Social Situation Monitor

Estimating undercoverage and non-take-up of minimum incomes schemes: methodological issues and two national case studies

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ESTIMATING UNDERCOVERAGE AND NON-TAKE-UP OF MINIMUM INCOME SCHEMES: METHODOLOGICAL ISSUES AND TWO NATIONAL CASE STUDIES

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INTRODUCTION

Alleviating poverty and social exclusion is the most important goal of minimum income (MI) schemes. These schemes provide cash benefits with the aim of guaranteeing a minimum amount of resources to those with insufficient means of subsistence, irrespective of their contribution history. Participation in an MI scheme is subject to a set of conditions on available income and assets.[1]

Aside from the issues related to work activation conditionalities, the poverty-reduction effect of a given MI scheme is related to various factors, e.g. a set of the eligibility conditions, the phenomenon of non-take-up (NTU), benefit adequacy and the interplay between MI and other social transfers. The potential for MI to reduce poverty depends on: i) how the poverty definition underlying the eligibility conditions relates to standard poverty concepts, ii) how many of the targeted units actually claim the benefit, and iii) whether the amount received is sufficient to overcome the poverty threshold. Taken together, these dimensions impact on the main output dimensions of the MI scheme, i.e. coverage rate, defined as the share of individuals in need who are entitled and apply to the benefit, and adequacy, defined in terms of a 'decent life' line (e.g. with respect to the at risk of poverty (AROP) line).[2] With respect to eligibility requirements, the coverage of MI relate to where the 'means testing line' is set and the indicators of economic resources used to select beneficiaries. For example, eligibility conditions are very different if they consider income only, or income and wealth in the means test. As for benefit amounts, MI are top-up benefits that complement household resources (incomes) up to a certain threshold. Their adequacy (or generosity) therefore depends on where that threshold is set, i.e. its distance from the AROP line.

The focus of this research note is NTU of social benefits, which affects both the coverage and the poverty reduction effects of MI. More specifically, NTU refers to incomplete benefit receipt among those actually eligible for the benefit. While this was a key topic in literature on the welfare state, it was largely neglected in the academic literature until the early 1990s (van Oorschot, 1996) and has only begun to be examined again in the last two decades (e.g. Currie, 2004; Hernanz et al., 2004; Matsaganis et al., 2014; Ferrarini et al., 2016). In most cases, the NTU of social assistance benefits was found to be related to red tape or other administrative barriers, such as the request for additional (out-of-context) information or administrative delays (Hernanz et al., 2004; Mazet, 2014; Frazer and Marlier, 2016a; Daigneault and Macé, 2020). Another important source of NTU is social stigma (Moffit, 1983; Hancock et al., 2004; Baumberg, 2016; Chambers et al., 2016; Van Mechelen and Janssens, 2017), as well as the lack of information and awareness among potentially eligible individuals (Matsaganis et al., 2010; Lamont et al., 2014; Mazet, 2014; Bhargava and Manoli, 2015; Eurofound, 2015). NTU may also depend on expected benefit amounts (Riphahn, 2001; Bruckmeier and Wiemers, 2012;

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[1] MI schemes are different from both unemployment benefits (UB) and universal basic income (UBI). The former are conditional on previous working activity, while the latter are not means-tested and are available as a universal right. MI schemes are often linked to employment policies and work-related conditionalities to overcome 'disincentives' to labour supply due to high marginal tax rates (Natili, 2019). Where these disincentives are too high, a 'poverty trap' may emerge.

[2] According to the AROP concept, individuals are considered poor when their equivalised disposable income is lower than 60% of the national median.

Arrighi et al., 2015), which in turn relates to the measure of generosity. Low take-up tends to prevent the welfare state from successfully combating poverty.

Estimating the undercoverage and NTU of a certain MI scheme is complex. Survey data usually under-estimate recipients and amounts of social transfers, preventing an accurate assessment of MI coverage and adequacy among poor households. In addition, they rarely record all of the information that would allow precise identification of the fulfilment of the set of MI eligibility requirements, complicating the identification of all households that are eligible for MI.

As emphasised in the Council Recommendation on adequate minimum income, improving both the coverage and take-up of MI is key to combating poverty. The Recommendation proposes a three-yearly reporting process on progress in this field. This research note focuses on two related concepts:
1. Undercoverage, which can be defined as 'the probability of not drawing an MI while being potentially entitled based on one's income' (or, more generally, having a 'low' income);
2. NTU, defined strictly here as 'the probability of not drawing an MI while being entitled based on the eligibility criteria set by the law'.

The term NTU should be used with caution. Firstly, data sources typically do not allow for verification of all criteria used to establish whether households are entitled to the MI, with researchers perhaps preferring to avoid complex assumptions and limit undercoverage enquiries (according to different definitions of the population at risk). Secondly, it may incorrectly imply that obstacles to effective receipt of MI stem from household ignorance or choice (e.g. willingness/stigma), whereas in reality NTU might reflect various sources, such as legal restrictions, bureaucracy, or service delivery processes.

This research note explores the suitability of available datasets to analyse undercoverage and NTU of MI schemes. It first reviews the characteristics of an ideal dataset that would allow researchers to properly estimate undercoverage and NTU, then describes two case studies for Belgium and Italy. The comparison between these two countries is interesting: Belgium has a long tradition of MI schemes, while Italy introduced national MI schemes only in 2018 (Inclusion Income, *Reddito di Inclusione* – REI, replaced in 2019 by the Citizenship Income, *Reddito di Cittadinanza* – RdC). The first case study looks at the undercoverage of MI schemes in both countries, using the (standardised) information provided in the European Union Survey on Income and Living Conditions (EU-SILC) (matched with administrative information in the Belgian case). This will measure the number of individuals/households satisfying the income test but not receiving the benefit. The second case study estimates NTU rates in Italy, using an innovative dataset that matches the Italian Household Budget Survey (HBS) with administrative data on RdC recipients. Both exercises also focus on the characteristics of individuals/households more likely to suffer from undercoverage or NTU of MI schemes.

The next section of this research note presents the most common and general data issues for the estimation of NTU and undercoverage. Two dedicated subsections deal with country-specific data issues for Belgium and Italy. The subsequent section presents the empirical exercises for the two country case studies, while a final section summarises the main results, draws conclusions and provides some suggestions on improving the availability of data suitable to estimate NTU.

DATA ISSUES

Estimating NTU of MI demands very particular data, requiring both individual/household fulfilment of the (usually) large set of eligibility requirements for MI and information on the actual receipt of the MI.

Two key empirical issues may be identified. Firstly, a great deal of information is needed to precisely identify the pool of potential beneficiaries of MI, i.e. those complying with all eligibility requirements (household income, financial and housing wealth, household characteristics, etc.) to simulate the various policy thresholds. It appears that no survey dataset precisely records all of the information needed to perfectly reconstruct the fulfilment of all eligibility requirements for MI (e.g. EU-SILC records incomes rather than wealth and consumption). In addition, incomes and assets recorded in surveys and in administrative data might differ from those reported in the applications for MI for various reasons, such as different reference periods, underreporting of administrative income and wealth, differences in the definitions of monetary variables, or varying definitions of household members. Unless timely and detailed census data on several characteristics of a population are available, most countries' administrative records only track specific groups of individuals (e.g. workers; certain benefit recipients), record a limited set to variables, and do not provide information on household composition and sociodemographic characteristics. Secondly, apart from the identification of eligible people, data are often limited in respect of the information about the actual beneficiaries of a certain MI. It is often very difficult to distinguish MI recipients from recipients of other means-tested and non-contributory transfers in most surveys (including EU-SILC). Survey datasets often underestimate the number of beneficiaries of means-tested social transfers because of beneficiaries' stigma-driven reluctance to report some income sources (Meyer and Sullivan, 2003; 2012). These two issues remain relevant when measuring undercoverage, i.e. where only the income requirement is considered, or where the analysis focuses on the overlap between the population identified as poor (according to a certain income or consumption threshold) and the pool of MI recipients.

Given the limits of survey and administrative data, matching administrative data on incomes, wealth and social transfers and survey data appears crucial to improve estimates of NTU or undercoverage across both time and space.

The capacity to estimate undercoverage and NTU depends on the availability of proper data from reliable sources and on the possibility to match these data. It is possible to identify the features of the ideal dataset to estimate the NTU rate of MI schemes (then the undercoverage rate) on the basis of the main features of MI scheme eligibility requirements. Gathering information on the eligibility of individuals and households for a certain MI scheme is essential in defining the pool of those potentially affected by NTU.

For example, in Italy, eligibility requirements concern income, wealth, ownership of some specific goods, duration of residency. Accordingly, the ideal dataset to precise identify those eligible for the MI scheme and estimate NTU rate should record:[3]

i. Information on the effective beneficiaries of the MI and detailed information on the benefit (amount, duration, etc.);

ii. Information on the value of the indicator that jointly considers household annual income and wealth (the latter valorised at 20% of its value) (*Indicatore Situazione Economica Equivalente* – ISEE);

iii. The value of all income sources for all household members, including social transfers other than the MI (to compute possible income deductions in the eligibility conditions);

iv. The value of financial assets, distinguished by asset type (e.g. shares, public bonds, bank accounts);

v. The value of housing wealth, distinguishing the residential home from other property;

vi. Information on specific consumption patterns (e.g. endowment, recent purchase of cars, motorcycles or boats);

vii. Information on having applied for the benefit (to distinguish possible reasons for NTU);

viii. Nationality and duration of residence in the country (including legal address).

The characteristics of an ideal database are country-specific, according to the types of entitlement requirement, even if all EU countries follow both income and wealth tests in their MI schemes (Raitano et al., 2021). Nevertheless, the framework depicted here may be useful to researchers and policymakers in weighing the pros and cons of available datasets to analyse the effectiveness of a certain welfare programme and to assess the relevance of the assumptions in the absence of one element of information.

In general, datasets built by matching social security administrative data (or tax files) with survey data (such as the EU-SILC or the HBS) offer good opportunities for the estimation of NTU and undercoverage rates. In many countries (e.g. Italy), administrative data record detailed information on labour incomes and monetary social transfers (including MI) but have limited information on household composition and characteristics. This type of information may be integrated from surveys such as EU-SILC or HBS. Administrative archives sometimes also provide information on wealth holdings of households applying for means-tested benefits, thus improving the ability to impute household wealth of non-applicants. In the Italian case, for example, means testing for most welfare benefits (including MI) is based on the ISEE declaration, which considers both income and wealth.

Using social security data on access and amounts of social transfers, together with information on fulfilment of the various eligibility conditions is a clear improvement on survey data alone, where social transfers are usually underreported (Meyer and Sullivan, 2003; 2012). Using only survey information on earnings and other market incomes to assess the fulfilment of income tests might bias such

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[3] In addition to the eligibility requirements, in all EU countries MI schemes are also conditional on the willingness to work of individuals in active age (apart from possible constraints on their activation, such as disability or family duties). However, willingness to work may be not considered an eligibility requirement per se, as it is usually assessed at a later stage when individuals satisfy all of the requirements. Nevertheless, the stringency of the rules on activation might be a potential reason for NTU of potential MI scheme applicants.

assessment when an individual underreports their income to tax and social security authorities. Survey data are less affected by income underreporting (e.g. by the self-employed) than administrative data, but the income test is based on the administratively reported income.

A relatively easy matching procedure is to use individuals' fiscal codes – recorded in both administrative and survey data – as the matching key among the different data sources.[4] A standardised procedure might be to ask permission to use data with sensitive information within a scientifically grounded project. Once data have been anonymised, they can be used for research.[5]

The following sections review the characteristics of the available surveys (notably the EU-SILC) to estimate NTU and discuss how administrative data might be used by Belgium and Italy – possibly jointly with survey data – to improve their capacity to estimate NTU and undercoverage and to compare the characteristics of benefit recipients with those individuals/households characterised by NTU or undercoverage of a certain MI.

COUNTRY-LEVEL DATA: BELGIUM

EU-SILC remains the most accurate data source on income and living conditions in Belgium. Nevertheless, the dataset lacks information on some marginalised groups (e.g. homeless people, itinerant groups, people living in so-called collective households such as institutions or prisons). Part of the information needed for an accurate estimate of NTU of social assistance is not included in EU-SILC, primarily wealth and compliance with activation conditions. These issues will be discussed in greater depth in the Belgian case study.

There was a significant 'break' in the data series in EU-SILC 2019 for Belgium. Until 2018, the questionnaires were very lengthy and detailed, requiring good literacy skills from respondents, which may have caused selective non-response. Even among respondents, there were some issues with the reliability of the information on income. For the 2009-2018 waves, EU-SILC could be supplemented with data from the administrative register of social assistance transfers to households (PRIMA),[6] which are more reliable than the self-reported data in EU-SILC. The linkage with PRIMA is a good solution for the problem of underreporting of MI receipt by households. This underreporting may be due to shame, obliviousness (in cases of short spells of receipt) or misunderstanding of the questions on MI. In the income period 2008-2017, with parallel information drawn from EU-SILC (variable HY060) and PRIMA, the rate of underreporting in EU-SILC appeared to be 20.8%. Obtaining merged EU-SILC and PRIMA

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[4] The matching procedure fulfils all legal privacy requirements.

[5] In Italy, this procedure must be carried out by one of the Institutions belonging to the National Statistical System (SISTAN). Public institutions such as ministries, social security institutions and public research centres belong to the SISTAN, while the universities (even when publicly financed) are not included in the SISTAN and cannot access data with sensitive information unless they participate in a joint research project with an institution belonging to the SISTAN. Previously, matching between *Istituto Nazionale per la Previdenza Sociale* (INPS) administrative data and IT-SILC (AD-SILC database) was produced in the framework of some research projects financed by the European Commission Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL). However, an updated version of this dataset recording receipt and amounts of RdC was not available at the time of writing.

[6] PRIMA is available since 2008, thus earlier years of EU-SILC (2004-2007) are not used.

data for Belgium was relatively easy because both datasets are archived annually by the Belgian Federal Statistical Office (STATBEL). Anonymised versions of the merged datasets can be put at the disposal of researchers upon request.

