whether social assistance benefit design affects the cohabitation of adults with children in the European Union.[22]

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[21] People declaring to live alone while cohabiting.

[22] and more specifically in Belgium, where rates are strongly differentiated. Field reports mention cases of households where parents have a financial advantage to live separately: Schepers and Nicaise (2014) for example mention a "divorce trap" created by social assistance benefits in Belgium, disincentivizing single parents to move in with another adult.

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Declarations of interest

None.

Data availability

1. **SILC data:** available for scientific research at `https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions`
2. **Social assistance data:** available and collected from EUROMOD country reports at `https://euromod-web.jrc.ec.europa.eu/resources/country-reports` (Retrieved in December 2020)

Code availability

Proprietary, executable available on demand.

Appendices

Appendix A. Belgian case study

Belgium has introduced a minimum income guarantee in 1974[23]. Those benefits are granted by the Public Centres for Social Welfare[24] (hereafter PCSW), that are present in each of the 581 municipalities and are responsible to run the means-tests. Part of the benefits (at least 50%) are paid by the federal government. To benefit from this income, the applicant has to meet a number of criteria:

1. Citizenship: the applicant must have the Belgian citizenship or be an EU citizen family member having a residence permit of more than three months, a foreigner registered at the population register, a recognized refugee or a stateless person.
2. Residence: the applicant must reside in Belgium.
3. Age: the applicant must be at least eighteen years old. Exceptions are made for younger applicants if pregnant, in charge of children or emancipated by marriage.
4. Means: the applicant must have insufficient resources and be unable to obtain them by her- or himself. The PCSW has to run a means-test.
5. Labour market: the applicant must be available to the labour market, and do serious efforts to find a job (except in cases of serious health issues or other constraints[25]).
6. Exhaustion of social rights: the applicant must have applied for other aids (s)he might be eligible to.
7. Individual social integration project: since 2016, new applicants have to conclude an agreement with the PCSW, in which the necessary steps and the objectives towards social and/or socio-professional integration are established.[26]

The benefits depend on the household structure. The current categories were defined in 2002[27]: head of households (with children), isolated individuals and cohabitants. The benefits of a cohabitant person was established at 67 percent of the benefit of an isolated person. Moreover, the benefit is reduced by the amount own means, taking into account

[23]Loi du 7 août 1974 instituant le droit à un minimum de moyens d'existence.

[24]Centre public d'action sociale (CPAS) in French and Openbaar Centrum voor Maatschappelijk Welzijn (OCMW) in Dutch.

[25]Of which the validity is judged by the PCSW. Those can be for example being in training, having an handicapped child who needs special attention, be caring of young children, etc.

[26]Loi du 21 juillet 2016 modifiant la loi du 26 mai 2002 concernant le Droit à l'Intégration Sociale

[27]Loi du 26 mai 2002 concernant le Droit à l'Intégration Sociale

some exonerations.[28]

Compared to other countries, the level of cash social assistance is rather high. However, the level of per capita social assistance couples receive compared to a single person is rather low (Figures 1 and 2). In-kind assistance provided by PCSW and related organisms include subsidized housing, energy, medical aid and home help.

This low ratio has led to criticism and calls for change. Saintes and Woelfle (2018) (p.4), Perdaens et al. (2010) (p.14) or Schepers and Nicaise (2014) (p.15) report destructive effects on poor couples and families, who prefer to live separately to not see their financial means decrease strongly[29]. Moreover, Steenssens et al. (2016) report that 70% of PCSW observe increases in LAT-relations[30], who are in 90% of the cases granted full benefits. This same report as well as Galand et al. (2013) mention cases of couples renting a cheap room at an other address, where one of the partners would be domiciled without actually living there, in order to receive the full benefits.

While different political parties have included individualisation of social rights and the suppression of the cohabitant status in their programme, it seems that the budgetary costs of such measures represent the main obstacle. Middle ground solutions proposed by field associations and academics include the creation of a label to specific solidary housing projects, that would guarantee to precarious households wishing to share living costs they would not lose their rights to full social assistance benefits (Bernard (2007), Bernard (2016)).

Appendix B. Proof of propositions

Proposition 3 - Proof:
For low-income pairs: the difference between (the material part of) utility when single and when cohabitant equals $f(B_s) - f(\frac{2.\rho.B_s}{2^E})$. Given Eq. 10, the number of individuals that

[28]The details of what is included in own means and which exonerations are granted are detailed in: Arrêté royal portant règlement général en matière de droit à l'intégration sociale du 11 juillet 2002.

[29]For a more detailed overview of the legislation and the problem that the cohabitant status creates see also Galand et al. (2013) (p.23-26).

[30]Living apart together (LAT) unions are intimate relationships between unmarried partners who live in separate households but identify themselves as part of a couple. These relationships are sometimes referred to as "non-residential partnerships" (Strohm et al. (2009)).

will decide to live alone will increase with B_s (at constant ρ) if

$$f'(B_s) - f'(\frac{2.\rho.B_s}{2^E}).\frac{2.\rho}{2^E} > 0$$

This inequality will hold if

$$\rho < 2^{E-1}.f'(B_s)/f'(\frac{2.\rho.B_s}{2^E})$$

For mixed income pairs: suppose i is the individual with low income and j with the high income. The difference between (the material part of) utility when single and when cohabitant equals $f(B_s) - f(\frac{I_j}{2^E})$ for individual i and $f(I_j) - f(\frac{I_j}{2^E})$ for j. Obviously, for the poor individual, this difference increases with B_s (and it does not change for the richer individual), and mixed-income pairs are thus less likely to cohabit when B_s increases. For high-income pairs, social assistance parameters do not affect utility when being single or cohabiting, so their household structure will not change.

