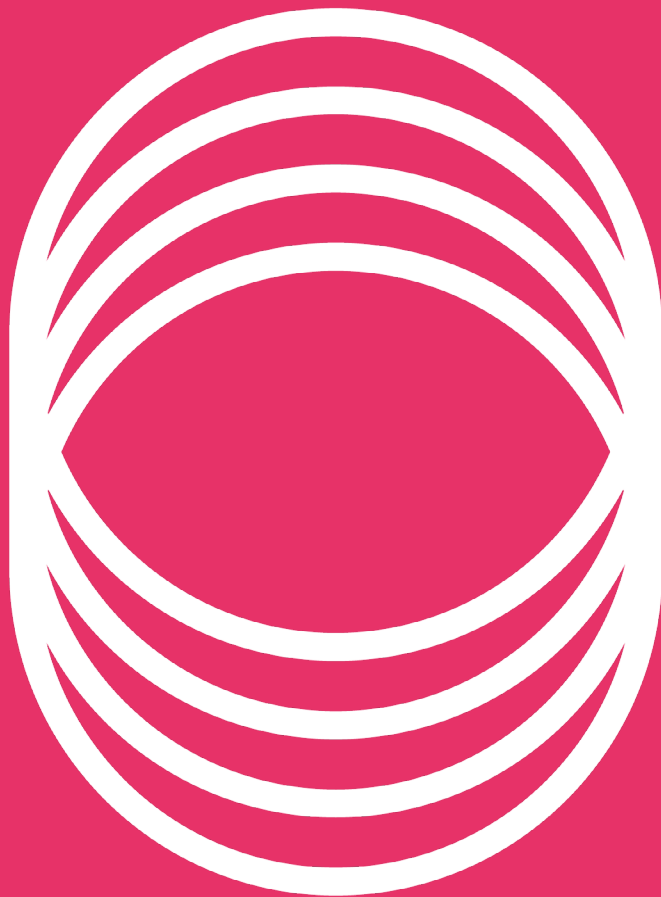


Proposed design methodology

Universal Basic Income
Pilot Project in Catalonia



Office of the Pilot Project to Implement the Universal Basic Income

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1. Introduction

The Office of the Pilot Project to Implement Universal Basic Income (hereinafter, the Pilot Project Office) was created in 2021 by the Government of the Generalitat (Decree 245/2021) to design and implement the Universal Basic Income Pilot Project in Catalonia. In this context, the Office contacted Ivàlua to work on a proposal for the design and implementation of the Pilot Project and to assess it. Initially, the Office published a draft proposal for the design of the Pilot Project (Pilot Project Office, 2022) outlining the main lines of the project. However, for various reasons, some of the initial aspects have had to be modified in order to ensure the methodological rigour of the Plan. **This report makes explicit the final proposal for the design of the Pilot Project**, the result of the collaboration between the Office and Ivàlua.

Ivàlua's role has been to advise on the different methodological aspects of the design, with the aim of ensuring that the Pilot Project is assessable; i.e. the methodology used is robust and allows for a causal analysis of the impact of the monetary transfer on the different outcomes of interest.

The Pilot Project Office is interested in **testing two key elements of a UBI for the Pilot Project: its basic nature and its universal nature.** A review of the literature and the theory of change carried out by Ivàlua (Borrell-Porta, de Quintana and Segura, 2023) suggests that these two elements have been relatively understudied in the context of developed countries, and therefore the Pilot Project approach is appropriate from an evaluation point of view in that it can provide new theoretical and empirical insights into the effects of a UBI.

The report is structured as follows: section 2 describes the implementation of the Pilot Project, and Section 3 describes the proposed definitive design methodology. This proposal has been made on the basis of the objectives and approach of the Office, taking into account the advice offered by Ivàlua, as set out in Borrell-Porta, de Quintana, Segura, Leon, Ramos and Vives-i-Bastida (2023).

2. Implementation of the Pilot Project: UBI in Catalonia

The UBI Pilot Project in Catalonia consists of a **payment of €800 for adults and €300 for children under 18 years of age**. Payments will be made monthly for 24 months and there will be no restrictions or conditions on how the cash allowance is spent by its recipients. About 10,000 people will participate, of which about 5,000 will receive the UBI.