From 2019, EU-SILC data on income are largely based on administrative register data, with a high degree of reliability. This simplifies data collection, improves its reliability, and (presumably) reduces non-response. For social assistance, PRIMA data are imported directly into EU-SILC by STATBEL. However, this new data collection method also experiences some issues with comparability of samples and specific variables before and after 2018.[7]

This research note uses two separate sets of pooled data across successive EU-SILC waves: the first covers income data for 2008 to 2017 (EU-SILC waves 2009-2018), and the second covers income data for 2018 to 2021 (EU-SILC waves 2019-2022). Households headed by persons aged 65+ were excluded from both datasets because MI benefits for older people are not reported separately from other pensions in EU-SILC. This resulted in a dataset of 42,755 households for the period 2008-2017, and 19,489 households for the income period 2018-2021.[8]

COUNTRY-LEVEL DATA: ITALY

The EU-SILC is one of the most important and accurate data sources to estimate undercoverage of MI in Italy, given its rich set of sociodemographic and economic variables. Unlike in Belgium, no dataset matching IT-SILC (the Italian component of the EU-SILC) and the MI administrative archives is available, Researchers must thus rely on the HY063 variable (non-contributory and means-tested transfers, recorded from the 2014 cross-sectional wave of the EU-SILC) for information on recipients and amount of MI schemes. However, the HY063 variable includes other residual benefits (e.g. electricity bonuses, tax credits for low-income people) which cannot be easily disentangled from the MI schemes without information on the specific policy receipt. As a consequence, the HY063 variable may represent a noisy proxy for MI, which needs to be aligned as closely as possible to the real number of recipients. While perfectly well-suited for the analysis of undercoverage, as all income sources are precisely recorded (using administrative registers), IT-SILC lacks the necessary wealth information to consider all MI eligibility requirements and shed some light on NTU. As the RdC was implemented in 2019, this research focuses on the 2020 wave of the IT-SILC (income reference year 2019). At the time of writing, the 2021 wave is the most recent available, but the data collection process and the most important economic variables of this wave are expected to have been significantly affected by the COVID-19 pandemic.

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[7] From EU-SILC 2019 onwards, all main household income components are derived from administrative registers and transformed into disposable net amounts, following several years of experiments. The interview method also changed from pen-and-paper personal interviewing to computer-assisted personal interviewing (telephone interviewing during COVID-19). These changes were introduced to facilitate interviewing and obtain more reliable information. Data collection was much more difficult (with lower response rates) during the COVID-19 period.

[8] These numbers include 'repeated' observations (i.e. households that stayed in the panel for two or three years) as EU-SILC itself is a rotating panel.

This research note makes use of the AD-HBS (Administrative Household Budget Survey), a unique dataset for Italy built by merging various waves of the Italian HBS with several administrative archives managed by the national social security institute (*Istituto Nazionale per la Previdenza Sociale* - INPS) (using anonymised fiscal codes as the matching key).[9] The HBS is carried out every year by the Italian National Statistical Institute (ISTAT) and records detailed information on household consumption expenditure for representative cross-sections of the Italian population. Households are interviewed in a given month and the number of households interviewed each month is roughly balanced in each wave of the survey.

The INPS archives record individual-level administrative information on labour earnings, pensions, and other important public cash transfers, such as child benefits, unemployment and short-term work allowances and, crucially, MI transfers. For the estimation of the NTU rate of the RdC, this research note focuses on the 2021 wave of the AD-HBS, but estimates for 2019 are also provided in order to compare a pre-pandemic and post-pandemic year. Given that the number of recipient households/individuals peaked in 2021,[10] comparing these two years assesses whether the increase in the number of beneficiaries was accompanied by a reduction in the NTU rate.

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[9] The AD-HBS dataset has been developed within a joint research project between the Italian Ministry of Economy and Finance and the Department of Economics and Law of Sapienza University of Rome.

[10] The RdC is provided in Italy at the household level. However, official statistics on beneficiaries are provided for both households and individuals.

ESTIMATING UNDERCOVERAGE: BELGIAN CASE STUDY

CONTEXT INFORMATION

Belgium has five MI schemes, which supplement other sources of income if the sum of the latter remain below the MI threshold:

- Social integration income (SII; in Dutch, 'leefloon') for (non-disabled) adults in active age (18-65), with Belgian or EU nationality;
- Equivalent integration income (equivalent SII) for foreigners who reside legally and regularly in Belgium;
- Income guarantee for older people (IGE) aged 65+;
- Income replacement allowance for disabled people;
- Guaranteed child allowance for children (of foreign origin) who are not entitled to the mainstream child benefit schemes.

The first four schemes are mutually exclusive and target separate categories, while using broadly the same thresholds, depending on the household situation of adults (cohabiting, single, household head with dependent children). These four schemes focus solely on adults because child allowances can be cumulated with the MI. In 2022, the four schemes together catered for approx. 406,000 adults, i.e. 4.4% of the adult population in Belgium.

The first two schemes are conditional on compliance with a 'negotiated integration contract', which stipulates activation through education or work. The SII can then be used as an employment subsidy. Unless mentioned otherwise, this analysis will focus on the SII (approx. 153,000 recipients in 2022) and equivalent SII (approx. 16,000 recipients in 2022). Table B.1 summarises the eligibility conditions for both schemes.

Table B.1 Eligibility conditions for Belgian SII (main MI scheme)

Dimension	Threshold
Citizenship	Belgian or EU nationality, registered foreigner, stateless person or recognized refugee
Residence	Legal and regular residence in Belgium: EU citizens: after three months' residence Foreigners: registration in population register (following application) after five years. Other foreigners in need can obtain equivalent SII
Age	Minimum 18 (exception for pregnant minors)
Income	Monthly income below MI threshold Exhausted the right to any other social benefit
Wealth	Means test includes imputed income from real and financial assets Own house (within certain limits) not taken into account
Activation	Willingness to work (exemptions for students) Young people (18-25) have to sign a 'personal integration contract'

REVIEW OF EARLIER ESTIMATIONS OF NTU FOR BELGIUM

Several previous studies have estimated the quantitative incidence of NTU of the MIS in Belgium:
- Groenez and Nicaise (2002);
- Bouckaert and Schokkaert (2011);
- Goedemé et al. (2022)

Groenez and Nicaise (2002)

This study was part of a larger project commissioned by DG EMPL in the context of the 'Preparatory actions to combat poverty' in 1999. The research covered 13 EU countries (Nicaise et al. 2004) and four in-depth case studies (BE, DK, EL, United Kingdom (UK); Nicaise, ed. 2001). The aim was to test performance indicators of coverage and adequacy of MI schemes, and to analyse mobility patterns into and out of social assistance. The study used the European Community Household Panel (ECHP), the predecessor of EU-SILC, for the period 1993-1997, merging the ECHP with its 'Belgian version', which contained more detailed information.

Groenez and Nicaise combined information on individual yearly incomes and individual monthly 'activity calendars' to estimate disposable monthly income data at household level. Periods for which the household income was lower than the MI and where no social assistance was received were qualified as 'undercoverage spells'. In this way, the **undercoverage rate** of the MI (based exclusively on income levels and ignoring other conditions for entitlement) was estimated at approx. 4.2% of the population as a whole, or 75-80% of those with 'pre-MI disposable incomes' below the MI threshold. In other words, in that period, three to four times more households were found to live below the MI threshold without drawing social assistance, compared to actual recipients.[11] Older people, migrants, women, single people, separated people, low-educated and less healthy/disabled people, agricultural/fisheries

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[11] Using a threshold of 95% of the legal MI scales as a margin of error to exclude marginal cases of entitlement.

workers, shop, service and market sales workers, and non-working people were overrepresented compared to the population at large. As such, the profiles of the MI recipients and the uncovered group were very similar. 54% of the undercoverage spells lasted longer than two years,[12], with household income estimated to be lower than 75% of the MI in 70% of cases.

The findings were surprising. However, with 4.2% of all households uncovered for at least one month in the year, Belgium was not the worst of the 13 countries examined, with corresponding rates in the other countries varying between 2% and 13% of the population. Finland had the most 'waterproof' MI system, with just 2% uncovered households and 12% receiving MI.

The research also examined mobility patterns between various states of social protection (undercoverage, MI, other social security, work, 'other'). Household characteristics and systemic features of national social protection and MI systems were found to explain part of the risks and resilience.

This research was likely methodologically superior to other studies using income data on a yearly basis. Not only was the ECHP a genuine panel study (covering almost a decade in most participating countries), the inclusion of monthly activity calendars and individual income figures allowed for a much more detailed analysis. Most importantly, potential MI entitlement periods of less than a year could be identified even in households where the overall household income of the corresponding year exceeded the MI threshold. This is no longer the case with EU-SILC. The detailed information of the ECHP also allowed for a more rigorous check of the accuracy of the incomes declared, resulting in better data cleaning. On the other hand, the estimation of monthly household income appeared to be very labour-intensive, while the risk of selective attrition of low-income households in such demanding panel studies may also cast some doubt on the external validity of the indicators.

Bouckaert and Schokkaert (2011)

This research used a simulation tool developed for socioeconomic policies (MEFISTO), together with Belgian EU-SILC income data from 2005. Focusing on the active age population (18-65), it applied essentially the same method as Groenez and Nicaise (2002), but with yearly income data. The undercoverage rate was estimated at 65% of all (financially) eligible households, with a 'margin of error' between 57% and 76%.[13] The authors also compared the *amounts* of 'potential MI entitlement' with those of actual recipients and found the undercoverage gap (i.e. the volume of non-disbursed MI to potentially entitled households) at 41-51% of the total pre-MI income gap.[14] The best estimate in budgetary terms appeared to be EUR 21.5 million.

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[12] Ignoring left and right censuring issues (window of observation limited to three years).

[13] Lower and upper bounds assume an underreporting and overreporting of 10%, respectively, in the incomes reported by potentially entitled respondents.

[14] Average forgone income supplement of NTU households, expressed as a percentage of the overall income gap of all eligible households, or that part of the ex-ante cost of the SII scheme that was not spent due to NTU.

Some methodological lessons can be drawn from this research. The use of NTU or undercoverage estimates for budget simulations is an interesting additional feature, as it is important for public authorities to be aware of the cost involved in combating NTU and extending entitlement. On the other hand, the authors admit that a single wave of EU-SILC involves a very small sample of low-income households and MI recipients. With just 100 identified recipients, the Belgian EU-SILC 2005 survey may be seen as insufficiently reliable.

Goedemé et al. (2022)

Funded by the Belgian Scientific Policy Office (BELSPO), the TAKE project was conducted by a consortium of research institutions and public administration services to examine the accessibility of various types of means-tested (cash or in-kind) benefits, including Belgian MI schemes for disabled people, other households in active age, and pensioners. For this RN, we will only summarise the TAKE findings relating to MI schemes for households in active age (SII) and for older people (IGE). It used stratified face-to-face surveys among low-income households, linked with administrative records. The overall response rate was 23%. A complex weighting procedure was applied to compensate for various sources of stratification and selective response.

The objectives of the survey were to check eligibility of households not drawing MI benefits and to examine the reasons for non-receipt. The combination of register and survey data allowed the researchers to simulate eligibility for both types of MI in a more realistic way than estimates based solely on register data. For example, for the SII, income from wealth and dwellings shared with persons other than dependent children could be taken into account. The advantage over EU-SILC data is less clear for the estimation of eligibility, although the TAKE survey examined reasons for non-receipt, which are ignored in the EU-SILC. Similarly, for the IGE, the restrictions relating to possession or transfer of assets were also investigated in TAKE, but are not available in EU-SILC.

The resulting NTU rate for the (equivalent) SII was estimated at between 43% and 46% of all eligible households in 2019 (with a confidence interval of 37-51%). This margin is partly explained by the use of two variants of simulation: a 'lenient' model that ignores the income drawn by other adults than the 'parents' in a household, and a 'strict' model that takes all incomes into account (municipal services use some discretion in deciding the incomes included). In absolute population numbers, between 68,000 and 82,000 adults, and 15,000 to 40,000 children forego the SII on a yearly basis. The authors note that these numbers are underestimated, in part due to the sampling error described above and because the use of yearly income data may overlook short periods of entitlement. The survey suggests that between 3.0 and 4.5 percentage points (pp) of the NTU may be attributed to non-compliance with activation conditions.
NTU rates are highest among homeowners and lowest among single parents. People with poor self-perceived health, low-educated, unemployed and materially deprived households tend to have lower NTU rates.

For the IGE, the estimated NTU rate was 50% (confidence interval: 42-59%). The corresponding absolute population numbers range between 46,000 and 86,000. This high NTU incidence is surprising because major efforts are made by pension funds to anticipate NTU and inform potentially eligible

households. An important qualification is that other sources suggest that a high proportion (15.7%) of those residing in homes for older people (collective households, which are not included in the survey) draw the IGE, compared to 5.3% of private households. The NTU rate in institutions is presumably lower, given their closer links with social services. Here again, the survey suggests that NTU rates are lower among the most vulnerable groups: single people, tenants, people with poor health, and materially deprived households. The fact that young pensioners (65-69 age group) also display a lower NTU rate may indicate that the proactive information efforts of the pension administration have become more effective in recent years.

An interesting additional contribution from this research is the combined analysis of hard and softer determinants of NTU. Based on a stepwise probit model, the authors state that information and processing obstacles play a major role in determining NTU: lack of knowledge and the (perceived) complexity of application procedures appear to explain a substantial part. By contrast, (self-reported) negative attitudes towards social support and fear of stigma do not seem to hinder applications significantly.

The research also demonstrates the effectiveness of specific administrative measures to assign social rights more proactively. It concludes with useful policy recommendations that go beyond the scope of this research note.