Proposition 4 - Proof:
Taking the derivative of Eq. 19 w.r.t. B_s gives

$$\frac{\partial G}{\partial B_s} = B_s\frac{\partial A_s}{\partial B_s} + B_c\frac{\partial A_c}{\partial B_s} + A_s$$

Since $A_s = S_L + 0.5S_M$ and $\frac{\partial S_L}{\partial B_s} = -\frac{\partial C_L}{\partial B_s}$,

$$\frac{\partial G}{\partial B_s} = (B_s - B_c).\frac{\partial S_L}{\partial B_s} + 0.5B_s\frac{\partial S_M}{\partial B_s} + A_s$$

The three terms are positive and the net effect will thus be positive. Taking the derivative of Eq. 19 w.r.t. B_c gives

$$\frac{\partial G}{\partial B_c} = B_s\frac{\partial A_s}{\partial B_c} + B_c\frac{\partial A_c}{\partial B_c} + A_c$$

Replacing A_s by $(1-R).A$ and A_c by $R.A$, and using the fact that $\frac{\partial A}{\partial B_c} = 0$ (see proposition 1), gives:

$$\frac{\partial G}{\partial B_c} = (B_c - B_s)A\frac{\partial R}{\partial B_c} + A_c$$

The first term is negative (as $B_c < B_s$), while the second is positive. The net effect is thus undetermined.

Proposition 5 - Proof:
Proof. For a given distribution of γ and a given ρ, the probability that individuals live alone increases with $U(I_i, I_j, \gamma_{ij}, 0) - U(I_i, I_j, \gamma_{ij}, 1)$. The derivative w.r.t. B_s of this

expression, for individuals in high-income pairs, equals $\pi.f'(B_s) - \pi^2.f'(\frac{2\rho B_s}{2^E}).\frac{2\rho}{2^E}$, which is positive for

$$\pi \leq \frac{2^{E-1}}{\rho} f'(B_s)/f'(\frac{2\rho B_s}{2^E})$$

Moreover, as $U(I_i, I_j, \gamma_{ij}, 0) - U(I_i, I_j, \gamma_{ij}, 1) = \pi.f(B_s) - \pi^2.f\left(\frac{2B_c}{2^E}\right)$ decreases with B_c, the probability to cohabit for individuals in high-income pairs increases with ρ, at given B_s.

Appendix C. Benefit levels, datasets included and cross-country comparability

In order to construct a dummy δ^a indicating as accurately as possible which households in the SILC datasets are potentially impacted by social assistance scheme parameters, there are two options. The first one would be to simply consider households who receive positive non-contributory means-tested social assistance cash benefits (HY063G), but from the data it seems that there is an important variation in the share of households who receive some form of social assistance (from 0 to 60 percent, depending on the country), and that many households with important incomes receive some small transfers.[31] We thus add the constraint that the household disposable income before social assistance benefits has to be lower than the relevant guaranteed minimum incomes. We can thus rewrite δ^a as the product of two dummies, indicating a low income (li), and the reception (rec) of social assistance benefits:

$$\delta^a = \delta^{li}.\delta^{rec}$$

For δ^{li}, we start from disposable income (HY020) and remove means-tested social assistance benefits. When the obtained income is lower than the guaranteed minimum income level, we set $\delta^{li} = 1$. For δ^{rec} we could use the variable HY063G in the EU-SILC survey, which contains the values of "periodic payments to people with insufficient resource" that are "non-contributory and means-tested" and not considered as other types of benefits (as unemployment benefits, family benefits, disability benefits, ...). This variable seems the most appropriate. However, this variable is only reported for some countries (less than half of them). We thus prefer to use HY060G, which contains all types of "periodic payments to people with insufficient resources", and which is reported for all countries except Denmark. Goedemé and Zardo Trindade (2020) report that those variables are mostly comparable except for some countries where other types of benefits might be wrongly included. This is the case for some parts of disability benefits (NL, SI, PO), education allowances (SK),

[31] This might be due to the fact benefits that are neither family, unemployment, disability or sickness benefits are included in HY063G, even tough not targeted at poor individuals.

family benefits (SE), survivor's benefits (LV), and scholarships for teachers in small rural area's (EE). As we conduct our analysis only on childless adult couples, and remove disabled individuals from the analysis[32], the biases should be limited. For the survivor's benefits, there should be few incomparable observations due to the fact that we focus on working-age population, keeping thus a limited number of widows. Regarding scholarships for teachers in small rural area's, we assume it represents an insignificant share of the sample. For Denmark, means-tested non-contributory benefits for unemployed are collected at individual level and given in PY093. For some countries, no information was provided for the META analysis (FI, LT, IE, RO), rendering it difficult to assess the degree of comparability of the benefits categorization. For older SILC-versions, we keep the same variables, or take the more aggregate variable when the same level of detail is not available. No significant changes with respect to META SILC 2010 are mentioned for our variables of interest in Goedemé and Zardo Trindade (2020).

Below tables give the maximum general-purpose cash social assistance benefit levels in EURO when living alone and cohabiting (resp. B_s and B_c). The conversion from national currency to EUR is done with Eurostat nominal exchange rates. The cells highlighted in gray mean that the corresponding SILC dataset is available and included in the probit estimation. For the probit analysis, benefits are expressed in purchasing power parity. Below figures are thus converted using Eurostat data on average basket prices (with EU-27 average as reference basket), and average inflation figures for EU-27.

[32]This is done by removing observations with PY130 $>$ 0: as in NL, SI and PO the main components of disability benefits are correctly included in PY130, this allows to relatively precisely identify disabled individuals.