Payments will be on an **individual** basis by bank transfer to an account held by the participant. In the case of children aged between 14 and 17, payment will go into a bank account held by the minor, although the actual management of the account will be the responsibility of a parent and/or legal guardian, in accordance with standard banking practice. In the case of children under the age of 14, who are not required to have a National ID card, the payment will go into a bank account owned by the parents or legal guardians, depending on the custody regime, or, failing that, by the person to whom custody has been delegated.

The general objective of the Pilot Project is to **collect evidence of the effects generated by a UBI**, which can provide relevant information in the future process of implementing universal basic income in the Catalan population as a whole, as explained in the presentation report of the Pilot Project (Pilot Project Office, 2023). In particular, the most relevant effects being studied are those derived from two of the essential characteristics of UBI, which is its *basic* and *universal* nature.

Basic income refers to an amount sufficient to cover the basic material needs for a dignified life. While there is no concrete definition of a sufficient amount, according to the literature on poverty and guaranteed income, the Office has deemed an amount equal or close to the relative at-risk-of-poverty threshold as basic. According to the 2021 Living Conditions Survey, the at-risk-of-poverty threshold in Catalonia stands at 941 euros per month for an adult living alone. However, the estimation of this threshold takes into account the economies of scale that exist within the household, so the threshold varies according to the number of members who live together. Thus, in a household of two adults, the at-risk-of-poverty threshold is 706 euros each. This is why guaranteeing the poverty threshold involves different amounts and information on household composition. In order to simplify and avoid technical difficulties that would be unmanageable in the framework of a pilot plan, but at the same time guarantee an amount close to the at-risk-of-poverty threshold, the monthly amount of the cash allowance has been set at 800 euros for adults and 300 euros for children under the age of 18.

Universal income refers to an income that is not targeted¹ to a specific social group or to a set of people who meet certain requirements (e.g. unemployed or with an income below a certain threshold). The universality of basic income is of interest, among other things, because of the aggregate effects it may have on a community – such as changes in the identity of the average beneficiary, spillover effects, and general equilibrium effects – which are not necessarily the sum of the individual effects (for a more detailed explanation, see Borrell-Porta, de Quintana and Segura 2023).

1 The opposite of universal would be means-tested or targeted.

Nevertheless, given the limitations of the Pilot Project, **it is necessary to establish an income and wealth ceiling**. The UBI proposed by the Pilot Project Office is based on the general policy that it should be accompanied by other measures, mainly a progressive tax reform to finance the net cost of the measure. Therefore, the whole population would receive UBI, but the wealthier population would pay more tax and consequently contribute more than they would receive in UBI. Tax reform is not possible under the Pilot Project. In order to partially simulate this redistribution, the Pilot Project Office has decided to establish income and wealth criteria in order to exclude from participation in the Pilot Project approximately the richest 10% of the population. As a result, although the UBI of the Pilot Project is not completely universal, it can be considered almost universal.

In view of the specific interest in the effects derived from the *basic* and *universal* characteristics of UBI, it has been considered necessary **to divide the Pilot Project into two separate trials**. On the one hand, **the randomised trial** will consist of the random selection of households throughout Catalonia, where all members who meet the participation criteria (detailed below) can receive the UBI. Half of the participants in the Pilot Project will be chosen through this trial. The other half will participate in **the synthetic trial** (or saturation trial at municipal level), in which selected municipalities will be selected according to methodological criteria. Two of these municipalities will be treatment municipalities, where all residents who meet the participation criteria will be eligible to receive the UBI. The rest of the selected municipalities will be control municipalities and a part of their population will be able to participate in the information gathering process of the project. The methodology of both trials is detailed in section 3.

The criteria for participation in the Pilot Project are set out below, followed by the proposed regime of compatibility with existing cash benefits:

2.1. Participation criteria

Registration and residency requirements

The criterion of registration and residency is the only one that differs between the two Pilot Project trials. In the randomised trial, the selected participants will have **to be registered residents at the selected addresses** on the date established by the Pilot Project regulations. In addition, at the time of submitting their application to participate in the Pilot Project, they must be registered residents and reside in Catalonia.

In the saturation trial at the municipal level, participants will have **to be registered residents in one of the selected municipalities** on the date established by the Pilot Project regulations. In addition, at the time of applying for participation in the Pilot Project, they must be registered residents in the municipality in question and reside there. **Alternatively, in the selected treatment municipalities, proof of actual and continuous residence can be provided by means of reports from social services or social organisations**. Proof of actual and continuous residence is not valid for persons from the control municipalities.