ESTIMATION OF NTU FOR BELGIUM, BASED ON EU-SILC 2009-2022

Methodology: strengths and limitations, transferability, and implementation issues

This research notes uses two subsets of EU-SILC data for Belgium:
-   An enriched panel for the period 2008-2017, based on EU-SILC waves 2009-2018, merged with administrative data on MI transfers;
-   Modernised cross-sectional EU-SILC data for the period 2018-2021 (EU-SILC waves 2019-2022).

Separate analyses were carried out for these two periods due to differences in the data collection methods that may affect the comparability of findings between the two periods.

The advantage of this approach (especially since 2018) is its simplicity. EU-SILC can be used as a single data source, with the addition of a relatively simple simulation algorithm for the calculation of eligibility for MI.[15] The undercoverage rate is defined as follows:
-   Step 1: classify every EU-SILC household into one of the three categories of (potential) beneficiaries (cohabiting adults, single adults, households with dependent children) corresponding to different groups in the MI scheme;
-   Step 2: simulate, for every household, the corresponding yearly disposable income threshold below which it would be entitled to MI benefits;
-   Step 3: identify the number of entitled households (E) by comparing their yearly disposable income before MI with the corresponding MI threshold;

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[15] All incomes in EU-SILC are expressed as net disposable incomes. This also applies to MI benefits, as they are non-taxable.

- Step 4: count the number of households within the E subset that actually received MI benefits (B);
- Step 5: the rate of undercoverage equals 100*(1 – B/E).

A number of limitations must be taken into account. Firstly, the yearly sample size of EU-SILC (despite its representativeness) is relatively small. Secondly, the analysis was confined to households with a head in the active age group. Thirdly, the focus on MI recipients concerns a small minority of the population, given that Belgian MI schemes are designed as a residual, 'last-resort' protection system. For example, in the EU-SILC 2022 wave, out of 4,554 households in active age, only 209 (4.6%) drew the (equivalent) SII benefit. Of those, 143 (3.14% of the reference sample) had a yearly income (before SII) below the MI threshold.[16] Another 129 (2.83%) were identified as eligible but not receiving the (equivalent) SII. As a consequence, estimations based on single EU-SILC waves are subject to a relatively large margin of error, which is not necessarily observable from trend graphs given the (rotating) panel nature of the dataset. Pooling data across several years thus remedied the sample size issue.

The estimation is limited to the two MI schemes for non-disabled persons in active age *(18-64)*, i.e. SII and its equivalent for non-EU citizens, equivalent SII. Means-tested disability pensions make up a different MI scheme, and within EU-SILC these benefits are mixed with other types of individual social security benefits (long-term sickness and 'insured disability'). The same applies to the MI scheme for pensioners (IGE), where reported benefits are mixed with regular pension benefits.

What we are measuring is actually undercoverage, i.e. households living below the MI threshold and not drawing MI benefits (or drawing them only partly). NTU is a narrower concept that also controls for eligibility conditions other than income and age. In the Belgian case, the other main eligibility conditions relate to limitations on wealth, as well as citizenship and activation requirements. Given that home ownership is no obstacle to accessing the SII and that most households living below the income threshold have no financial assets, the risk of bias from ignoring wealth is minimal. Nor are conditions relating to citizenship a major obstacle because non-EU citizens residing legally (and regularly) in the country are entitled to an equivalent SII' based on the same rules. As concerns the activation requirement, the TAKE survey suggests that it accounts for 3.0 to 4.5 pp of NTU. In other words, if this were the main difference between NTU and undercoverage, the NTU rate would presumably lie 3.0-4.5 pp lower than the undercoverage rate.

The undercoverage rate itself may be underestimated for several reasons:
- EU-SILC provides yearly income data, even for components that may have been drawn for shorter periods (e.g. MI, unemployment benefits). As a consequence, short spells of MI receipt may well be reported, while short periods of undercoverage remain invisible as long as the overall yearly income of the household exceeds the MI threshold. This explains why some households report

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[16] Households reporting receiving the SII while their yearly income exceeded the SII threshold likely experienced short spells of income support.

receiving an MI benefit despite not being identified as entitled to it ('type II error' or 'false posi-tives' in statistical terms).[17] The data suggest that approx. one-third of all recipients are in this situation. NTU (or undercoverage) is likely to be higher in short-term periods of financial hardship (due to the information hurdles, and the duration/obstacles of application processes), making this a source of underestimation of the NTU rate. As it was not possible to identify such short spells of undercoverage, the type II error cases of MI recipiency were ignored in all estimations;

- This analysis was confined to the identification of periods of entitlement for which no MI was attributed, for whatever reason. It did not check for partial or temporary undercoverage, i.e. cases where an MI was drawn but the amount did not fully compensate for the income deficit, for ex-ample where entitled households applied after a few months of hardship and missed part of their potential benefit;

- The samples of EU-SILC are drawn from the population register, which contains all individuals with a legal address in Belgium. Only private households are sampled and only households living in their registered residence are reached. EU-SILC thus excludes some marginalised groups, such as homeless people, travellers, people living in institutions (such as hospitals, prisons, homes for older people, convents) and undocumented migrants. Nicaise et al. (2014; 2019) estimate that this may result in an underestimation of the financial poverty (AROP) rate by between 0.6 and 1.7 pp (of the entire population). Except for those living in institutions, the vast majority of these cat-egories are also uncovered (i.e. living below the MI threshold);[18]

- The linkage between EU-SILC and PRIMA (or any similar register) necessitates a matching between households that may be defined differently by the two sources. EU-SILC considers households as people living together at the same address and sharing resources and/or expenses, whereas the MI legislation may define households differently. For Belgium, this study merges PRIMA house-holds to match them with EU-SILC households. Nevertheless, the TAKE researchers warn that mu-nicipal social services have some discretion in interpreting the legal definition of cohabitants. In practice, this means that they can sometimes consider adults and their older parents living at the same address or households hosting a homeless person as separate households, and thus be slightly more generous than the law prescribes. This study adopts the strictest interpretation of the law and considers all people living together as cohabiting, which may result in somewhat lower estimates of the undercoverage rate.

Table B.2 presents the income thresholds used for the simulation of entitlement to (equivalent) SII.[19] Category 1 relates to cohabiting adults (18+) and category 2 to single-adult households. Category 3 applies to single-parent or two-parent households with dependent children. There are no SII supple-ments for children, as child allowances are universal and not considered in the means test.

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[17] The term 'error' is inappropriate in many cases because it is perfectly possible to receive MI benefits for a few weeks or months while the annual household income exceeds the yearly MI scale. Another legitimate explanation is the fact that in some cases, MI recipients moving into work can continue to receive a tapered MI benefit to attenuate the 'poverty trap effect'. Genuine reporting errors may relate to confusion (by respondents) between MI and other types of financial assis-tance (such as a heating allowance or a municipal housing supplement) granted by social services.

[18] People living in retirement homes or hospitals are usually better covered, given the links between these institutions and social services. Homeless people and travellers can receive the SII in the municipality where they have a 'reference address', but experience great difficulties in obtaining that reference address due to administrative hurdles and municipalities' reluc-tance to host and support them. Undocumented migrants are not eligible for the MI and are not included in NTU estimations.

[19] Scales linked to the index of consumption prices; using the scales applied at the end of each year.

Table B.2. Yearly income thresholds used for the estimation of SII entitlement (*)

Income year	Year in EU-SILC	Category 1: Cohabiting (EUR)	Category 2: Single (EUR)	Category 3: With dependent child(ren) (EUR)
2008	2009	5,692.45	8,538.68	11,384.91
2009	2010	5,806.30	8,709.45	11,612.61
2010	2011	5,922.53	8,883.78	11,845.05
2011	2012	6,161.46	9,242.20	12,322.93
2012	2013	6,410.70	9,616.05	12,821.41
2013	2014	6,538.91	9,808.37	13,077.84
2014	2015	6,538.91	9,808.37	13,077.84
2015	2016	6,669.69	10,004.54	13,339.39
2016	2017	6,939.19	10,408.80	13,878.41
2017	2018	7,141.58	10,712.38	14,283.19
2018	2019	7,284.12	10,926.19	15,057.85
2019	2020	7,429.80	11,144.72	15,057.85
2020	2021	7,671.25	11,506.89	15,550.96
2021	2022	8,195.85	12,293.82	16,614.44

* Yearly amounts, current prices.

Results for the period 2008-2017

- Over the 10-year period, 2,509 households (5.9%) would be eligible for the (equivalent) SII based on their financial income;
- Among the (financially) eligible households, the undercoverage rate is estimated to amount to 58.5% (stdev .045);
- Although there is no clear trend, the average estimated undercoverage rate was 5 pp higher in the first half of the period;
- The bulk of underreporting of MI receipt in EU-SILC is attributable to type II error (false positives), i.e. households that do not report receiving the SII would have received either small amounts or just short-term support.

Results for the period 2018-2021

The modernised (cross-sectional) EU-SILC waves collected in 2019-2022 are used for this period. Findings are reported for the pooled data across all four waves in order to average out part of the variance. Despite this, there is no discernible trend across the years.

- Based on their disposable (financial) income before SII transfers, 5.8% of these households would be eligible for (equivalent) SII (stdev .0023), almost the same proportion as for 2008-2017;
- Among the eligible households, the average rate of undercoverage is 46.6% (stdev .016; 48.4% in 2018, 46.1% in 2019, 44.6% in 2020 and 47.4% in 2021). Interestingly, despite the use of different datasets and methods, these rates are only slightly higher than the rate (baseline

43%) found by Goedemé et al. (2022) in the TAKE research, which combined a large survey with administrative register data. The variation within the observation period should be handled with caution, because the apparent dip in 2020 coincides with the COVID-19 pandemic, which involved severe problems of non-response;[20]

- Compared to 2008-2017, the estimated undercoverage rate in 2018-2021 is more than 10 pp lower, despite essentially the same estimation methodology being applied in both periods. Notwithstanding differences in data collection methods and the potential response bias caused by the COVID-19 pandemic, it is also plausible that efforts to reduce undercoverage have been relatively successful in recent years, because the problem has been continuously on the policy agenda. The Belgian Combat Poverty Service campaigned with seminars, publications and videos, while the use of e-government was intensified (especially social security administration) and simplified. In addition, regional and local initiatives reached out to potentially eligible households. Despite differences in data sources and methods used, the survey of the various estimates of undercoverage over the past 30 years suggest a longer-term declining trend;
- Nevertheless, the undercoverage rate remains worryingly high, given that the Belgian MI schemes are nearly 50 years old (the SII was introduced in 1974). Extrapolation of the figures from the 2022 EU-SILC survey suggests that 99,000 Belgian households (or 2.75%) are living with less than the guaranteed minimum income (which in turn lies 7-30% below the official AROP threshold, depending on the household type). In other words, there is still ample room for improvement.

Who are the uncovered?

Table B.3 presents the profile of uncovered households, compared to the population at large and the reference group of (financially) eligible households, based on the pooled data for the period 2018-2021. Generally, the profile of the uncovered group is more vulnerable (in terms of any of the parameters) than that of the average Belgian household, but slightly less vulnerable than the subgroup of households eligible for the SII. This is also reflected in the fact that the average pre- MI (yearly) income of the uncovered households was EUR 2,300 higher than that of eligible households. It also means that their potential benefit was lower than that of effective recipients.

On the degree of vulnerability of uncovered households, households with children are the exception: their share in the uncovered group is smaller than in the overall population. This finding is consistent with several other studies of undercoverage. The likely reason is that households feel a greater pressure to apply for help when the wellbeing of children is at stake, with social services more inclined to help for the same reason.

The overrepresentation of uncovered households in the (more wealthy) Flemish region deserves further investigation. It may reflect the more conservative, meritocratic Flemish culture, with different

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20   During the COVID-19 period, the Belgian government took exceptional income support measures as part of social protection to cushion the income losses linked to temporary unemployment. It remains too soon to speculate about the impact of such measures on the take-up of the SII.

attitudes to social assistance among households or, indeed, the tighter conditions imposed by local authorities or workers on the ground.[21]

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[21] It is generally accepted that the assignment of the SII is to some extent determined by local politics, with representatives of political parties participating in the assessment of application files.

Table B.3 Household characteristics of the uncovered group vs eligible group for SII and full EU-SILC sample, 2018-2021

	Uncovered	Eligible	Full sample
Characteristics of the household head			
Sex			
Male	58.2%	53.3%	64.7%
Female	41.8%	46.7%	35.3%
Country of origin			
Belgium	53.8%	51.7%	80.7%
EU-28 (until SILC 2020), EU-27 (from SILC 2021)	15.9%	12.0%	8.0%
Extra-EU	30.3%	36.3%	11.3%
Level of education			
No formal education	2.6%	5.8%	1.0%
Primary	6.1%	8.4%	4.5%
Secondary	57.0%	60.4%	49.7%
Tertiary	34.3%	25.5%	44.8%
Self-reported health			
Very good	25.2%	22.5%	29.6%
Good	42.9%	37.3%	46.3%
Fair	17.5%	19.7%	15.7%
Bad	11.8%	14.6%	6.7%
Very bad	2.6%	6.0%	1.6%
Activity status			
Employed	39%	24%	74%
Unemployed	18%	14%	6%
Retired	6%	9%	7%
Invalid	12%	12%	8%
Other	24%	41%	5%
Age group			
18-25	13%	12%	3%
26-35	16%	21%	20%
36-45	15%	17%	25%
46-55	25%	24%	27%
56-64	32%	26%	25%
Characteristics of the household			
Tenure status			
Owner	33.8%	19.8%	64.5%
Tenant (market price)	47.6%	57.8%	26.0%
Tenant (below market price)	12.7%	18.9%	8.1%
For free	6.0%	3.5%	1.3%
Region			
Brussels	28.9%	27.6%	12.3%
Flanders	35.2%	28.9%	55.6%
Wallonia	35.9%	43.5%	32.1%
Pre-SII income (euros)			
Average housedhold income before (equivalent) SII	9,650	7,339	45,877
Household type (SII categories)			
Category 1 (Cohabitant)	28.6%	23.7%	40.7%
Category 2 (Single)	56.0%	56.5%	28.8%
Category 3 (hh with children)	15.4%	19.8%	30.5%

Conclusions of the Belgian case study

Combining the results of previous studies with this analysis here, it can be cautiously concluded that the problem of undercoverage in Belgium may have decreased in the past 30 years, but remains very worrying: nearly one in two households with incomes below the MI threshold do not appear to effectively draw support from the 'safety net of last resort'.