SILC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	NaN	NaN	427	439	454	461	752.94	773.26	794.91	813.99	827.82	837.76	844.46	863.04
BE	613.33	625.6	644.48	697.61	725.79	725.79	755.08	785.61	801.34	817.36	817.36	867.4	884.74	892.7
BG	NaN	NaN	20.53	20.53	20.53	24.26	24.26	24.26	24.26	24.26	24.26	24.26	24.26	27.99
CY	NaN	331.47	364.17	379.31	425	452	452	452	452	480	480	480	480	480
CZ	108.61	110.3	112.58	125.31	118.25	123.64	127.12	135.59	131.25	123.84	125	126.14	129.53	132.96
DE	NaN	NaN	345	347	351	359	364	374	382	391	399	404	409	416
DK	NaN	NaN	1202.45	1236.45	1276.49	1323.57	1348.08	1388.42	1407.9	1433.84	1454.54	1473.16	1498	1513.71
EE	47.93	47.93	57.52	63.91	63.91	63.91	76.7	76.7	76.7	90	90	130	130	140
ES	326.96	340.65	360.82	361.72	373.45	376.73	395.57	395.57	396.18	396.18	396.69	397.71	405.84	503.06
FI	NaN	NaN	381	399.1	417.45	417.45	419.11	461.05	477.26	480.2	485.5	485.5	487.89	491.21
FR	NaN	433.06	440.86	447.91	454.63	460.09	469.33	477.31	485.66	501.81	516.46	527.32	539.48	553.7
HR	NaN	NaN	NaN	NaN	NaN	NaN	80.66	79.77	79.17	104.79	105.07	106.2	107.19	107.84
HU	NaN	78.1	86.35	90.65	81.33	82.76	81.61	78.82	76.8	73.86	73.55	73.21	73.74	71.5
IE	NaN	717.91	804.51	856.47	884.62	848.68	814.04	814.04	814.04	814.04	814.04	814.04	835.69	857.34
LT	NaN	43.01	53.43	74.29	91.23	91.23	91.23	101.37	101.37	101.37	102	102	102	122
LU	NaN	NaN	1168.54	1201.5	1308.67	1308.67	1361.95	1393.24	1425.31	1458.18	1458.18	1458.18	1511.18	1511.18
LV	NaN	34.47	38.57	38.42	52.43	56.44	56.63	57.36	49.89	49.8	49.8	49.8	49.8	53
MT	NaN	NaN	357.76	367.83	379.61	396.41	399.75	413.21	424.99	435.08	436.77	441.83	446.9	451.97
NL	NaN	840.84	865.8	882.2	898.7	909.33	919.7	935.49	925.37	948.18	960.83	972.7	982.79	992.12
PL	NaN	55.79	65.55	70.62	57.32	62.09	60.2	59.27	67.14	67.36	67.36	71.98	73.78	73.7
PT	NaN	171.73	177.05	181.91	187.18	189.52	189.52	189.52	178.15	178.15	178.15	180.99	183.84	186.68
RO	NaN	NaN	28.78	27.15	25.47	29.68	29.49	28.03	28.29	31.84	31.83	31.51	30.97	30.4
SE	NaN	369.55	375.13	369.21	346.55	385.85	411.97	441.17	448.48	426.44	414.82	410.82	407.88	389.93
SI	NaN	200.56	205.57	212.97	221.7	226.8	229.52	260	261.56	265.22	269.2	288.81	292.56	385.05
SK	NaN	41.9	48.56	53.74	58.43	60.5	60.5	60.5	60.5	61.6	61.6	61.6	61.6	61.6
UK	NaN	364.89	374.26	328.99	312.5	330.36	336.77	379.14	365.57	388.89	436.08	386.25	361.05	357.77

Table C1: Amounts for singles over time (nominal EUR)
Source: Euromod country reports, own calculations