Wealth

Individuals who have **not been obliged to file a wealth tax return** for the last fiscal year with available data, in accordance with the regulations governing wealth tax, may participate in the Pilot Project.

Income

Individuals whose **gross annual income is equal to or less than EUR 45,000** in the last fiscal year with available data, may participate in the Pilot Project.

Table 1. Participation criteria

Participation criteria	Randomised trial at the household level	Synthetic trial at municipal level
Registration and residency requirements	<p>Registration at the selected addresses on the date established by the Pilot Project regulations.</p> <p>Registration and residence in Catalonia on the date of submission of the application for participation.</p>	<p>Registration in one of the selected municipalities on the date established by the Pilot Project regulations.</p> <p>Registration and residence in one of the selected municipalities on the date of submission of the application for participation.</p> <p>As an alternative to registered residence, in the treatment municipalities, proof of actual and continuous residence as of the date established by the Pilot Project regulations can be provided by means of reports from social services or social organisations.</p>
Wealth	Not having been obliged to file a wealth tax return in the last fiscal year with available data, in accordance with the regulations governing this tax.	
Income	Having a gross annual income of €45,000 or less in the last fiscal year with available data.	

Participation in the Pilot Project is voluntary and the area of application is Catalonia. Therefore, during the course of the Pilot Project, the participants must **remain registered, reside in Catalonia and not live outside Catalonia for more than 90 days a year**. If this is not the case, the person will be understood to have renounced their participation in the Pilot Project. In all cases, participants may withdraw from the Plan at any time. With regard to the amount of UBI, the only change envisaged in the course of the Pilot Project is raising the amount to 800 euros for individuals turning 18.

There is no age limit for participation in the Pilot Project or for receiving the payment. However, persons born, adopted or fostered at the selected addresses and municipalities, once the pilot

Plan participation application period has expired, will not be eligible to participate. Therefore, only those who have applied prior to the start of the pilot can participate; once launched, no one else can be added.

2.2. Proposed regime of compatibility of the Pilot Project's monetary allowance with the pre-existing system of cash benefits

According to the universal basic income model on which the Pilot Project is based, in a scenario in which a UBI is implemented throughout Catalonia, the latter would replace all benefits of equal or lower amounts, both contributory and non-contributory (welfare). In the case of benefits comprising higher amounts, the part up to the UBI amount would be replaced, while the rest of the benefit amount would be maintained. This would **simplify and defragment the current map of cash benefits**, especially in the case of welfare benefits, which comprise low amounts².

In the context of the Pilot Project, the regulatory and jurisdictional framework that regulates the pre-existing system of public benefits and pensions cannot be completely modified – as would be the case if the UBI were implemented throughout Catalonia – which imposes limitations on how the UBI of the Pilot Project fits within the current system of cash benefits. However, there is some scope for modification, and the Pilot Project Office is working in this direction, assessing the **feasibility of making modifications to the compatibility regimes of the welfare or non-contributory benefits** which are governed by income insufficiency criteria.

These modifications are **necessary to avoid the loss of social rights during the Pilot Project and to address the lack of protection of this group of participants once it has ended**. One of the priorities of the Pilot Project Office is to ensure the participation of people who receive welfare benefits, given that they represent one of the groups that could most benefit from a UBI, since they would be freed from the conditionality of these benefits, and therefore, a compatibility regime that does not discourage participation in the Pilot Project is being implemented.

The Office proposes the following compatibility regime with pre-existing, welfare (non-contributory) and contributory benefits:

- **Welfare benefits to guarantee minimum income³ and unemployment benefits (excluding unemployment benefit for the over 52s):**

The current legislation that regulates these benefits establishes as requirements the lack of income, the situation of need and other limits of income, earnings and economic

2 Welfare-type cash benefits take as a reference the Sufficiency Income Indicator of Catalonia (IRSC) and the Public Multiple Effects Income Indicator (IPREM).

3 State welfare pensions: retirement and disability benefits, family benefits for dependent children and minimum subsistence income. And also autonomous community welfare benefits: guaranteed citizens' income, benefits for young people emancipated from foster care, benefits to cover basic needs, benefits for at-risk children, benefits for household expenses and supplementary cash benefits in addition to state aid, pensions and benefits.

resources. Therefore, as a general rule, the receipt of the monetary allowance of the Pilot Project would imply non-compliance with these requirements and the termination of these benefits.