Given that the right to an MI – and (equivalent) SII in particular – is, in principle, quasi-universal, it can be assumed that nearly all uncovered households are lawfully entitled to it, and further efforts to reach out proactively to potential beneficiaries are crucial. E-government tools can be used more effectively, but more proactive and customer-friendly service provision remain key as well.

The analysis suggests that the use of EU-SILC to monitor undercoverage is feasible at low cost on a continuous basis. The data and the methodology are imperfect:

- Yearly samples are small and exclude some of the most vulnerable groups. 'Satellite surveys' targeting these groups can fill this gap;
- Available information on MI benefits is limited to the two mainstream schemes. More specific information on the IGE and the income replacement allowance for disabled people could usefully be collected in the future;
- Information on financial wealth and real estate ownership is lacking, although (at least in Belgium) it could easily be plugged into EU-SILC from existing register data;
- Short spells of MI entitlement cannot be identified based on yearly income data. Nevertheless, the method can give an indication of the extent of the problem and trends over time.

The suspicion of underreporting of MI receipt in the period prior to 2018 deserves further examination. While EU-SILC data seem to miss some 20% of all MI benefits, a closer look suggests that most unreported benefits are low or short-lived. Linked survey and register data provide an opportunity for more accurate measurement than EU-SILC alone.

ESTIMATING UNDERCOVERAGE AND NON-TAKE-UP: ITALIAN CASE STUDY

CONTEXT INFORMATION – NATIONAL MI SCHEMES

Italy has long lagged behind other European countries on MI policy. After more than a decade of fragmented experiments, the first national MI scheme, the REI, was introduced in 2018 (Raitano et al., 2018). In April 2019 the REI was replaced by a far more generous scheme, the RdC, which will in turn be replaced by the inclusion allowance (*Assegno di inclusion* – ADI) from January 2024 (Jessoula et al., 2019; Franzini and Raitano, 2023).

This research note focuses on the RdC, as the MI scheme in place in the years in question. The main differences between the ADI and the RdC concern the equivalence scale adopted and the exclusion of households without children/older people/disabled people from the ADI.[22] Due to the differences in eligibility requirements, the pool of potential ADI beneficiaries will be lower than that of RdC and skewed towards households with vulnerable members. According to the regression analysis (see below), this may lead to a higher take-up rate. However, closely analysing the effect of the transition from the RdC to the ADI on NTU and undercoverage will be relevant for future research.

The RdC is a means-tested transfer conditional on labour market activation (Jessoula et al., 2019). In addition to an extremely stringent residence requirement, the means test jointly considers household income and wealth. In order to be eligible, households must satisfy all of the requirements summarised in Table I.1.

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[22] See Franzini and Raitano (2023) and Aprea et al. (2023) on the differences between RdC and ADI.

Table I.1 RdC eligibility requirements

Dimension	Threshold
Residence	10 years, the last two of which continuously
ISEE (composite indicator considering household income and wealth)	EUR 9,360
Annual income	EUR 6,000 multiplied by the equivalence scale EUR 7,560 for households where all non-disabled members are aged at least 67 EUR 9,360, multiplied by the equivalence scale, for households living in rented accommodation
Real estate assets	EUR 30,000 excluding the family home
Financial assets	EUR 6,000 for single-member families plus EUR 2,000 for each additional member, up to EUR 10,000. Some exceptions for households with disabled members or additional children
Durable goods	No purchase of cars, motorcycles, boats in the preceding two years

The RdC tops up household income to the level established by the income test (i.e. EUR 6,000 multiplied by the equivalence scale; EUR 7,560 for households where all non-disabled members are aged at least 67. In addition, a monthly allowance covering expenses for rent (EUR 280; EUR 150 for households where all non-disabled members are aged at least 67) and mortgages (EUR 150) is also paid to beneficiaries living in rented accommodation or who have to pay a mortgage on their home.

The peculiar equivalence scale adopted – which assigns a value of 1 to the first household member, 0.4 to every other adult (18 or above), and 0.2 to every other child (18 or below) up to a maximum value of the scale of 2.1 (2.2 for households with disabled members) – is recognised as particularly penalising for large households with children (Scientific Committee for the Assessment of Citizenship Income, 2021), as it assumes high economies of scale from living together (Raitano, 2022). Similarly, the residence requirement, which is completely unrelated to economic well-being, excludes many otherwise 'deserving' households from the scheme.

Overall, in 2021, the RdC catered to approximately 4 million people (6.7% of the Italian population), while, in 2022, coverage declined slilghtly, to 3.7 million people (6.2% of the Italian population).[23] These figures are much higher for the poorer Southern regions, with a peak of 16.4% in Campania in 2021 (15.6% in 2022).

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[23] All individuals receiving at least one month of RdC are counted among recipients; See INPS (May 2023). *Statistical report.* Appendice_Statistica_Maggio_2023.pdf

Context – ISEE declaration

Access to the RdC benefit is strictly related to the unusual means testing process in Italy. Most of cash and in-kind social transfers in the Italian welfare system require an ISEE value lower than a specific threshold (e.g. EUR 9,360 for RdC). ISEE represents a complex indicator of equivalised economic conditions, considering both income and wealth.[24] Interestingly, the ISEE value is not self-reported by social transfers claimants, but provided by the INPS. In order to request it, people must file and submit a specific declaration to INPS on all household income and (financial and housing) wealth sources. Once the document certifying the ISEE value is received, people can use it to claim any social transfer referring to the ISEE and/or to its components for the mean -test. The need for a certified ISEE value means that claiming social benefits relies on a two-step bureaucratic mechanism, which might clearly influence NTU – people must file the ISEE declaration and then claim the income support in question. This mechanism becomes relevant in explaining NTU of the national MI scheme because only a fraction of poor households overcome the first step (Boscolo and Gallo, 2023).

Using an original methodology based on 2018 ISEE administrative records and a tax-benefit microsimulation model on IT-SILC data, Boscolo and Gallo (2023) show that roughly 1.1 out of 3.0 million of poor households did not file the ISEE declaration.[25] They report that this reluctance is more likely for older households, those headed by a woman, migrant households, those without underage children, those living in an owned house, and those who report greater financial wealth among the poor. They not an association between the absence of an ISEE declaration and the occupational status of household members. More specifically, households with at least one self-employed or one unemployed person are more reluctant to request the ISEE value, suggesting that they might fear the authorities' scrutiny.

The Boscolo and Gallo (2023) study refers to 2018 administrative data, one year before the introduction of the RdC. As the RdC has a much larger eligible population and is a more generous measure than its predecessor (Jessoula et al., 2019), it likely incentivised a greater number of households to endure the bureaucratic effort needed to receive the ISEE declaration. Nevertheless, it is likely that a relevant fraction of poor households still do not request the ISEE value and thus remain excluded from the Italian welfare system.

Review of earlier estimations of NTU and undercoverage for Italy

When the RdC was introduced in March 2019, several academics and Italian public institutions undertook simulations on the eligible population of the new national MI scheme for 2019, which ranged between 1.3 and 1.8 million of households (Baldini and Gallo, 2019). Considering that about 1.07 million of households received the RdC benefit in 2019 according to the INPS,[26] it follows that the RdC NTU rate ranged between 20% and 40%, depending on the simulation, during that first year.

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[24] The ISEE indicator was introduced in 1997 to overcome the limits of proxying household economic wellbeing through personal tax incomes (e.g. wealth and some income sources are excluded from the calculation of the Italian personal income tax), and to – partially – solve the issue of fiscal evasion.

[25] The authors define poor households as those reporting (or would have had if requested) an ISEE value below EUR 6,000, thus the ISEE eligibility threshold of the national MI scheme (i.e. REI) in 2018.

[26] See https://www.inps.it/it/it/dati-e-bilanci/osservatori-statistici-e-altre-statistiche/dati-cartacei---rdc.html

Curci et al. (2020) used a microsimulation model based on Bank of Italy's Survey on Household Income and Wealth (SHIW) data to update the previous simulations for the first stage of the COVID-19 pandemic (May 2020), reporting an NTU rate of 35%. Comparing the simulated and actual distribution of recipient households showed that the NTU is higher in the northern regions of Italy, among larger families, and, in general, among those who expect a limited monthly benefit amount. The dramatic negative effects of COVID-19-related restrictions on the labour market and the national economy lasted until spring 2021 and are likely to have increased the number of claimants for income support measures. Unsurprisingly, using a microsimulation model based on IT-SILC data, Baldini and Gallo (2021) estimated an RdC NTU rate lower than that of Curci et al. (2020), equalling almost 20% in April 2021.

More recently, two studies focused on NTU among specific categories of the poor population: foreign citizens (Giuliano et al., 2022) and homeless people (Gatta, 2023). Giuliano et al. (2022) used an updated version of the same microsimulation model adopted by Baldini and Gallo (2021) and found that the NTU of the RdC was about 26% at national level in 2020. However, they highlighted that the NTU is significantly greater among eligible foreign citizens, at 42%. They suggested two possible reasons: i), cultural and language barriers, as well as the necessary certification for income and household wealth abroad, all of which worsened the bureaucracy related to RdC; and ii) the equivalence scale adopted in the RdC to define income eligibility criteria and benefit amount is highly unfavourable to large families, which are more common in the foreign population.

Gatta (2023) addressed the take-up rate among homeless people of three welfare benefits – the RdC, an emergency benefit related to the COVID-19 pandemic (REM), and disability benefit.[27] The study also explored the mechanisms driving NTU, paying specific attention to the role of bureaucratic barriers and stigma. Given the well-known underrepresentation of homeless population in official statistical sources, the data were collected *ad hoc* through face-to-face interviews with a representative sample of the homeless population in Rome. The study found a low take-up rate of the RdC, both in absolute value and compared to the other benefits: only 42% of eligible homeless people received the RdC. Given the very high application rate among these households (85.3%), it pointed out that the bulk of NTU stemmed from administrative issues, such as the rejection of valid applications. These results were complemented by experimental evidence on the role of perceptions in willingness to apply, comparing perceptions of bureaucratic complexity and benefit 'undeservingness'. The study found that lowering the perception of undeservingness of the RdC (by telling interviewed individuals that receiving the benefit is their right) did not impact their decision to apply, but, rather, shifted their reason for non-application from perceived undeservingness to bureaucratic complexity. These results highlighted that the RdC is perceived as a highly stigmatising benefit, whose large and complex set of eligibility requirements act as a barrier to take-up, especially among homeless people.

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[27] The study refers to a probabilistic sample of the homeless population in Rome. According to ISTAT, the size of the homeless population in Rome is second only to Milan.

Estimation of undercoverage and NTU for Italy: methodological approaches

The brief review above highlights two main issues: there are very few estimations of the NTU or un-dercoverage rate of the RdC, especially across the population as a whole; and the data and method-ologies adopted for those estimations are heterogeneous. This section proposes two different ap-proaches to estimate undercoverage and NTU in Italy. The former, in line with the Belgian case study, uses 2020 IT-SILC data and focuses on undercoverage, while the latter uses 2021 AD-HBS data and focuses on NTU.[28] More specifically:

1. Estimating undercoverage using IT-SILC waves. While the IT-SILC survey does not record spe-cific information on RdC receipt, effective beneficiaries may be imputed from those receiving non-contributory and means-tested benefits (HY063G variable), exploiting the IT-SILC panel dimension and the benefit amounts received. The other eligibility requirements, including in-formation on household wealth (which is poorly recorded in IT-SILC data) and the values of the various ISEE subindicators (needed to estimate the RdC eligible population) are simulated using a static tax-benefit microsimulation model, drawing on Gallo and Raitano (2023). The main limit of this exercise depends on the need to identify the subgroups of individuals re-ceiving a means-tested and non-contributory benefit (i.e. positive value of the HY063 variable) who are actually receiving the RdC, as the HY063 variable also includes other types of social transfers. Similar to the Belgian case study, IT-SILC data cannot be used to estimate NTU be-cause the poor wealth information available in the survey does not allow household ISEE and wealth to be adequately inferred.

2. Estimating NTU by matching the Italian HBS with social security administrative archives for the individuals interviewed in IT-HBS. Exploiting administrative information on household labour income, social transfers and ISEE, as recorded in INPS archives for the sample of individuals interviewed in IT-HBS, allows an estimate of the numbers fulfilling the eligibility requirements for the RdC who have actually received the benefit.[29] The main limit of this estimate is that wealth of the households that do not fill an ISEE declaration has to be imputed to identify the pool of households eligible for the RdC.

These two approaches allow an estimate of the extent of undercoverage and NTU, as well as investi-gating the characteristics of non-applicants and recipients, including the relative poverty gap between these two groups. They are discussed in more detail below.

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[28] A third strategy, based on using a dataset matching INPS administrative information with IT-SILC data, cannot be pursued because of the unavailability of such a database in recent years.

[29] This facilitates study of the link between NTU and consumption poverty. Italy is the only EU country that provides official estimates of a consumption-based absolute poverty indicator based on reference budgets (ISTAT, 2009; Cutillo et al., 2022). Assessing the relationship between NTU and this type of poverty indicator thus seems particularly important.

Estimation of undercoverage for Italy: IT-SILC approach

Definition of the RdC recipient population

The EU-SILC dataset does not report a variable on the cash benefits received through the MI scheme. Information on (cash) social benefits received at household level is instead provided in an aggregate way, distinguishing different transfers by their main function: family/children-related allowances, housing allowances, and social exclusion not elsewhere classified. Although some uncertainties may persist in how the MI scheme is interpreted within the national welfare system, the MI benefit should generally belong to the latter category of cash social transfers, as is the case in Italy.