SILC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	NaN	NaN	330	340	352	357	564.71	579.95	596.18	610.49	620.87	628.32	633.35	647.28
BE	408.89	417.07	429.66	465.07	483.86	483.86	503.39	523.74	534.23	544.91	544.91	578.27	589.82	595.13
BG	NaN	NaN	18.56	18.56	18.56	21.93	21.93	21.93	21.93	21.93	21.93	21.93	21.93	25.31
CY	NaN	248.6	273.13	284.48	318.75	339	339	339	339	360	360	360	360	360
CZ	95.2	96.68	98.68	109.84	103.65	108.37	111.43	118.69	114.9	108.4	109.42	110.42	113.39	116.39
DE	NaN	NaN	310	312	316	323	328	337	344	352	359	364	368	374
DK	NaN	NaN	1202.45	1236.45	1276.49	1323.57	1348.08	1388.42	1407.9	1433.84	1454.54	1473.16	1498	1513.71
EE	43.14	43.14	51.77	57.52	57.52	57.52	69.03	69.03	69.03	81	81	117	117	126
ES	188.82	196.51	207.55	209.59	216.82	218.66	229.05	229.05	229.4	229.4	229.68	230.26	281.68	305.39
ES	188.82	196.51	207.55	209.59	216.82	218.66	229.05	229.05	229.40	229.40	229.68	230.26	234.85	316.19
FI	NaN	NaN	323.85	339.24	354.83	354.83	356.24	391.89	405.67	408.17	412.68	412.68	414.71	417.53
FR	NaN	324.8	330.64	335.94	340.92	345.07	352	357.98	364.25	376.36	387.35	395.48	404.61	415.28
HR	NaN	NaN	NaN	NaN	NaN	NaN	53.77	53.18	52.78	62.87	63.04	63.72	64.31	64.71
HU	NaN	74.2	82.03	86.12	77.27	78.63	77.53	74.88	72.96	70.16	69.87	69.55	70.05	67.92
IE	NaN	597.11	669.2	712.5	735.88	706.01	677.21	677.21	677.21	677.21	677.21	677.21	695.18	713.15
LT	NaN	43.01	53.43	74.29	91.23	91.23	91.23	91.23	91.23	91.23	91.8	91.8	91.8	109.8
LU	NaN	NaN	870.16	894.25	967.75	967.75	1007.71	1031.18	1055.23	1079.88	1079.88	1079.88	1119.63	1119.63
LV	NaN	34.47	38.57	38.42	52.43	56.44	56.63	57.36	49.89	49.8	49.8	49.8	49.8	53
MT	NaN	NaN	186.46	201.56	207.45	215.85	217.52	224.25	230.14	235.18	236.03	238.56	241.09	243.63
NL	NaN	600.6	618.43	630.14	641.93	649.97	656.92	668.21	660.98	677.27	686.31	694.78	701.99	708.66
PL	NaN	42.18	48.24	51.97	42.18	45.69	44.29	43.62	56.49	56.67	56.67	61.26	62.79	62.72
PT	NaN	145.97	150.49	154.62	159.1	161.09	161.09	161.09	133.61	133.61	133.61	135.74	137.88	140.01
RO	NaN	NaN	25.93	24.58	23.11	26.71	26.54	25.23	25.46	28.69	28.68	28.39	27.91	27.4
SE	NaN	303.1	308.1	302.65	284.86	317.18	338.88	361.9	367.57	349.51	339.98	336.36	333.68	318.77
SI	NaN	170.48	174.73	181.02	188.44	192.78	195.09	195	196.17	212.18	215.36	226.72	229.66	302.26
SK	NaN	36.39	42.19	46.54	50.79	52.6	52.6	52.6	52.6	53.55	53.55	53.55	53.55	53.55
UK	NaN	286.13	293.59	258.16	245.31	259.32	264.3	297.57	286.92	305.36	342.57	303.42	283.63	281.05

Table C2: cohabitant amounts over time (nominal EUR)
Source: Euromod country reports, own calculations

SILC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	NaN	NaN	0.773	0.774	0.775	0.774	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
BE	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667
BG	NaN	NaN	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904	0.904
CY	NaN	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
CZ	0.877	0.877	0.877	0.877	0.877	0.876	0.877	0.875	0.875	0.875	0.875	0.875	0.875	0.875
DE	NaN	NaN	0.899	0.899	0.9	0.9	0.901	0.901	0.901	0.9	0.9	0.901	0.9	0.899
DK	NaN	NaN	1	1	1	1	1	1	1	1	1	1	1	1
EE	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
ES	0.577	0.577	0.575	0.579	0.581	0.580	0.579	0.579	0.579	0.579	0.579	0.579	0.579	0.629
FI	NaN	NaN	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
FR	NaN	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
HR	NaN	NaN	NaN	NaN	NaN	NaN	0.667	0.667	0.667	0.6	0.6	0.6	0.6	0.6
HU	NaN	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
IE	NaN	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832	0.832
LT	NaN	1	1	1	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9
LU	NaN	NaN	0.745	0.744	0.739	0.739	0.74	0.74	0.74	0.741	0.741	0.741	0.741	0.741
LV	NaN	1	1	1	1	1	1	1	1	1	1	1	1	1
MT	NaN	NaN	0.521	0.548	0.546	0.545	0.544	0.543	0.542	0.541	0.54	0.54	0.539	0.539
NL	NaN	0.714	0.714	0.714	0.714	0.715	0.714	0.714	0.714	0.714	0.714	0.714	0.714	0.714
PL	NaN	0.756	0.736	0.736	0.736	0.736	0.736	0.736	0.841	0.841	0.841	0.851	0.851	0.851
PT	NaN	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.75	0.75	0.75	0.75	0.75	0.75
RO	NaN	NaN	0.901	0.905	0.907	0.9	0.9	0.9	0.9	0.901	0.901	0.901	0.901	0.901
SE	NaN	0.82	0.821	0.82	0.822	0.822	0.823	0.82	0.82	0.82	0.82	0.819	0.818	0.818
SI	NaN	0.85	0.85	0.85	0.85	0.85	0.85	0.75	0.75	0.8	0.8	0.785	0.785	0.785
SK	NaN	0.868	0.869	0.866	0.869	0.869	0.869	0.869	0.869	0.869	0.869	0.869	0.869	0.869
UK	NaN	0.784	0.784	0.785	0.785	0.785	0.785	0.785	0.785	0.785	0.786	0.786	0.786	0.786
Av.	**0.755**	**0.820**	**0.820**	**0.822**	**0.822**	**0.821**	**0.814**	**0.807**	**0.807**	**0.806**	**0.806**	**0.806**	**0.806**	**0.808**