In these cases, the Pilot Project Office proposes a specific benefit suspension regime for the 24 months during which the Pilot Project cash allowance is paid. Once the UBI payments have ended, the cause for suspension disappears and the UBI monetary allowance received during its duration should not be counted as income for the purposes of assessing the resumption or termination of the benefit, since it is considered to be an extraordinary and time-limited income.

- **Welfare benefits for dependency, allowance for fostering children under the care of the Generalitat de Catalunya, one-off benefit to cover extraordinary needs for medical interventions to recover from an assault and unemployment benefits for the over 52s:**

The Office proposes that these benefits should continue to be received alongside the UBI, since the purpose pursued is different from that of the latter. With regard to unemployment benefits for the over 52s, the Pilot Project Office believes that, although the aim of covering basic material needs is the same, it differs from other allowances and welfare benefits in that this form of aid has an impact on pension contributions.

- **Contributory benefits and allowances that do not establish income requirements or limits for eligibility:**

These will be compatible with the monetary allowance of the Pilot Project.

In any case, this is an issue that **is being worked on at the time of writing**, in accordance with criteria of legal viability, competence and political opportunity. The above proposals are therefore subject to change. In particular, the limitations of competence of the existing regime must be taken into consideration.

Finally, with the aim of finding the best possible fit between the Pilot Project and the benefits system in Catalonia, the Pilot Project Office considers it essential to participate, collaborate and coordinate with the bodies responsible for management and processing benefits. Therefore, meetings have been and are being held with the different bodies responsible for management and processing (Ministry of Social Rights of the Generalitat de Catalunya, the National Social Security Institute and the State Public Employment Service).

The two tables below – Table 2 and Table 3 – summarise the proposed changes by state and regional welfare benefit.

Table 2. Proposed changes to the compatibility regime for pre-existing state-wide welfare benefits

State benefit	Proposed regulatory change Pilot Project Office	Justification
Minimum subsistence income	<ul style="list-style-type: none"> • Suspension or termination + preferential processing of new requests. 	
Non-contributory pension or disability benefit	<ul style="list-style-type: none"> • Not counted in UBI economic threshold calculation new requests from participants in the Plan once it has ended. 	Same purpose
Family benefits for dependent minors		
Unemployment benefits for the over 52s	<ul style="list-style-type: none"> • Compatibility. Not counted as income. 	Avoid the loss of contributions that entitles recipient to contributory retirement benefits
Other unemployment benefits, including the job seekers allowance	<ul style="list-style-type: none"> • Suspension or termination + preferential processing of new requests. • Not counted in UBI economic threshold calculation new requests from participants in the Plan once it has ended. 	Same purpose
Dependency	<ul style="list-style-type: none"> • Compatibility. Not counted as income. 	Different purpose

Table 3. Proposed changes to the compatibility regime for pre-existing autonomous community welfare benefits

Generalitat de Catalunya benefits	Proposed change	Justification
Benefits for young people emancipated from foster care	<ul style="list-style-type: none"> • Suspension or termination + preferential processing of new requests. • Not counted in UBI economic threshold calculation new requests from participants in the Plan once it has ended. 	Same purpose
Benefits to cover basic needs		
Benefits for at-risk children		
Benefits for household expenses		
One-off benefit to cover extraordinary needs for medical interventions to recover from an assault	<ul style="list-style-type: none"> • Compatibility. Not counted as income. 	Different purpose
Benefits for the fostering of children under the care of the Generalitat de Catalunya	<ul style="list-style-type: none"> • Compatibility. Not counted as income. 	Different purpose
Supplementary cash benefits in addition to state aid, pensions and benefits	<ul style="list-style-type: none"> • Depending on the benefit which is the subject of the supplement. 	Supplementary nature of the benefit giving rise to eligibility
Guaranteed income	<ul style="list-style-type: none"> • Suspension or termination + preferential processing of new requests. • Not counted in UBI economic threshold calculation new requests from participants in the Plan once it has ended. 	Same purpose

3. Proposed design methodology of the Pilot Project

The impact of the UBI will be assessed **through a double evaluation consisting of a randomised controlled trial (RCT) at the household level and a synthetic trial at municipality level**⁴.

A **randomised controlled trial** is a method of impact assessment in which eligible units (individuals, households, businesses, schools, etc.) are randomly assigned to either a group that receives the intervention, called the *treatment group*, or to one that does not receive the intervention, which we call the *control group*. **Given a sufficiently large sample, the random assignment of the units to one of the two groups allows us to obtain two comparable groups**, both in terms of observable and unobservable variables, and thus avoids so-called *selection bias*, in other words, that the people who receive the intervention and those who do not receive it have different characteristics which could condition the results and as a consequence make it impossible to distinguish whether the differences observed between the two groups are due to participation in the programme or policy or to the differential characteristics that both groups already had at the outset.