Since the 2014 survey wave, EU-SILC data provide an additional disaggregation of social transfers, classifying benefits into four different subcategories: i) contributory and means-tested; ii) contributory and non-means-tested; iii) non-contributory and means-tested; iv) non-contributory and non-means-tested. Following the ESSPROSS standards, a benefit is defined as non-contributory if it is not conditional on the payment of contributions by individual or by other parties on their behalf, while a benefit is means-tested if it is conditional on the beneficiary's income and/or wealth values. Looking at the eligibility criteria and characteristics of the Italian MI scheme, the RdC benefit clearly fits within the third subcategory (non-contributory and means-tested). In the IT-SILC datasets from 2014 to 2020, all social transfers belonging to the 'social exclusion not elsewhere classified' category are non-contributory and means-tested only.

Figure I.1 shows how the share of households receiving at least one euro of 'social exclusion not elsewhere classified' transfers along the household equivalised income distribution (excluding household income values of transfers under analysis)[30] changed between 2018 (2017 incomes) and 2020 (2019 incomes). Only 270,000 of Italian households (1% of the total population) received a HY063 means-tested and non-contributory 'social exclusion not elsewhere classified' transfer in 2017, 133,000 of whom belonged to the first decile group. In 2018, the number of households receiving a 'social exclusion not elsewhere classified' transfer increased to 951,000 (4% of the total population), likely thanks to the introduction of the first MI scheme (REI) (Jessoula et al., 2019). However, a further and larger increase is evident in 2019, when the RdC was introduced, when the number of households receiving a 'social exclusion not elsewhere classified' transfer rose to 2.81 million, about 11% of the total population. As expected, the increase was higher in the first decile, where 31.4% of households received at least one euro of means-tested and non-contributory social transfers (900,000 households).

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[30] Equivalised income computed by applying the RdC equivalence scale.

Figure I.1. Share of recipient households, by year and decile of equivalised income distribution
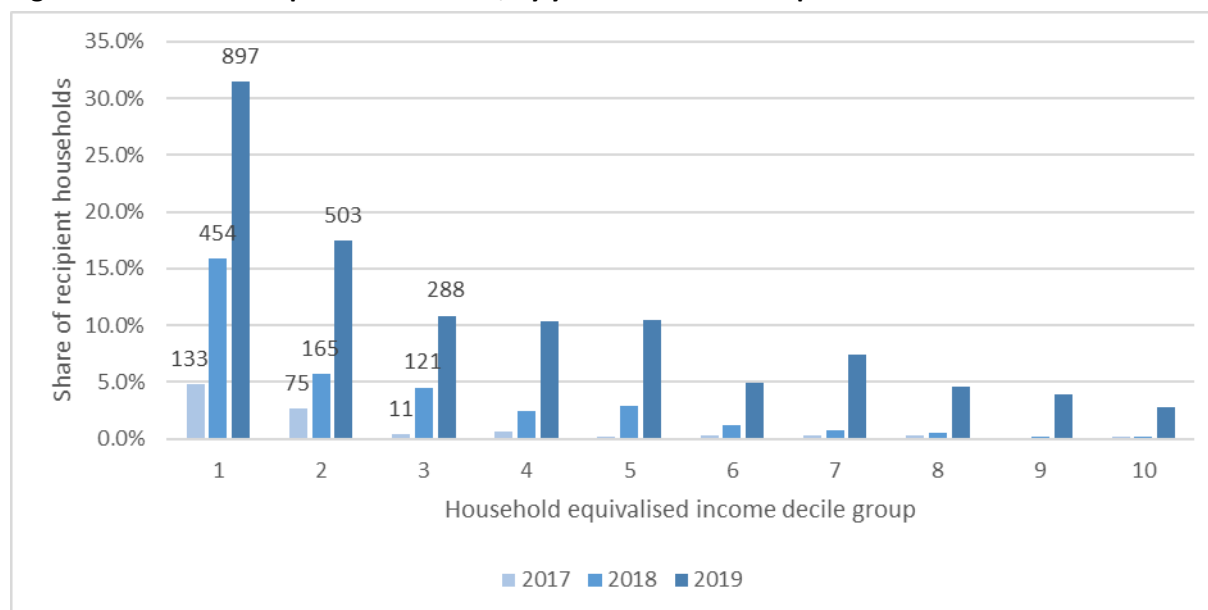
Note: Columns of the first three decile groups report the weighted number of households (in thousands of units) referring to the shares on the vertical axis.

The raw population of recipient households arising from the 2020 IT-SILC variable on the receipt of 'social exclusion not elsewhere classified' transfers is too wide to be considered a correct estimate of the RdC recipient population. According to the INPS, 1.1 million Italian households received at least one RdC benefit transfer in 2019.[31] The share of recipient households is non-negligible in the richer decile groups in 2019 (Figure I.1), while it is expected to be zero (or close to zero) among households with high income values. This may be because the 2020 IT-SILC variable reporting the 'social exclusion not elsewhere classified' transfers includes something other than the RdC (and residual benefits related to the previous MI scheme for 2019). Accordingly, following the Gallo and Raitano (2019) finding that about 90% of the RdC eligible population is in the first two deciles of the household equivalised income distribution, only those 1.4 million households belonging to the first two decile groups are considered potential RdC recipient households here. The latter methodological choice is supported by the fact that the value of the second decile of household equivalised income (EUR 12,223) almost coincides with the income eligibility threshold (EUR 6,000*2.1=EUR 12,600).

The estimated RdC recipient population in IT-SILC data is refined by removing the households receiving impossible values for the RdC benefit (i.e. yearly benefit lower than EUR 40 or higher than EUR 12,420)[32] and those without at least one member satisfying the residence requirement (i.e. resident in Italy during the last 10 years). The final RdC recipient population thus counts about 1.25 million households in IT-SILC data. This is still slightly higher than the official number for 2019 (1.1 million). A

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[31] See https://www.inps.it/it/it/dati-e-bilanci/osservatori-statistici-e-altre-statistiche/dati-cartacei---rdc.html

[32] The yearly RdC benefit has to be at least equal to EUR 40, which is the minimum amount for one month of benefit receipt. At the opposite end, the yearly RdC benefit cannot exceed EUR 15,960, which is received if the household pays a rent higher than EUR 3,360 and reports an income of zero (annual value adjusted to reflect the fact that the RdC benefit began in April 2019).

calibration of the estimated and actual RdC recipient populations was carried out, referring to the known composition of recipient households in December 2019 by macro-area of residence (North, Centre, South) and household size (one member, two members, three members, four members, five or more members). The calibration process was developed randomly, by removing the 'RdC receipt' from some sample observations, to make relative frequencies of estimated and real populations as similar as possible.[33]

Definition of the eligible population

In line with the approach in the Belgian case study, a simplified methodology is adopted to define the RdC eligible population. As the information on household wealth, ISEE value, and recent purchase of cars, motorcycles or boats is unavailable in IT-SILC data and would require complex microsimulation models, only two of the six RdC eligibility requirements are simulated here: residence status and yearly income.[34] Consequently, the estimation cannot be interpreted as NTU, but, more properly, as under-coverage.

Figure I.2 shows how the yearly income threshold changes by household size and type, distinguished by presence of only members aged 67 or more in the household ('elderly households') and tenure status (living in rented accommodation or not). Elaborations on the 2020 IT-SILC sample highlight that about 2.6 million Italian households have an income before 'social exclusion not elsewhere classified' transfers below the RdC income eligibility threshold, about 83% of which belong to the first decile group. In conclusion, comparing the estimated recipient and eligible populations, the undercoverage rate in Italy was 58.1% in 2019. While far from a perfect situation of full coverage, it is interesting that, in 2019, the undercoverage rate of the one-year-old Italian MI scheme was 'only' 12 pp higher than the 45-year old Belgian MI scheme.

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[33] Given that the two populations were already similar enough in absolute and relative frequencies by macro-region of residence and household size, the calibration process was completed by randomly removing receipt from 12% of recipient households living in the South of Italy and counting three or four members (58 observations out of 483).

[34] The income definition adopted in the RdC Regulation is different with respect to the 'standard' household disposable income provided in the EU-SILC data. However, additional elaborations on the same microsimulation model adopted by Boscolo and Gallo (2023) and Aprea et al. (2023) show that the correlation index between these two income definitions is substantially close to 1 (0.98).

Figure I.2. Yearly income threshold to be RdC eligible, by household size and type
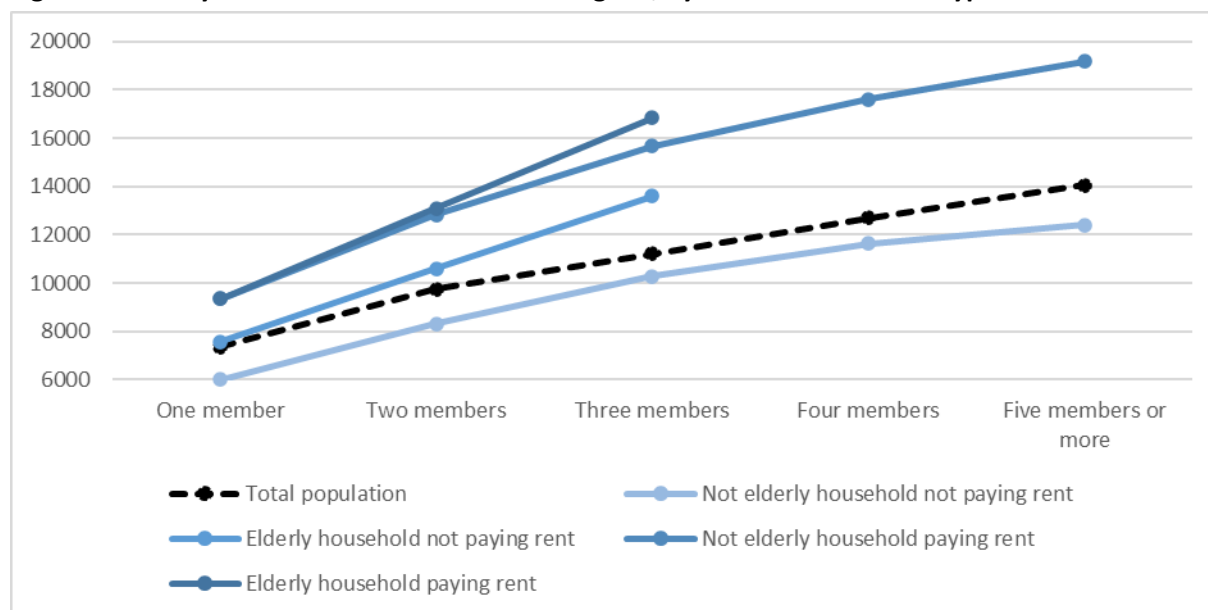
Characteristics of the uncovered

Table I.2 presents the profiles of uncovered households compared to the eligible and total populations in 2019. In order to provide findings as comparable as possible to the Belgian case study, it illustrates the same household characteristics as Table B.2, with some changes reflecting Italian population specificities (education levels, age groups), data unavailability (presence of health issues),[35] and MI scheme design (household types).

Similar to Belgium, the profile of the uncovered group tends to be more vulnerable than that of the average household in Italy (Table I.2). Heads of uncovered households are more frequently foreign-born (especially from non-EU countries), low-educated, inactive or invalid, aged between 56 and 75, and suffer slightly more often from chronic illness or some limitation in activities. Uncovered households also live less frequently in owned accommodation or in the North or Centre of Italy, and are far more likely to be composed of single persons (61% vs 32% of the total population). The greater vulnerability of the uncovered households is confirmed by their average household income value, which is one-seventh of the total population average.

Unlike Belgium, however, the uncovered group does not appear significantly less vulnerable than the RdC eligible population. For the eligible population, the head of uncovered households is slightly more frequently Italian-born and more educated, living more often in owned accommodation. Nevertheless, uncovered households report an average household income value lower than the eligible population and their household heads are less frequently employed.[36]

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[35] IT-SILC 2020 data do not provide the variable on self-reported health status.

[36] In the comparison between uncovered and eligible households, only the following characteristics are significantly different at 10% significance level: unemployed, aged 35 or younger, aged 46-55, aged 66-75, aged 76 or more, owner, tenant (market price), average household income, single person.

Table I.2. Household characteristics of uncovered group vs eligible group for RdC and full EU-SILC sample, 2019

	Uncovered	Eligible	Full sample
Characteristics of the household head			
Sex			
Male	43.5%	45.9%	51.6%
Female	56.5%	54.1%	48.4%
Country of origin			
Italy	80.8%	79.9%	89.1%
EU-28	4.5%	5.7%	3.4%
Extra-EU	14.7%	14.5%	7.5%
Level of education			
Primary education or lower	23.9%	21.5%	18.0%
Lower secondary	35.5%	40.3%	28.2%
Upper secondary	29.9%	28.5%	34.6%
Tertiary	10.7%	9.7%	19.2%
Presence of health issues			
Chronic illness or strong limitation in activities	22.8%	22.5%	21.9%
Limitation in activities	12.5%	11.7%	9.6%
Any health issue	64.8%	65.8%	68.4%
Activity status			
Employed	31.1%	33.9%	49.1%
Unemployed	17.9%	22.4%	6.2%
Retired	22.3%	18.6%	31.2%
Invalid	3.8%	3.3%	1.8%
Other	25.0%	21.7%	11.8%
Age group			
35 or younger	9.9%	13.1%	10.5%
26-45	18.2%	18.6%	17.1%
46-55	19.8%	24.2%	21.8%
56-65	21.4%	20.8%	18.7%
66-75	17.9%	13.8%	15.8%
76 or older	12.8%	9.5%	16.0%
Characteristics of the household			
Tenure status			
Owner	51.7%	44.4%	74.0%
Tenant (market price)	29.7%	37.2%	17.1%
Tenant (below market rent)	5.4%	5.4%	1.9%
For free	13.2%	12.9%	7.0%
Region			
North-west	21.9%	20.0%	28.1%
North-east	13.0%	10.9%	19.8%
Centre	17.9%	16.3%	20.3%
South	31.7%	33.9%	21.2%
Islands	15.4%	18.9%	10.6%
Total			
Average household income before (equivalent) RdC (euros)	4,537	5,993	32,552
Household type			
Single person	61.3%	51.0%	32.4%
Single parent household	3.8%	5.2%	2.6%
Two adults without children	12.3%	14.2%	27.0%
Two adults with children	11.2%	14.3%	16.7%

	Uncovered	Eligible	Full sample
Characteristics of the household head			
3+ adults without children	8.2%	10.2%	16.3%
3+ adults with children	3.2%	5.0%	5.0%

Table I.2 shows that eligible households with heads aged 66+, retired or inactive, and those composed of single persons are uncovered far more frequently. Despite national efforts to include more 'elderly households' by providing higher income eligibility thresholds, this category is one of the most uncovered. It is likely that a relevant part of this subgroup relies more on informal support from their family than from the state, or receives other types of social transfers, such as old-age pensions, minimum pension (top-up) or social allowances (further means-tested non-contributory benefit for older people, included in ESSPROS and in the EU-SILC within pension and old-age benefits). Interestingly, households headed by women tend to be uncovered slightly more often. Both of these results deserve further investigations to understand the extent to which they reflect the role of wealth and other eligibility requirements for the RdC, or a greater sensitivity to stigma, lack of information or willingness to claim, or indeed other cultural or sociological aspects.