Table C3: Cohabitant / Single ratio's over time
Source: Euromod country reports, own calculations

country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AT	-	-	-	-	-	-	-	-	-	-	-	-	-
BE	0.66	0.65	0.64	0.67	0.7	0.67	0.68	0.7	0.71	0.73	0.71	0.74	0.75
BG	-	-	0.33	0.3	0.3	0.36	0.3	0.28	0.25	0.23	0.2	0.19	0.17
CY	-	-	-	-	-	-	-	-	-	-	-	-	-
CZ	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.75	0.7	0.65	0.6	0.54	0.49
DE	-	-	-	-	-	-	-	-	-	0.49	0.5	0.49	0.49
DK	-	-	-	-	-	-	-	-	-	-	-	-	-
EE	0.45	0.37	0.37	0.41	0.41	0.41	0.48	0.43	0.39	0.42	0.38	0.5	0.47
ES	0.6	0.59	0.59	0.58	0.59	0.58	0.61	0.61	0.61	0.61	0.6	0.56	0.55
FI	-	-	-	-	-	-	-	-	-	-	-	-	-
FR	-	0.51	0.5	0.5	0.51	0.51	0.49	0.5	0.5	0.52	0.53	0.53	0.54
HR	-	-	-	-	-	-	0.28	0.27	0.27	0.32	0.31	0.29	0.28
HU	-	0.6	0.6	0.61	0.59	0.56	0.47	0.44	0.43	0.41	0.39	0.34	0.31
IE	-	0.82	0.92	0.97	1.01	0.97	0.93	0.93	0.93	0.93	0.88	0.87	0.86
LT	-	0.42	0.46	0.64	0.79	0.79	0.79	0.63	0.63	0.56	0.48	0.48	0.46
LU	-	-	1.08	1.06	1.12	1.1	1.12	1.1	1.1	1.12	1.12	1.08	1.12
LV	-	0.28	0.24	0.21	0.29	0.28	0.28	0.28	0.22	0.28	0.27	0.26	0.23
MT	-	-	0.6	0.63	0.63	0.65	0.63	0.64	0.64	0.65	0.65	0.65	0.65
NL	-	0.91	0.91	0.9	0.91	0.91	0.9	0.9	0.88	0.9	0.89	0.89	0.88
PL	-	0.35	0.32	0.29	0.28	0.26	0.24	0.23	0.28	0.27	0.26	0.27	0.25
PT	-	0.62	0.61	0.59	0.57	0.57	0.57	0.57	0.47	0.45	0.43	0.42	0.41
RO	-	-	0.35	0.3	0.33	0.34	0.32	0.28	0.25	0.24	0.2	0.18	0.13
SE	-	-	-	-	-	-	-	-	-	-	-	-	-
SI	-	0.65	0.62	0.61	0.51	0.52	0.51	0.5	0.5	0.54	0.54	0.56	0.54
SK	-	0.34	0.34	0.32	0.33	0.33	0.32	0.31	0.3	0.28	0.26	0.25	0.22
UK	-	0.44	0.44	0.43	0.46	0.45	0.46	0.47	0.47	0.46	0.42	0.4	0.38

Table C4: Total social assistance benefits for a couple / Minimum wage (if exists)
Source: Euromod country reports, Eurostat, own calculations

Appendix D. Year and Geographical dummies

	Model 1	Model 2	Model 3
year2008	−0.03580***	−0.03203***	−0.01039***
	(0.00025)	(0.00025)	(0.00025)
year2009	−0.06010***	−0.05379***	−0.03894***
	(0.00025)	(0.00025)	(0.00025)
year2010	−0.06013***	−0.05641***	−0.04233***
	(0.00025)	(0.00025)	(0.00025)
year2011	−0.06656***	−0.06637***	−0.05556***
	(0.00025)	(0.00025)	(0.00025)
year2012	−0.04998***	−0.05112***	−0.04017***
	(0.00025)	(0.00025)	(0.00025)
year2013	−0.05423***	−0.05786***	−0.04956***
	(0.00025)	(0.00025)	(0.00025)
year2014	−0.07788***	−0.06986***	−0.06127***
	(0.00025)	(0.00026)	(0.00026)
year2015	−0.08553***	−0.07832***	−0.06715***
	(0.00025)	(0.00026)	(0.00026)
year2016	−0.08409***	−0.07813***	−0.06523***
	(0.00024)	(0.00026)	(0.00026)
year2017	−0.10735***	−0.10592***	−0.08205***
	(0.00025)	(0.00026)	(0.00026)
year2018	−0.10234***	−0.10257***	−0.08371***
	(0.00025)	(0.00026)	(0.00026)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table D1: Year dummies (ref. 2007)

	Model 1	Model 2	Model 3
n_europe	-0.18210^{***}	-0.21784^{***}	-0.19345^{***}
	(0.00019)	(0.00019)	(0.00021)
e_europe	-0.05192^{***}	-0.04729^{***}	-0.22867^{***}
	(0.00040)	(0.00040)	(0.00044)
c_europe	-0.16765^{***}	-0.16893^{***}	-0.24359^{***}
	(0.00010)	(0.00010)	(0.00015)
s_europe	0.21422^{***}	0.21221^{***}	0.21500^{***}
	(0.00092)	(0.00093)	(0.00093)
sw_europe	0.15130^{***}	0.16459^{***}	0.09879^{***}
	(0.00015)	(0.00015)	(0.00020)
se_europe	0.21661^{***}	0.21975^{***}	0.00249^{***}
	(0.00024)	(0.00024)	(0.00029)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table D2: Geographical dummies (ref. Western Europe)