The **synthetic control method** is a statistical method to assess the effect of an intervention in comparative case studies. In synthetic control studies, the effect of the policy or programme is estimated **by comparing the evolution of the variables of interest of the treated units with the evolution of a synthetic control group**. This control group is created from a weighted combination of control units chosen in such a way as to minimise differences in the evolution of the variables of interest between the treated units and the synthetic control in the period prior to the intervention. So, in the post-intervention period, the evolution of the synthetic control group acts as an estimate of the counterfactual, that is of what would have happened to the treated units if the intervention had not taken place.

Approximately 10,000 people will participate in the Pilot Project, of which 5,000 will receive the UBI. Within the framework of the randomised controlled trial, **the proposal is to grant the UBI to some 2,500 people chosen** at random from among all eligible people in Catalonia, and to compare the results with some 2,500 more people, also chosen at random, who will not receive the UBI. Within the framework of the synthetic trial, the proposal is **to grant the UBI in two municipalities in Catalonia of 1,200-1,400 inhabitants to all eligible registered residents**⁵, so that UBI ends up being received by some 2,500 more individuals. In this case, the results will be compared with the results of a set of municipalities (probably between 3 and 5) whose inhabitants will not receive the UBI.

This dual approach **will allow us to draw conclusions at the scale of Catalonia on the effects of a basic, individual and unconditional income thanks to the randomised trial, while at the same time testing the effects of universality thanks to the synthetic control study in the two**

4 Synthetic trial refers to the saturation trial at municipal level using the statistical method of synthetic control.

5 As an alternative to registration of residence, and as explained in section 2, in the treatment municipalities, proof of actual and continuous residence as of the date established by the Pilot Plan regulations can be provided by means of reports from social services or social organisations.

municipalities. On the one hand, the randomised controlled trial should help to understand what happens at the individual and household level when the UBI is received: that is, what decisions individuals make about work, education, family, consumption, investment, etc. as a result of receiving an unconditional monthly payment for two years. On the other hand, the synthetic trial should make it possible to understand what happens at the aggregate level when all people in a given territory are beneficiaries of a UBI, mainly in terms of the use and operation of public services, civic participation, economic activity, etc.

In line with the interests of the Office and the literature review conducted by Ivàlua⁶, the study will focus on exploring the effect of the UBI on the dimensions and sub-dimensions set out in Table 4 and Table 5.

Table 4. Dimensions of interest at the individual and household level

Dimension of interest	Sub-dimensions of interest
Material well-being	Living conditions, income and expenses of certain groups of goods and services.
Financial behaviours	Savings, debt and investment.
Emotional well-being and autonomy	Satisfaction with life, mood, cognitive capacity, decision-making capacity, freedom of choice, intra-household affective relationships, youth emancipation and use of time.
Labour market	Employment, job searching and entrepreneurship.
Health	State of physical and mental health and use of health services.
Gender relations	Domestic and care work and distribution of resources.
Values and attitudes	Political participation and attitudes towards the welfare state, UBI and other social issues.
Relationship with social services	Use and satisfaction with social services.

Table 5. Dimensions of interest at the municipal level

Dimension of interest	Sub-dimensions of interest
Use and operation of public services	Use and operation of health, mental health, social services and education services.
Local economy	Housing prices, inequality, economic activity, unemployment, business and cooperative fabric, etc.
Participation and social cohesion	Associative fabric, political participation and social conflict.

6 See Borrell-Porta, de Quintana and Segura (2022) for a review of the literature.

Furthermore, subject to statistical criteria on the samples of both studies, the comparison of the respective results can help us to understand what are the direct effects of receiving an income and what are the general equilibrium effects derived from a whole community receiving it. Therefore, in the case of the synthetic control study, the proposal is to also study what happens at the individual and household level in the municipalities receiving the UBI using the same information gathering instruments as in the randomised trial (survey). In short, **the two studies are considered complementary**, in that they answer different questions that together allow us to fulfil the main objectives of the Pilot Project.

The design methodology of the two studies is described below.