Estimation of NTU for Italy: AD-HBS approach

Methodology: strengths and limitations, transferability, and implementation issues

In line with the social policy literature, the NTU rate is defined as one minus the ratio of recipient households/individuals over eligible households/individuals (Bargain et al. 2012; Goedemé and Janssens, 2020; Nelson and Nieuwenhuis, 2021). As it was not possible to identify and exclude type-II errors (Goedemé and Janssens, 2020), the estimates assume that all recipient households are eligible. The research also sheds some light on what tertiary non-take-up, following Van Mechelen and Janssens (2017), i.e. $1 - \frac{\text{n.eligible}}{\text{n.vulnerable}}$. According to the AD-HBS approach, vulnerable individuals are those in income consumption-based absolute poverty.

According to the above definition, the estimation of NTU requires information on households/individuals receiving the RdC, as well as information on households/individuals eligible for the scheme (i.e. satisfying all residence and monetary eligibility requirements). The former is readily available, as the AD-HBS dataset records detailed administrative information on RdC receipt and amounts for all individuals interviewed in the Italian wave of the HBS survey. As filing the ISEE declaration is a necessary condition for receiving the RdC, information on eligibility requirements is available for these households. By contrast, information on eligibility requirements for households not receiving the benefit and not filing an ISEE declaration is not available and must be imputed. These households accounted for roughly 75% of 2019 sample and 70% of 2021 sample, with shares clearly much lower among households in a worse economic condition (47% in the first expenditure decile in 2019, 44% in the first expenditure decile in 2021).

Of the various ISEE sub-indicators, four were imputed when the ISEE declaration was not filled, namely: the household income indicator (*Indicatore della Situazione Reddituale* – ISR) and the household wealth indicator (*Indicatore della Situazione Patrimoniale* – ISP) to calculate the overall ISEE value, and the household financial wealth and real estate (excluding main residence) indicators to simulate the two wealth eligibility requirements. Given the high number of zero values, especially in

the wealth variables, the model-based imputation procedure follows a two-stage approach. The first stage estimates the probability of a zero value for each income/wealth component, while the second stage imputes the specific non-zero values only for the units with a 'sufficiently low' probability to have a zero value. The specific imputation algorithm used is the predictive mean matching algorithm proposed by Raghunathan et al. (2001). All regression models include a large set of covariates, such as age group, citizenship, education level, marital status of the household head, household size, presence of underage children, work intensity of household members, tenure status and overall household income (from administrative records), degree of urbanization and NUTS-3 region of residence. The study proxies the residence requirement by summing the number of years with a registered labour contract (as the whole working life of individuals is observed).

This approach to NTU estimation has several strengths. Firstly, the availability of administrative information on RdC beneficiaries avoids many otherwise necessary assumptions – the set of receiving households and the amounts of benefit received are readily available and do not need to be imputed. Secondly, the availability of information on initial and final dates of RdC receipt allows, in principle, an estimate of NTU at a higher frequency than the year, capturing both short MI spells and the evolution of economic outcomes. This procedure requires several assumptions and is not undertaken here. Thirdly, the information set used to simulate the various ISEE sub-indicators and, in turn, RdC eligibility requirements is wide-ranging and comprises both socio-demographic and economic variables. Fourthly, the availability of expenditure information allows an assessment of the relationship between the NTU and the official consumption-based absolute poverty indicator. This is particularly important because this indicator is unique in Europe and these types of indicators are found to be highly correlated to economic deprivation (Meyer and Sullivan, 2012; Brewer et al., 2017). Finally, the rich information set available in the AD-HBS may be used to assess the relationship between the propensity of NTU and various relevant socio-demographic characteristics.

The estimation approach also has some weaknesses, however. Firstly, some income sources (capital and business incomes) are not recorded in the administrative archives merged with the HBS. As both of these income sources tend to be concentrated at the top of the income distribution, the simulation of the ISEE sub-indicators used to compute RdC eligibility requirements may be downward-biased. While the issue may be mitigated by introducing expenditure variables in the simulation models, it cannot be completely encapsulated. Similar considerations apply to income underreporting, which may be particularly relevant for the self-employed (Raitano and Fantozzi, 2015). Secondly, the NTU may be underestimated because the HBS sampling method, like the EU-SILC, excludes marginalised groups without a legal address, such as homeless people, for whom NTU is a relevant phenomenon (Gatta, 2023). Finally, while all European countries run consumption surveys, the link with register data is extremely cumbersome and related to country-specific procedures. As such, while the methodology proposed here could, in principle, be reproduced by other countries, it requires ad hoc efforts and is not directly transferrable to other contexts.

Empirical evidence

This section reports the empirical findings on NTU in Italy in 2021 according to the AD-HBS approach. It is divided into two subsections.[37] The first provides the estimate of the overall NTU rate of the RdC in Italy in 2021 and presents descriptive evidence on several socio-demographic characteristics potentially related to NTU. The second provides evidence on the correlation between the same characteristics and NTU by means of multivariate logit regressions. While not claiming to provide any causal evidence on the drivers of NTU, which would require controlling for both endogeneity issues and omitted variable bias, the logit models improve the descriptive evidence by estimating the *all else being equal* effect of a given characteristic on the likelihood of NTU. In other words, the models estimate the correlation between the likelihood of NTU with a given characteristic, compared to a reference household, while keeping all other relevant characteristics constant. Additional insights into the interpretation of the regression results are provided in each subsection. Results for 2019 are presented in a separate subsection and compared to those for 2021.

Descriptive findings

In 2021, the baseline estimate for the NTU rate of the RdC was 38.5%. In other words, of all households potentially eligible for the RdC, 38.5% did not receive the benefit.[38]

This subsection provides some descriptive evidence on the potential mechanisms driving NTU, broadly referring to the 'dynamic model of benefit receipt pioneered by Van Oorschot (1996). According to this theoretical model, NTU may arise in different stages of the application process: the threshold stage, the trade-off stage, and the application stage. The threshold stage arises before the beginning of the application process, whereby potential applicants must have i) a general knowledge of the existence of the scheme, and ii) a positive attitude towards claiming. Once this basic threshold is overcome, potential applicants may start considering the pros and cons of actually claiming the benefit – the trade-off stage. At this stage, the severity of need is weighed with a set of costs, including both psychological costs (perceived undeservingness, stigma) and those related to the bureaucratic complexity of the application. Finally, once benefits are considered to outweigh the costs, the application stage begins, whereby applications from eligible claimants may be wrongly rejected by the administrative authorities in charge.

This subsection shows the conditional mean of NTU by groups of household characteristics that may be broadly associated with each of these three stages. It should be borne in mind that the association of the characteristics with the different stages of NTU is necessarily fuzzy. For instance, being a foreigner could be related to the threshold stage (i.e. language and/or cultural barriers preventing knowledge of benefit existence), the trade-off stage (i.e. higher perceived bureaucratic complexity of application), and the application stage (i.e. missing documents, discriminatory attitude among public

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[37] All results are obtained using sample weights included in the HBS.

[38] Available data do not allow for distinguishing between RdC claimant and non-claimant households, making it impossible to know how many non-eligible households tried to claim the benefit. However, looking at households who filed the ISEE declaration only, the data show that all households satisfying the means testing then received the RdC. It can thus be concluded that NTU is rare among households (probably) aware of their eligibility and which have applied for social transfers in the past.

officials). This research assigns being a foreigner to the threshold stage assuming the prevalence of language and cultural barriers. The main results are presented in Figures I.3a to I.3c, where the horizontal line refers to the average NTU rate (38.1%).

For the threshold stage, the characteristics considered are: i) having a foreign national household head; ii) age class of household head, assuming households with older heads may be less exposed to news on benefit existence; iii) education level of household head, assuming a positive relationship between educational attainment and likelihood of being aware of the scheme.
The main results are summarised in Figure I.3.

NTU appears to be positively influenced, in a non-linear way, by the age of the household head: it is very low (23.7%) for households headed by a member aged less than 25 and very high (60%) for those headed by an individual aged over 75. NTU is also above average for the 66-75 age class. Intermediate age classes do not exhibit a clear pattern and are all relatively close to the average. Contrary to expectations, NTU is also positively influenced by the education level of the household head: it reaches 60.3% for households headed by a tertiary graduate (possibly due to stigma or to relatively shorter unemployment spells, which prevent them from applying for a benefit for a few months), compared to 33.2% of those headed by an individual with a lower-secondary diploma. Having a foreign head of household is negatively associated with NTU. Again, this is contrary to expectations, as language barriers and administrative barriers related to the availability of valid identification and residence documents may be a serious issue (Gatta, 2023). However, the HBS survey only reaches foreign nationals with legal residence in Italy (reducing the relevance of such barriers), while the very stringent eligibility requirement excludes many foreign-headed households from the pool of eligible households.

Figure I.3. Threshold stage: NTU and household characteristics, conditional means
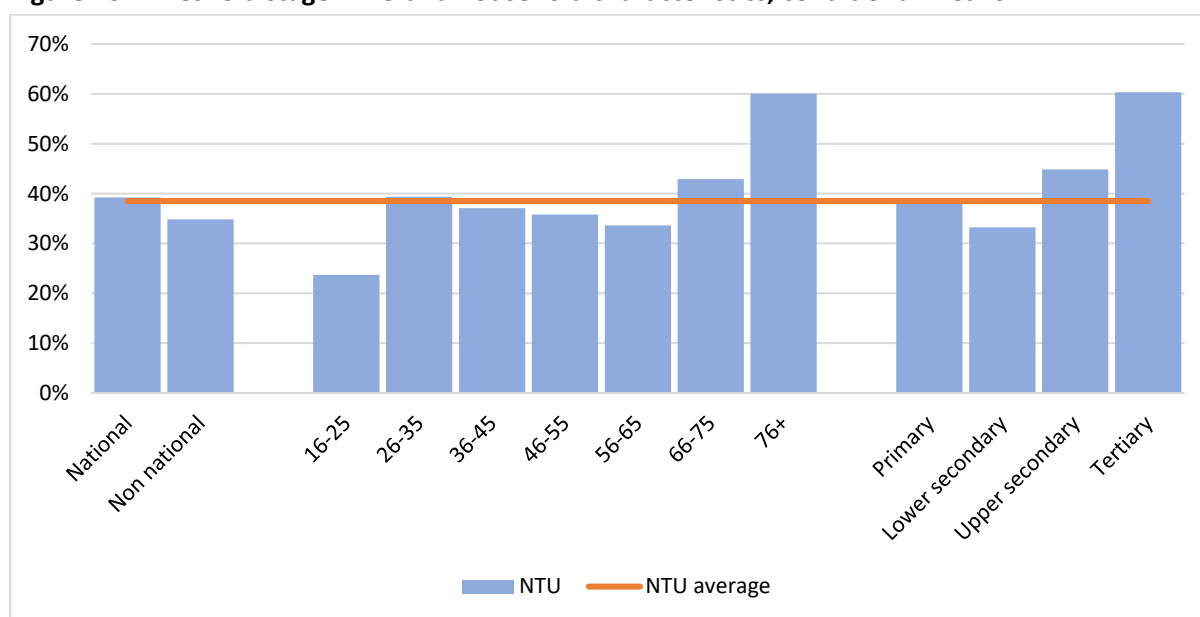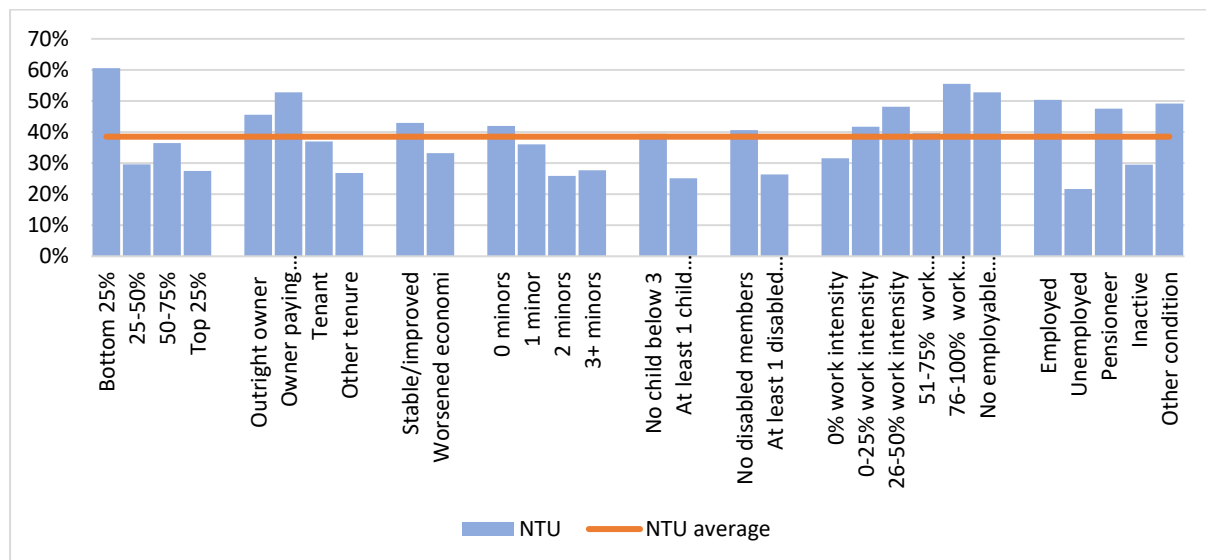

Source: Authors' elaborations, based on AD-HBS 2021 data.