Appendix E. Effect of age on cohabitation

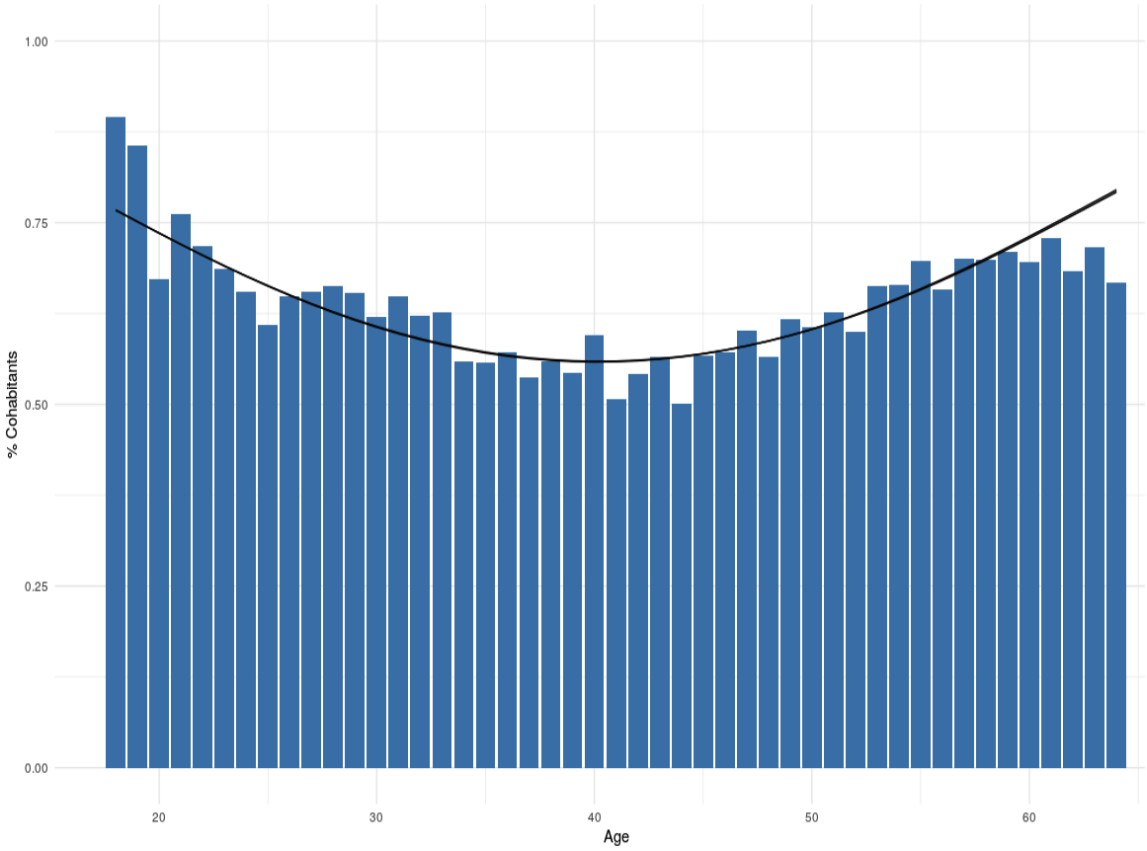

Figure E.5: Estimated and observed effect of age on cohabitation
Source: EU-SILC 2018 (all countries), own calculations

Appendix F. Robustness checks

Appendix F.1. Linear Model

	Model 1	Model 2	Model 3
(Intercept)	0.70250***	1.30700***	1.44156***
	(0.00234)	(0.00720)	(0.01038)
δ^a	−0.89096***	−0.86865***	−0.98257***
	(0.02643)	(0.02624)	(0.02653)
$\delta^a B_s$	−0.00005***	−0.00006***	−0.00011***
	(0.00001)	(0.00001)	(0.00001)
$\delta^a \rho$	0.74116***	0.70560***	0.71962***
	(0.03256)	(0.03230)	(0.03263)
age		−0.03346***	−0.03376***
		(0.00034)	(0.00034)
age^2		0.00042***	0.00042***
		(0.00000)	(0.00000)
$Educ_L$		0.01376***	0.01216***
		(0.00222)	(0.00221)
$Educ_H$		−0.02451***	−0.02469***
		(0.00178)	(0.00177)
$(1-\delta^a)B_s$			−0.00020***
			(0.00000)
$(1-\delta^a)\rho$			−0.05088***
			(0.00961)
Geographical dummies		*See below*	
Year dummies		*See below*	
R^2	0.01906	0.03517	0.03956
Adj. R^2	0.01904	0.03514	0.03953
Num. obs.	817741	817741	817741

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E1: Linear Model

	Model 1	Model 2	Model 3
year2008	−0.01258***	−0.01143***	−0.00374
	(0.00293)	(0.00291)	(0.00291)
year2009	−0.02145***	−0.01900***	−0.01378***
	(0.00294)	(0.00291)	(0.00291)
year2010	−0.02142***	−0.01988***	−0.01493***
	(0.00293)	(0.00291)	(0.00290)
year2011	−0.02369***	−0.02339***	−0.01963***
	(0.00292)	(0.00290)	(0.00290)
year2012	−0.01771***	−0.01795***	−0.01431***
	(0.00291)	(0.00289)	(0.00288)
year2013	−0.01924***	−0.02025***	−0.01760***
	(0.00291)	(0.00288)	(0.00288)
year2014	−0.02783***	−0.02419***	−0.02135***
	(0.00291)	(0.00303)	(0.00302)
year2015	−0.03058***	−0.02729***	−0.02353***
	(0.00291)	(0.00303)	(0.00303)
year2016	−0.03001***	−0.02714***	−0.02271***
	(0.00291)	(0.00303)	(0.00303)
year2017	−0.03847***	−0.03719***	−0.02866***
	(0.00296)	(0.00308)	(0.00308)
year2018	−0.03668***	−0.03598***	−0.02936***
	(0.00292)	(0.00305)	(0.00305)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E2: Linear Model - Year dummies (ref. 2007)