3.1. Randomised trial at household level

In the framework of the randomised trial at household level, **the UBI will be granted to some 2,500 people chosen at random from** among all eligible people in Catalonia. The aim of the randomised trial at the household level is to answer the following question: **“What are the effects of granting an individual a UBI on the behaviours, decisions and well-being of the recipients and their households?”**

In this section we explain the methodology for selecting the people who will receive the UBI and the design issues necessary to ensure the feasibility of the trial.

Randomised trial at cluster level

For an impact assessment to produce a robust estimate of the effect of the intervention, it is necessary to have two comparable groups: one that participates in the intervention and one that does not. The most credible way to ensure the **two groups are comparable is for the allocation of participants to each group to be random**, as this ensures that the only factor that determined participation in the programme or policy was chance, and therefore that there are no other variables that differ systematically between the two groups. This guarantees that any differences we observe between the two groups can only be the result of participation in the programme, as this is the only factor that differentiates the two.

A key decision in randomised trials is whether the treatment is randomised at the individual level or at a higher level of aggregation. In general, the level of randomisation is determined by the level at which the intervention takes place. However, there are situations where it is advisable to randomise at a higher level of aggregation than the level of intervention. For example, in programmes or policies where we expect to see externalities, it is preferable to randomise at the level at which we expect most of these externalities to occur, in order to avoid the control group’s outcomes being affected by the fact that there are people around them participating in the programme⁷. In these cases we talk about cluster randomised trials (CRT), since the randomisation does not occur at individual level but at the level of a group or cluster, such as households, schools or municipalities (Baird, Bohren, McIntosh and Özler, 2018).

7 One of the key assumptions of randomised controlled trials is that the outcomes of each individual do not depend on the group to which the people around them are assigned, an assumption that does not hold when there are externalities between the treatment and control groups.

Randomised trial of the UBI Pilot Project in Catalonia

This section explains the main decisions that have determined the design of the randomised household-level trial of the UBI Pilot Project in Catalonia. Specifically:

1. The selection of participants
2. The level at which intervention will take place
3. The level at which it will be randomised
4. The stratification of randomisation
5. The units of analysis that will be used in the assessment
6. The size of the sample and the statistical power derived from it

Selection of participants

To select the persons participating in the randomised trial at the household level, the Population Register of Catalonia will be used, which is fed with information from the register of residents. It is a register at the individual level of all persons who officially reside on a regular basis in a municipality in Catalonia and, therefore, of the entire universe of persons potentially eligible to receive UBI.

Ideally, the selection of the sample of potential participants should be at household level, since it is important to be able to select all members of the same household. However, in practice this option is not feasible, as there is no register of all persons usually residing in Catalonia aggregated at the household level. Based on the information provided by the register of residents it is not possible to group persons into households, but it is possible to group them at the household level⁸, which opens up the possibility of using the household rather than the individual as the sampling unit for selecting potential participants. Although the match between residence and household is not perfect, this option ensures that it is unlikely that only one member of a household will participate in the Pilot Project.

Idescat will select a **simple random sample of approximately 3,200 households throughout Catalonia**, in order to obtain a sample of approximately 8,000 potential participants.

Level of intervention

One of the fundamental characteristics of the UBI is that it is a subjective and individual right. In order for the treatment to be faithful to the principles of UBI, the level of intervention in the randomised trial will be the individual. In other words, **the UBI will be granted on an individual basis to each of the beneficiaries**.

Level of randomisation in treatment and control

As explained above, one of the important decisions when designing an RCT is at what level of aggregation the units to be treated will be chosen, or, in the case of this pilot plan, at what level of aggregation the people who will be offered the UBI (treatment group) and, at the same time,

8 By household we mean a set of people who share a residence, most of their budget (income and expenses) and make important decisions as a unit. By address, on the other hand, we refer to a group of persons who share only the habitual residence in the same dwelling.

the people who will participate but not receive the UBI (control group) will be chosen. In the case of the UBI Pilot Project, it has been decided to randomise control and treatment at household level for the following reasons.

One of the key objectives of the Pilot Project is to test the effect of a basic UBI. Bearing in mind that the UBI is granted at individual level, if the randomisation in the treatment and control group were also done at individual level, the beneficiaries would most likely decide to share the money received with the rest of the members of their household, which would mean that the UBI would no longer be individual and basic, and this would dilute the intensity of the treatment. As mentioned above, the selection of participants will be done through the Population Register, as it allows people to be grouped into households. This opens up the possibility of using the household rather than the individual as the unit of randomisation in the treatment and control groups. Although the match between residence and household is not perfect, with this option we ensure that the average intensity of the treatment is increased. It also further reduces the likelihood of having two people in the same household who are part of different groups. Finally, randomising in the treatment and control at household level also allows us to analyse the effects of the UBI on intra-household decisions and relationships.