For the trade-off stage, the characteristics considered are: i) severity of need (proxied by income top-up component of the RdC), assuming the potential benefit amount as one of the key drivers of the decision of applying for MI;[39] ii) tenure status, as the RdC design may be more appealing for tenants; and iii) a set of variables related to perceived deservingness/undeservingness, namely the variation in economic conditions from the preceding year, the number of minors, a dummy identifying the presence of at least one child below the age of three in the household, a dummy identifying the presence of at least one disabled member in the household, a measure of work intensity,[40] the employment status of the household head, and consumption-based absolute poverty. While the presence of fragile categories such as minors and/or disabled people may decrease the perceived social stigma of the measure, having an unemployed head and/or being in absolute poverty may increase self-perception of benefit deservingness. On the other hand, high work intensity may induce unwillingness to apply (cost) for both 'ethical' and economic reasons. The former concerns the aspiration to rely on work alone as a means of getting on with life's necessities, while the latter concerns the opportunity cost of working vs very high marginal tax rates. The main results are summarised in Figure I.4.

Figure I.4 Trade-off stage: NTU and household characteristics, conditional means

Source: Authors' elaborations, based on AD-HBS 2021 data.

The severity of need is negatively associated with NTU. This aligns with the literature, which identifies the severity of need as a key driver of the application to apply for MI (Arrighi et al., 2015; Milligan and Schirle, 2019).[41] More specifically, NTU is 60.6% for households entitled to a low benefit (bottom quartile of the distribution of benefits) and 27.5% for households entitled to high benefits (top quartile of the distribution of benefits). Intermediate categories all have below-average NTU rates, highlighting

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[39] The proxy of severity of need adopted is censored from above – maximum benefit amounts are capped by the particular RdC equivalence scale.

[40] The measure of work intensity adopted is calculated as the total amount of weeks worked over the total amount of available working weeks. Students and members over 67 (retirement age in Italy) are excluded.

[41] As the RdC is a top-up scheme, the benefit variable is built as the difference between the value of the maximum benefit according to household characteristics (income threshold) and household income. The rent/mortgage compensations are not considered. Accordingly, the severity of need is inversely related to overall economic conditions.

that a significant portion of NTU is concentrated in the set of low-potential-benefit households, stressing the role of less severe material conditions and low incentives for application. In line with both previous literature and expectation, this result must be reassessed through multivariate regressions. Indeed, the severity of need is affected by a number of variables that may also affect the likelihood of NTU, such as the number of household members or presence of disabled household members. Mean benefit levels for households receiving the RdC (on average, EUR 5,056 per year) are higher than the expected benefit that would have been received by those not taking up the benefit (on average, EUR 3,504 per year).[42]

Homeowners exhibit above-average NTU rates, at 52.8% for homeowners paying a mortgage. Contrary to expectations, NTU for tenants, despite the pro-tenant design of the RdC (higher income eligibility threshold, partial rent compensation) is not much below the average, at 36.9%. By contrast, NTU for households with alternative tenure status (rent-free dwellings) is much lower, at 26.8%.

The presence of fragile categories potentially reducing the perceived undeservingness of the measure is associated with a lower NTU rate. More specifically, NTU is decreasing in the number of minors, and is far below average for households with a child below three (25.1%), households with at least one disabled member (26.3%), and households headed by an unemployed or inactive member (21.6% and 29.5%, respectively). Previous literature identifies children and disabled individuals in need as categories socially perceived as more 'deserving' of social assistance than the 'poor' in general (Van Oorschot, 2002; Bhargava and Manoli, 2015; Gatta, 2023), while unemployment/inactivity may increase self-perceptions of benefit deservingness. NTU is above average for households headed by an employed member (50.3%) and is increasing in household work intensity, albeit in a non-linear way. These results may be explained by social stigma and unwillingness to apply for social assistance when working.

Finally, the positive association between NTU and having a retired household head, or between the NTU and absence of employable members in the household, is likely to be mediated by age (lower knowledge of the existence of the scheme, accumulated savings).

For the application stage, the key characteristic considered is a variable combining the five geographical macro-areas of the country (north-west, north-east, centre, south, islands) and the size of the city of residence (metropolitan city, non-metropolitan city with at least 50,000 inhabitants, city with fewer than 50,000 inhabitants), recognising that the quality of public services may be lower in the South and in the Islands (Nifo and Vecchione, 2014) and in small cities. A set of other potentially relevant characteristics are added to this group, namely: i) gender and marital status of the household head, ii) consumption-based absolute poverty status, ownership of a car, and connection to the city gas pipeline as proxies for deprivation in various economic and non-economic dimensions, iii) climatic zone of

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[42] For consistency with the previous analysis, the benefit includes only the income component.

the city of residence, and iv) total number of household members.[43] The main results are summarised in Figure I.5.

Figure I.5. Application stage: NTU and household characteristics, conditional means
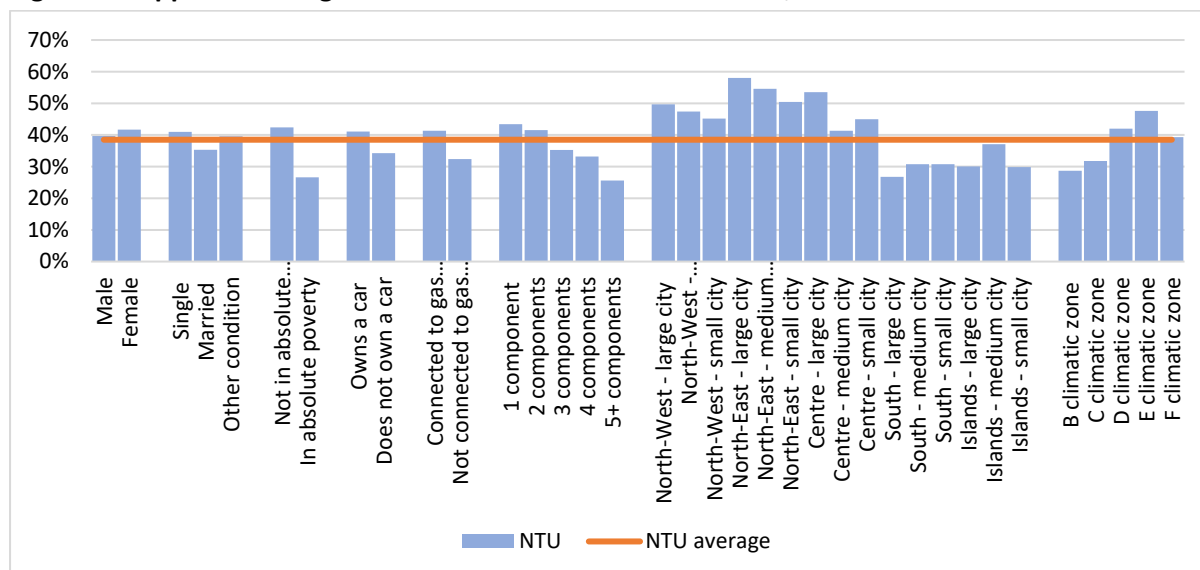
Source: Authors' elaborations, based on AD-HBS 2021 data.

NTU tends to be far lower in the poorest areas of the country (south, islands), which have the highest number of beneficiaries and are also characterised by lower 'institutional quality' (Nifo and Vecchione, 2014). More specifically, NTU is lowest in large towns in the south of the country (26.8%) and below average for all other combinations in the south and in the islands. Interestingly, in the north and the centre of the country, NTU is highest in large cities, possibly due to social stigma. All variables proxying deprivation in economic conditions show the expected (negative) association with NTU, which is below average for households in absolute poverty (26.6%), households not owning a car (34.3%), and households not connected to the city gas pipeline (32.4%). Finally, while NTU tends to be lower for larger households (correlated with the number of children) and for residents of hotter regions (correlated with geographical macro-area), it does not appear to be influenced by the gender and marital status of the household head. However, the overlap between the absolute poverty indicator and the set of households eligible for the RdC is remarkably low – only 33.4% of households in absolute poverty are eligible for the RdC.

Multivariate regression-based findings: correlates on NTU
This subsection aims to deepen understanding of NTU in Italy in 2021 by means of a more formal regression-based analysis. It provides the estimates of a logit regression model, where the variable of

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[43] Climatic zones are defined by the number of degree-days, i.e. the days in a year the average temperature is below 20°C times the positive difference between 20°C and the average temperature. Climatic zones are ordered in descending order (hotter temperatures for lower letters, i.e. B hotter than C, hotter than D, etc.). More specifically, climatic zone B has 600-900 degree-days, climatic zone C has 901-1,400 degree-days, and so on.

interest is the indicator function identifying NTU and explanatory variables are those discussed in the previous section.[44]

In general, logit models are binary response models where the probability of a given outcome is modelled as a function of a set of explanatory variables and is restricted to the 0-1 interval. Given that in the framework of logit regression, estimated coefficients have no straightforward interpretations, Tables I.3a to I.3c – all referring to the same regression model – show average predicted probabilities for each category.

For the set of explanatory variables related to the threshold stage (Table I.3), the descriptive evidence is confirmed by the regression analysis. More specifically, NTU appears to be positively influenced by the age of the household head (predicted probability of NTU is 54.1% for households headed by a member aged over 76) and by the education level of the household head (predicted probability of NTU is 49.9% for households headed by a member with tertiary education). The negative association between NTU and a foreign head of household is also confirmed.

Table I.3. Threshold stage: NTU and household characteristics.

Characteristic	Predicted probability	95% confidence interval	
National	39.6%	37.4%	41.7%
Foreign national	33.2%	27.7%	38.7%
16-25	18.3%	4.7%	31.9%
26-35	36.9%	29.9%	43.9%
36-45	40.0%	34.7%	45.3%
46-55	37.8%	33.6%	42.1%
56-65	34.6%	30.2%	38.9%
66-75	37.3%	29.2%	45.4%
76+	54.1%	43.0%	65.2%
Primary	34.6%	30.0%	39.2%
Lower secondary	36.1%	33.3%	38.9%
Upper secondary	44.5%	40.0%	48.9%
Tertiary	49.9%	42.4%	57.4%

Note: Predicted probabilities of NTU from logit multivariate regression.
Source: Authors' elaborations, based on AD-HBS 2021 data.

The results on the explanatory variables in the trade-off stage are also in line with the descriptive evidence (see Table I.4).

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[44] The logistical regression is performed only on eligible households. Population weights provided in the HBS survey are used.

Table I.4. Trade-off stage: NTU and household characteristics

Characteristic	Predicted probability	95% confidence interval	
Expected benefit: 1st quartile	56.8%	52.1%	61.5%
Expected benefit: 2nd quartile	30.9%	27.1%	34.8%
Expected benefit: 3rd quartile	33.2%	29.0%	37.4%
Expected benefit: 4th quartile	31.3%	26.9%	35.8%
Outright owner	47.7%	43.8%	51.6%
Owner paying mortgage	48.5%	38.4%	58.5%
Tenant	34.0%	31.3%	36.6%
Other tenure	34.0%	28.5%	39.4%
Stable/improved economic condition	40.7%	38.2%	43.2%
Worsened economic condition	35.7%	32.7%	38.7%
0 minors	41.3%	38.1%	44.4%
1 minor	36.1%	30.3%	41.9%
2 minors	27.7%	20.3%	35.2%
3 minors	31.3%	16.6%	46.0%
No child below 3	38.8%	36.8%	40.8%
At least 1 child below 3	33.8%	23.7%	43.9%
No disabled members	40.6%	38.5%	42.7%
At least 1 disabled member	26.6%	21.9%	31.4%
0% work intensity	39.3%	36.4%	42.3%
1-25% work intensity	39.0%	31.2%	46.8%
26-50% work intensity	39.9%	34.0%	45.8%
51-75% work intensity	27.1%	16.5%	37.8%
76-100% work intensity	35.9%	27.2%	44.6%
No employable member	36.5%	28.3%	44.7%
Employed	47.2%	42.7%	51.7%
Unemployed	25.4%	21.2%	29.5%
Pensioneer	40.9%	32.9%	48.9%
Inactive	37.2%	31.7%	42.6%
Other condition	43.1%	22.8%	63.3%

Note: Predicted probabilities of NTU from logit multivariate regression.

Source: Authors' elaborations, based on AD-HBS 2021 data.

Crucially, the severity of need shows a similar pattern even when other explanatory variables are considered: the predicted probability of NTU is above-average only for the low-benefit category, even after controlling for other variables such as household size, suggesting that the mechanisms identified above may play a role. The difference in the predicted probability of NTU for the other benefit categories is not statistically significant. The predicted probability of NTU is inversely related to the presence of minors and disabled household members, and to having an unemployed or inactive household head. It is particularly low for households with disabled members (26.6%) and those headed by an unemployed person (25.4%). Unlike the descriptive evidence, work intensity and NTU appear to be inversely related, with lower predicted rates of NTU probability for households working at least 50%

of yearly available hours – 27.1% for households with 51-75% work intensity. However, differences are not statistically significant at the 5% level. Finally, again unlike the descriptive evidence, the predicted probability of NTU of tenants is significantly below average (34%) and much lower than those of outright homeowners (47.7%).