	Model 1	Model 2	Model 3
n_europe	−0.06768***	−0.07943***	−0.06902***
	(0.00230)	(0.00228)	(0.00254)
e_europe	−0.01878***	−0.01594***	−0.08004***
	(0.00479)	(0.00476)	(0.00519)
c_europe	−0.06222***	−0.06166***	−0.08757***
	(0.00121)	(0.00122)	(0.00172)
s_europe	0.07284***	0.06994***	0.07052***
	(0.01050)	(0.01042)	(0.01041)
sw_europe	0.05217***	0.05583***	0.02977***
	(0.00172)	(0.00172)	(0.00224)
se_europe	0.07373***	0.07536***	−0.00299
	(0.00279)	(0.00278)	(0.00325)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E3: Linear Model - Geographical dummies (ref. Western Europe)

Appendix F.2. Country dummies (instead of broader geographical dummies)

	Model 1	Model 2	Model 3
(Intercept)	0.26601***	2.06375***	2.10252***
	(0.00036)	(0.00070)	(0.00284)
δ^a	−2.35007***	−2.30230***	−2.30378***
	(0.00229)	(0.00231)	(0.00231)
$\delta^a B_s$	0.00007***	0.00006***	0.00018***
	(0.00000)	(0.00000)	(0.00000)
$\delta^a \rho$	1.84000***	1.73806***	1.58285***
	(0.00281)	(0.00283)	(0.00424)
age		−0.09840***	−0.09842***
		(0.00003)	(0.00003)
age^2		0.00123***	0.00123***
		(0.00000)	(0.00000)
$educ_L$		0.03439***	0.03417***
		(0.00019)	(0.00019)
$educ_H$		−0.07543***	−0.07521***
		(0.00015)	(0.00015)
$(1-\delta^a)B_s$			0.00012***
			(0.00000)
$(1-\delta^a)\rho$			−0.15747***
			(0.00321)
Country dummies		*See below*	
Year dummies		*See below*	
Log Likelihood	−560263465.70713	−552212937.88568	−552209205.99660
Num. obs.	818750	818750	818750
McFadden's R^2	0.02260	0.03664	0.03665

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E4: Probit model with country dummies

	Model 1	Model 2	Model 3
year2008	0.01456***	0.02081***	0.02144***
	(0.00025)	(0.00025)	(0.00025)
year2009	−0.00946***	−0.00039	0.00202***
	(0.00025)	(0.00025)	(0.00025)
year2010	−0.01047***	−0.00423***	−0.00165***
	(0.00025)	(0.00025)	(0.00025)
year2011	−0.01959***	−0.01719***	−0.01452***
	(0.00025)	(0.00025)	(0.00025)
year2012	−0.00546***	−0.00462***	−0.00223***
	(0.00025)	(0.00025)	(0.00025)
year2013	−0.01257***	−0.01451***	−0.01210***
	(0.00025)	(0.00025)	(0.00025)
year2014	−0.03567***	−0.02139***	−0.01827***
	(0.00025)	(0.00026)	(0.00026)
year2015	−0.04222***	−0.02847***	−0.02588***
	(0.00025)	(0.00026)	(0.00026)
year2016	−0.04286***	−0.03085***	−0.02879***
	(0.00025)	(0.00026)	(0.00026)
year2017	−0.05011***	−0.04017***	−0.03846***
	(0.00025)	(0.00026)	(0.00027)
year2018	−0.05194***	−0.04508***	−0.04322***
	(0.00025)	(0.00026)	(0.00026)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E5: Year dummies (ref. 2007)

	Model 1	Model 2	Model 3
countryBE	0.07244***	0.03235***	0.01009***
	(0.00039)	(0.00039)	(0.00050)
countryBG	0.46806***	0.43989***	0.53568***
	(0.00057)	(0.00057)	(0.00128)
countryCY	0.40854***	0.38484***	0.40232***
	(0.00112)	(0.00113)	(0.00116)
countryCZ	0.36718***	0.35508***	0.43010***
	(0.00044)	(0.00044)	(0.00099)
countryDE	−0.04549***	−0.07325***	−0.01693***
	(0.00031)	(0.00031)	(0.00073)
countryDK	−0.01499***	−0.07193***	−0.07689***
	(0.00046)	(0.00047)	(0.00112)
countryEE	0.06663***	0.05206***	0.13984***
	(0.00085)	(0.00085)	(0.00134)
countryES	0.34109***	0.34277***	0.34307***
	(0.00033)	(0.00033)	(0.00080)
countryFI	0.09369***	0.05038***	0.09798***
	(0.00046)	(0.00046)	(0.00072)
countryFR	0.13162***	0.09832***	0.12115***
	(0.00032)	(0.00032)	(0.00048)
countryHR	0.47133***	0.42459***	0.46618***
	(0.00088)	(0.00088)	(0.00135)
countryHU	0.32490***	0.30951***	0.40290***
	(0.00044)	(0.00045)	(0.00117)
countryIE	0.45731***	0.41371***	0.42130***
	(0.00060)	(0.00060)	(0.00065)
countryLT	0.15262***	0.13736***	0.22816***
	(0.00065)	(0.00065)	(0.00124)
countryLU	0.06639***	0.07683***	0.01222***
	(0.00128)	(0.00129)	(0.00157)
countryLV	0.28694***	0.27197***	0.38037***
	(0.00078)	(0.00079)	(0.00148)
countryMT	0.49709***	0.48279***	0.46432***
	(0.00177)	(0.00179)	(0.00193)
countryNL	0.14816***	0.11421***	0.07958***
	(0.00036)	(0.00036)	(0.00056)
countryPL	0.36454***	0.35519***	0.42437***
	(0.00036)	(0.00036)	(0.00102)
countryPT	0.57624***	0.53346***	0.59274***
	(0.00047)	(0.00047)	(0.00090)
countryRO	0.42267***	0.41357***	0.50801***
	(0.00041)	(0.00041)	(0.00120)
countrySE	0.03143***	−0.03265***	0.01403***
	(0.00039)	(0.00039)	(0.00069)
countrySI	0.13913***	0.14977***	0.20002***
	(0.00087)	(0.00087)	(0.00108)
countrySK	0.33521***	0.33430***	0.42031***
	(0.00064)	(0.00064)	(0.00122)
countryUK	0.38010***	0.38777***	0.43188***
	(0.00032)	(0.00033)	(0.00067)

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table E6: Country dummies (ref. AT)

References

Anderberg, D.. Marriage, divorce and reciprocity-based cooperation. Scandinavian Journal of Economics 2007;109(1):25–47.