Thus, given that a random sample of participants in the Pilot Project is selected using the register of residents, **it has been decided that the household will be the level at which the participants are randomised in the treatment or control group.** In short, allocating the UBI at individual level and randomising participants in the treatment or control groups at household level ensures that the UBI is received individually and in most cases in the basic amount, while making it feasible to analyse the effects of the UBI at individual and household level in a situation where all eligible members of the household (cluster) are also entitled to receive the benefit.

Stratification of randomisation in treatment and control

Stratifying the sample when randomising has several advantages. First, it assures us that there is balance between the treatment and control group for the variables we use to stratify, which are generally variables that we expect to be highly correlated with the main outcomes of interest. At the same time, by reducing the risk of imbalance, it also reduces the risk of making Type 1 errors, i.e. concluding that the treatment is working when it is not. Third, it facilitates analysis of the subgroup by the strata used, ensuring that control and treatment statuses are balanced within the subgroup. Fourth, it protects us in situations where there is significant attrition in one stratum but not in the rest, as we can remove the stratum in question from the analysis and still have a valid trial for the rest of the strata. And finally, it increases the statistical power of the trial by reducing the error variance.

At the time of randomisation, **the only information of the participants used will be the variables taken from the register of residents**, that related to the receipt of other benefits and the income variable, which will have been consulted to determine eligibility. Therefore, the stratification can only be carried out taking into account these variables. Meanwhile, since randomisation is at the household level, only categories defined at this level can be used. Given these restrictions, the randomisation will be stratified by the following variables:

- Type of household: single person versus multiperson.
- Presence of children: households where at least one child under 18 years of age is a registered resident versus households where only adults are registered.

- Proportion of beneficiaries in the household: “complete” households, where all persons have applied to participate in the Pilot Project and are eligible, versus “incomplete” households, where some of the persons have either not applied to participate in the Pilot Project or are not eligible.
- Location of the household: households located in rural municipalities, towns or suburbs versus households located in cities.
- Other incompatible benefits: households where at least one person is receiving other social benefits not compatible with the UBI versus households where no person is receiving other incompatible benefits.

This means dividing the sample into 20 strata (Table 6).

Table 6. Strata for randomisation

Strata	Type of household	Presence of children	Proportion of beneficiaries in the household	Location of the household	Other incompatible benefits
Stratum 1	Single person	No	Complete	City	Yes
Stratum 2	Single person	No	Complete	City	No
Stratum 3	Single person	No	Complete	Non-city	Yes
Stratum 4	Single person	No	Complete	Non-city	No
Stratum 5	Multiperson	Yes	Complete	City	Yes
Stratum 6	Multiperson	Yes	Complete	City	No
Stratum 7	Multiperson	Yes	Complete	Non-city	Yes
Stratum 8	Multiperson	Yes	Complete	Non-city	No
Stratum 9	Multiperson	Yes	Incomplete	City	Yes
Stratum 10	Multiperson	Yes	Incomplete	City	No
Stratum 11	Multiperson	Yes	Incomplete	Non-city	Yes
Stratum 12	Multiperson	Yes	Incomplete	Non-city	No
Stratum 13	Multiperson	No	Complete	City	Yes
Stratum 14	Multiperson	No	Complete	City	No
Stratum 15	Multiperson	No	Complete	Non-city	Yes
Stratum 16	Multiperson	No	Complete	Non-city	No
Stratum 17	Multiperson	No	Incomplete	City	Yes
Stratum 18	Multiperson	No	Incomplete	City	No
Stratum 19	Multiperson	No	Incomplete	Non-city	Yes
Stratum 20	Multiperson	No	Incomplete	Non-city	No

Analysis level

As indicated in Table 4, the Pilot Project aims to analyse the effect of the UBI on both individual and household related aspects. In this sense, two levels of analysis **are taken into account in the framework of the randomised trial**:

- **Individual level:** aspects such as health, mental health, subjective well-being, autonomy, use of time, employment and education will be analysed at individual level for all individuals over 16 years of age who take part in the randomised trial. Also, given that the granting of the UBI is at individual level but randomisation is at household level, individual decisions influenced by household dynamics will be analysed; e.g. emancipation decisions and distribution of tasks and resources, gender relations and gender-based violence.
- **Household level:** for all households to which at least one person participating in the trial belongs, the randomised trial will also analyse the effect of the UBI on household decisions. At household level, aspects such as housing expenses, indebtedness, use of social services and the situation of children in terms of education, health and welfare will be analysed.