Finally, results on the explanatory variables for the trade-off stage (see Table I.5) are in line with the descriptive evidence, with the sole exception of the variable indicating the connection to the city gas pipeline (highly correlated with the geographical area of residence). Crucially, results concerning the geographical area of residence remain highly significant: compared to residents in large cities in the north-west of the country (48.7%), the likelihood of NTU is much lower in small cities in the south and in the islands (30.8% and 28.7%, respectively).

Table I.5. Application stage: NTU and household characteristics, plus additional *explanatory variables*

Characteristic	Predicted probability	95% confidence interval	
Male	37.7%	34.8%	40.6%
Female	39.4%	36.2%	42.6%
Single	39.0%	35.0%	42.9%
Married	40.5%	36.0%	45.1%
Other condition	36.3%	32.7%	39.8%
Not in absolute poverty	40.6%	38.4%	42.8%
In absolute poverty	31.5%	27.4%	35.7%
Owns a car	40.7%	38.2%	43.2%
Does not own a car	34.8%	31.3%	38.3%
Connected to gas pipeline	37.2%	34.8%	39.6%
Not connected to gas pipeline	41.6%	32.8%	42.7%
1 component	37.8%	33.6%	41.7%
2 components	37.6%	33.5%	44.0%
3 components	38.7%	34.3%	48.2%
4 components	41.2%	26.6%	52.0%
5+ components	39.3%	32.8%	42.7%
North-west - large city	48.7%	38.0%	59.4%
North-west - medium city	49.2%	39.2%	59.1%
North-west - small city	45.0%	36.1%	53.8%
North-east - large city	54.9%	39.6%	70.3%
North-east - medium city	48.3%	35.2%	61.4%
North-east - small city	46.3%	35.1%	57.4%
Centre - large city	47.9%	38.4%	57.4%
Centre - medium city	40.5%	32.1%	48.9%
Centre - small city	41.7%	34.5%	49.0%
South - large city	31.2%	23.1%	39.3%
South - medium city	32.2%	25.9%	38.4%
South - small city	30.8%	26.1%	35.5%
Islands - large city	38.1%	26.6%	49.6%
Islands - medium city	40.0%	30.0%	50.1%
Islands - small city	28.7%	21.9%	35.5%

Characteristic	Predicted probability	95% confidence interval	
B climatic zone	29.7%	21.6%	37.7%
C climatic zone	38.6%	34.1%	43.1%
D climatic zone	40.5%	35.9%	45.1%
E climatic zone	40.6%	34.8%	46.4%
F climatic zone	32.5%	15.5%	49.6%
Observations	2,402		
Pseudo R2	18.3%		
Log-likelihood	-1.45E+06		

Note: Predicted probabilities of NTU from logit multivariate regression.

Source: Authors' elaborations, based on AD-HBS 2021 data.

Results for 2019 through the AD-HBS approach

The baseline estimate for the NTU rate of the RdC in 2019 was 53%, far higher than in 2021, and above the estimates mentioned in the review of previous studies. While the number of eligible households from the dataset (1,119,000) is very close to the administrative total (1,108,000), the estimated pool of potential beneficiaries is larger than previous estimates (2,380,000 households). Many factors may influence this result, including the imputation of wealth for all households not filing an ISEE declaration. As a robustness check, the NTU rate is thus estimated for the sub-sample of households filing an ISEE declaration, for which no imputations are needed. In 2019, the NTU rate for this sub-sample of households was 39.8%, lower than the average, as households filing the ISEE declaration tend to be more deprived than other households. From another perspective, over 58% of households in NTU come from the sub-sample of households for which no imputation is needed, as all information about their income and wealth is available in AD-HBS.[45]

While different in absolute terms, the distribution of the severity of need (again proxied by severity of need) bears some similarities between 2019 and 2021. Figure I.6 plots the marginal effects (in pp) for each of the four categories of the variable proxying severity of need in both years.

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[45] Similarly, among households that filed an ISEE declaration in 2021, the share of NTU was 25.6% (compared to the overall average of 38.5%). 55% of NTU arises from the sample for which no imputation is made.

Figure I.6. NTU and severity of need, 2019 and 2021, marginal effects
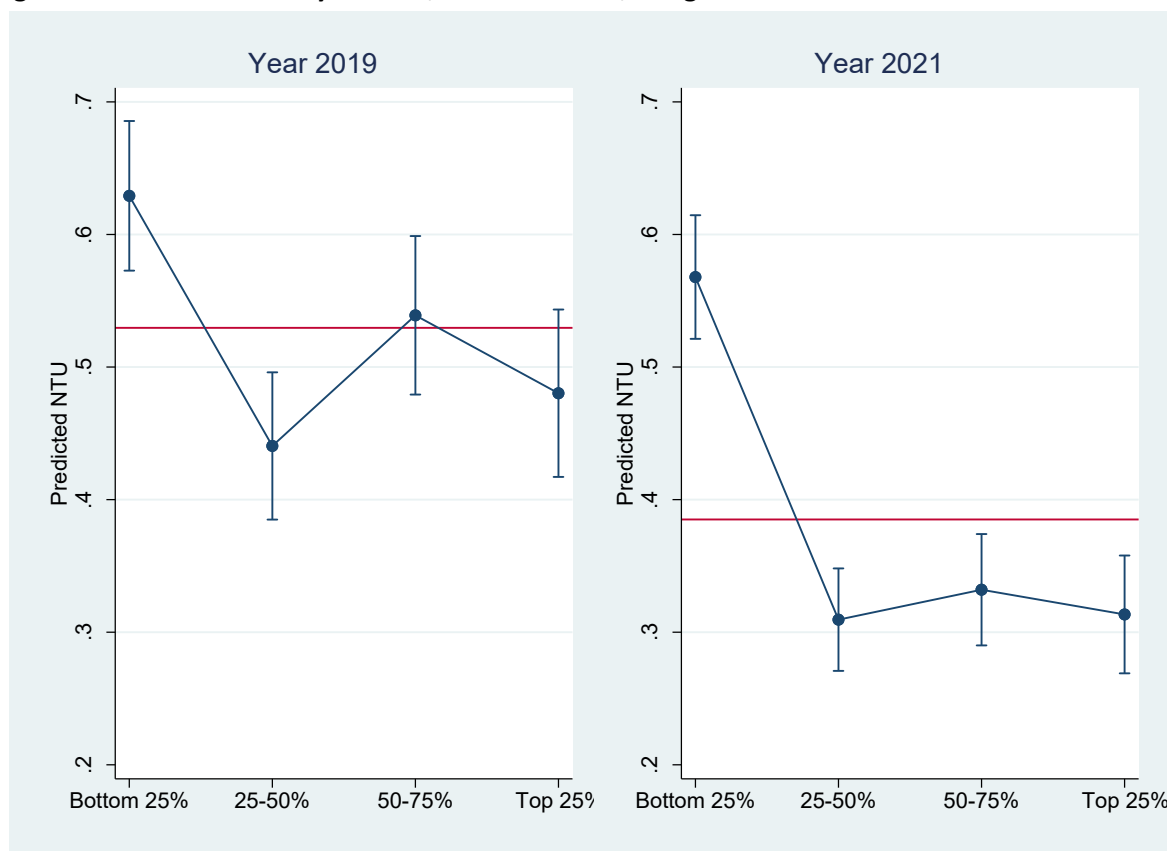
Source: Authors' elaborations, based on AD-HBS 2019 and 2021 data.

Despite some minor differences, NTU is much higher for households with less severe material conditions and lower potential benefits. As noted in the preceding section, this result is reasonable and in line with previous literature.

The reduction in the NTU rate between 2019 and 2021 seems very large and appears entirely due to the increase in the number of households receiving the benefit for at least one month from 2019 to 2021 (the RdC was introduced in April 2019). The increase in the number of recipient households is partly compensated by an increase in the pool of eligible households, likely due to the scars of the COVID-19 crisis. Overall, the percentage reduction in the NTU rate between 2019 and 2021 is over 27%, may reflect both an incomplete recovery from the COVID-19 crisis and more widespread knowledge of the policy two years after its introduction.

CONCLUSIONS

Improving the coverage and take up of MI schemes is a key factor in combating poverty, as emphasised in the Council Recommendation on adequate minimum income. The Recommendation foresees a three-yearly reporting process for progress.

This research note focuses on two concepts related to the somewhat ambiguous concept of NTU:
- Undercoverage, defined as 'the probability of not drawing an MI while being potentially entitled based on one's income';
- NTU in a strict sense, defined as 'the probability of not drawing an MI while being entitled based on the eligibility criteria set by the law'.

The term NTU should be used with caution because most data sources do not provide all of the information necessary to establish whether households are entitled to the MI, and it may wrongly suggest that the obstacles to effective receipt of MI stem from household ignorance or choice, thus ignoring the obstacles linked to legal restrictions, bureaucracy or service delivery processes.

As an existing data source harmonised at EU-level, the EU-SILC was used to estimate undercoverage for two national case studies for Belgium and Italy. For Italy, administrative data linked with the HBS (carried out in most EU countries, albeit without a harmonised framework) were used to estimate NTU.

Despite the limitations of this exploratory research, it concludes that undercoverage can be estimated for all EU Member States, taking into account national specificities. The estimates can be compared across time, across countries and regions, and across socio-demographic groups.

There are, however, some data limitations that need to be borne in mind:
- It is acknowledged that the poorest groups in society, such as homeless people, travellers and undocumented migrants, are not included in the sampling frameworks of most surveys, and there are indications of severe undercoverage among these groups (e.g. undocumented migrants are excluded from MI schemes). In addition, incomes recorded in surveys may differ from the administrative definition of income used in defining the entitlement to MI;
- In some countries, single waves of EU-SILC or HBS include small numbers of (potential) MI recipients, and therefore produce greater margins of error in estimated undercoverage rates. This partly explains why the Belgian case study used pooled EU-SILC data across several years;
- MI applications can be filed for short spells of hardship. However, this research note uses datasets based on yearly income or expenditure data. There is an implicit assumption that undercoverage/NTU rates are equal between shorter and longer spells of hardship, but in fact there is reason to believe that these rates are higher for short spells;
- Previous research (as well as the analysis for Belgium in the period 2008-2017) suggests that households tend to underreport receipt of social assistance (including MI). Matches between surveys and administrative data recording the receipt of MI should be pursued (as in the case of the Italian AD-HBS dataset);

- The EU-SILC variable that reports receipt of MI may (intentionally or otherwise) include other types of ad hoc financial support;
- Existing datasets were not explicitly designed for the study of undercoverage/NTU in social protection schemes. Usually, they allow researchers to check citizenship and financial (income, wealth (to some extent)) conditions for eligibility, whereas other criteria should ideally be added to the simulations to reflect national specificities in the eligibility conditions.

These factors may bring about both overestimation and underestimation of undercoverage/NTU rates.

The analysis and review of previous studies suggests that further refinements and extensions of existing surveys could improve the accuracy of estimates for undercoverage and NTU:

- Satellite surveys of EU-SILC targeting hard-to-reach groups (homeless people, travellers, undocumented migrants), using tailored questionnaires that combine information comparable to EU-SILC with ad hoc modules. Such surveys could be used to estimate undercoverage of the most disadvantaged groups not covered by the mainstream EU-SILC surveys. Pilots of such satellite surveys were successfully carried out in Belgium (Nicaise, Schockaert & Bircan 2019);
- In-depth profiling of undercovered groups should combine survey data (EU-SILC, HBS) with administrative register data (ISEE declarations, archives of MI recipients in Italy, data from the Crosspoints Database of Social Security in Belgium) to sketch a more precise and detailed profile. In the case of EU-SILC, the panel structure allows the duration of undercoverage to be examined;
- This study's analysis of undercoverage/NTU was limited to a binary notion of receipt ('did potentially entitled households draw a benefit or not?'), but the datasets could also reveal situations of partial coverage, i.e. where households received just part of their potential benefits (due to delayed application, administrative obstacles, etc.). This could be checked at least approximatively by examining whether the benefit amount received was sufficient to close the gap between pre-MI income and the MI threshold on an annual basis.

Notwithstanding the methodological and data limitations, the two case studies confirm that undercoverage/NTU in MI schemes remains a serious problem. In Belgium, despite the indications of a downward long-term trend, and a fairly generous legal framework in terms of accessibility, almost half (46.6%) of the (financially) eligible households remained uncovered in recent years, raising questions about the efficiency of policy measures and local service delivery. Belgium has advanced e-government tools that should allow federal and local government services to identify potential beneficiaries and reach out to them for further examination of their rights.

In Italy, using EU-SILC and a similar methodology to the Belgian case study, the undercoverage rate for the RdC is estimated at 58.1%. While the estimated undercoverage rate is very large in both absolute terms and compared to Belgium in the same year, it could be affected by the very short duration of the policy (April 2019). Using the AD-HBS dataset, the NTU rate in the same year was estimated at 53%. In other words, 53% of households fulfilling all eligibility criteria did not receive the benefit. Despite the considerable difference between the data sources used (administrative vs survey income data), the estimated NTU rate was more than 5 pp below the estimated undercoverage rate. This is in

line with expectations, as additional restrictions (such as wealth and citizenship) reduce the pool of eligible households. Finally, the NTU rate was estimated for 2021 to assess its dynamics two years after introduction and after the COVID-19 crisis. A key result is that the rate decreased over time (to 38.5% in 2021) and both mechanisms likely played a key role.

In Belgium and Italy, the profile of households affected by undercoverage/NTU appears slightly less vulnerable than the reference group of eligible households (although more vulnerable than the population at large). Vulnerability is measured on the basis of characteristics such as female gender, migration status, subjective health status, young age, unemployment, tenancy, severity of need (or its mirror, pre-MI income) and living in less wealthy regions. The contrast is more pronounced in Belgium. In both countries, there are two exceptions: older households have a lower probability of receiving an MI (in Italy, social assistance benefits other than the MI are provided to poor older people), while households with (small) children are usually better covered.

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