Becker, G.S.. A theory of marriage: Part i. Journal of Political economy 1973;81(4):813–846.

Becker, G.S.. A theory of marriage: Part ii. Journal of political Economy 1974;82(2, Part 2):S11–S26.

Bernard, N.. L'habitat groupé pour personnes en précarité sociale: et si on arrêtait de pénaliser la solidarité? Les échos du logement 2007;:1.

Bernard, N.. De l'importance d'un label. Les échos du logement 2016;2016:8.

Bitler, M.P., Gelbach, J.B., Hoynes, H.W., Zavodny, M.. The impact of welfare reform on marriage and divorce. Demography 2004;41(2):213–236.

Buhmann, B., Rainwater, L., Schmaus, G., Smeeding, T.M.. Equivalence scales, well-being, inequality, and poverty: sensitivity estimates across ten countries using the luxembourg income study (lis) database. Review of income and wealth 1988;34(2):115–142.

Chiappori, P.A.. Equivalence versus indifference scales. The Economic Journal 2016;126(592):523–545.

Chiappori, P.A., Mazzocco, M.. Static and intertemporal household decisions. Journal of Economic Literature 2017;55(3):985–1045.

Decancq, K., Fleurbaey, M., Schokkaert, E.. Happiness, equivalent incomes and respect for individual preferences. Economica 2015;82:1082–1106.

Galand, S., Stroobants, V., Termote, H., van de Wiel, A., Van Hootegem, H.. Protection sociale et pauvreté - rapport bisannuel 2012-2013 2013;.

García, L.L., Jong, K., Sturkenboom, M.. Straf samenwonen niet afmet de kostendelersnorm. `https://www.trouw.nl/opinie/straf-samenwonen-niet-af-met-de-kostendelersnorm~b2517952/?referrer=https`; 2021. Retreived December 2020.

Goedemé, T., Zardo Trindade, L.. Metasilc 2015: A report on the contents and comparability of the eu-silc income variables 2020;.

Grossbard-Shechtman, S.. Marriage and the economy. Marriage and Economy: Theory and Evidence from Advanced Industrial Societies 2003;:1–34.

Hess, G.D.. Marriage and consumption insurance: What's love got to do with it? Journal of Political Economy 2004;112(2):290–318.

Kotlikoff, L.J., Spivak, A.. The family as an incomplete annuities market. Journal of political economy 1981;89(2):372–391.

Lefebvre, P., Merrigan, P.. The impact of welfare benefits on the conjugal status of single mothers in canada: Estimates from a hazard model. Journal of Human Resources 1998;:742–757.

Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., Caan, W.. An overview of systematic reviews on the public health consequences of social isolation and loneliness. Public health 2017;152:157–171.

Low, H., Meghir, C., Pistaferri, L., Voena, A.. Marriage, labor supply and the dynamics of the social safety net. Technical Report; National Bureau of Economic Research; 2018.

Perdaens, A., Roesems, T., Feyaerts, G., Bernard, N., Lemaire, L.. Vivre sans chez soi à bruxelles rapport bruxellois sur l'état de la pauvreté - 2010 2010;.

Persson, P.. Social insurance and the marriage market. Journal of Political Economy 2020;128(1):252–300.

Potoms, T., Rosenberg, S.. Public insurance and marital outcomes: Evidence from the affordable care act's medicaid expansions. Forthcoming 2021;.

Rosenzweig, M.R., Stark, O.. Consumption smoothing, migration, and marriage: Evidence from rural india. Journal of political Economy 1989;97(4):905–926.

Saintes, F., Woelfle, A.. Taux cohabitant : frein à la solidarité et entrave à la vie familiale - analyse de l'arrêt de la cour de cassation du 9 octobre 2017. Service Etudes et Action politique de la Ligue des familles 2018;.

Schepers, W., Nicaise, I.. Investir dans l'enfance pour briser le cercle vicieux de l'inégalité. EU Network of Independent Experts on Social Inclusion 2014;.

Steenssens, K., Hausmann, T., Lamberts, M., Van Regnmortel, T., Cortese, V., Hamzaoui, M.. Aanpassing van de leefflooncategorieën aan de hedendaagse samenlevings- en woonvormen - een mixed method verbeteronderzoek 2016;.

Strohm, C.Q., Seltzer, J.A., Cochran, S.D., Mays, V.M.. "living apart together" relationships in the united states. Demographic research 2009;21:177.

Tjøtta, S., Vaage, K.. Public transfers and marital dissolution. Journal of Population Economics 2008;21(2):419–437.

Van Parijs, P., Vanderborght, Y.. Basic income: A radical proposal for a free society and a sane economy. Harvard University Press, 2017.

Walker, I., Zhu, Y.. Child support and partnership dissolution. The Economic Journal 2006;116(510):C93–C109.