Sample size and statistical power of the trial

The statistical power of a randomised trial refers to the probability of detecting significant effects of the intervention, if any. In the case of the UBI Pilot Project this represents the probability that, if the UBI has real effects, the study will be able to detect them. The **statistical power calculations identify the size of the smallest effect size that can be detected given the sample available**, in this case 5,000 people (2,500 who will receive the UBI and 2,500 who will not).

For the randomised study, the statistical power has been calculated for several variables, both for outcomes at individual level and for outcomes at household level. Estimates assume that approximately 15% of the beneficiaries will be under the age of sixteen and will therefore not be surveyed. Two scenarios have also been considered: a scenario in which all people aged 16 and over respond to surveys (scenario 1: 4,250 adults, belonging to 1,700 households), and a scenario with a sample attrition of 20%, i.e. where only 80% of people aged 16 and over respond to the surveys (scenario 2: 3,400 adults, belonging to 1,360 households). Table 7 shows the minimum detectable effects (MDE) on several variables under each of the scenarios.

Table 7. Minimal detectable effects in the randomised trial⁹

	Mean	Scenario 1		Scenario 2	
		Absolute MDE	Relative MDE	Absolute MDE	Relative MDE
Individual indicators					
Employed people aged 16 and over (%)	40.3%	5.33	13.2%	5.96	14.8%
Self-employed people aged 16 and over (%)	4.4%	2.24	50.4%	2.50	56.4%
People aged 16 and over engaged in domestic and care work (%)	7.3%	2.83	38.7%	3.16	43.2%
People aged 16-25 undergoing training (%)	54.2%	5.41	10.0%	6.05	11.2%
People with unmet medical needs (%)	2.2%	1.59	73.1%	1.77	81.8%
People who save (%)	43.2%	5.38	12.5%	6.02	13.9%
Satisfaction with life (0-10 scale)	5.0	0.28	5.7%	0.32	6.4%
General health condition (% very good or good)	63.6%	5.23	8.2%	5.85	9.2%
Household indicators					
Expenditure on food (€/unit)	277.6	19.7	7.1%	22.0	7.9%
Delays in paying bills (%)	8.9%	3.9	44.3%	4.4	49.5%
Households with material deprivation (%)	5.4%	3.1	57.2%	3.4	63.9%
Households with social welfare benefits (%)	3.3%	2.4	73.8%	2.7	82.5%

The absolute minimum detectable effect tells us the minimum difference between the control group and the treatment group that the trial will be able to detect, while the relative minimum detectable effect puts this variation in relation to the baseline level of the variable under con-

⁹ For the general life satisfaction variable, mean values are calculated using data from the assessment of BMincome. For the remaining variables, the source of information is the 2020 Living Conditions Survey. In the case of variables expressed as proportions, the minimum detectable effect in absolute value is expressed in percentage points, while for the rest of the variables it is expressed in the units shown in brackets.

sideration and indicates the percentage variation that will be detectable. Here are some specific examples: if the UBI has an effect on the employed people aged 16 and over, if the difference between the treatment group and the control group is at least 5.33 percentage points this will be detected, which would imply an increase or decrease of 13.2% of employed people over the baseline level. Similarly, if the UBI succeeds in increasing the number of 16-25 year olds in education, the effect can be detected if the difference between the treatment and control group is 5.41 percentage points, which implies a 10% increase over the baseline level. In general, the calculations find that the statistical power of the Pilot Project is adequate and that the sample, for both scenarios, is sufficient to detect reasonable effects given the intervention.

The calculations presented take into account the fact that this is a randomised trial at the cluster level, assuming an intra-cluster correlation of 40%. However, they do not take into account the stratification of the randomisation. In general, stratifying the sample when randomising increases statistical power by reducing the error variance. Therefore, taking into account the fact that the plan is to stratify the randomisation, the minimum detectable effects expected in practice are slightly smaller.

Finally, the power calculations will be revised once baseline information is available to allow us to adjust the assumptions of expected sample size, mean and standard deviation of the variables and intra-cluster correlation, among other things. The final calculations will be available in the analysis plan to be published shortly.

Implementation plan for the randomised controlled trial

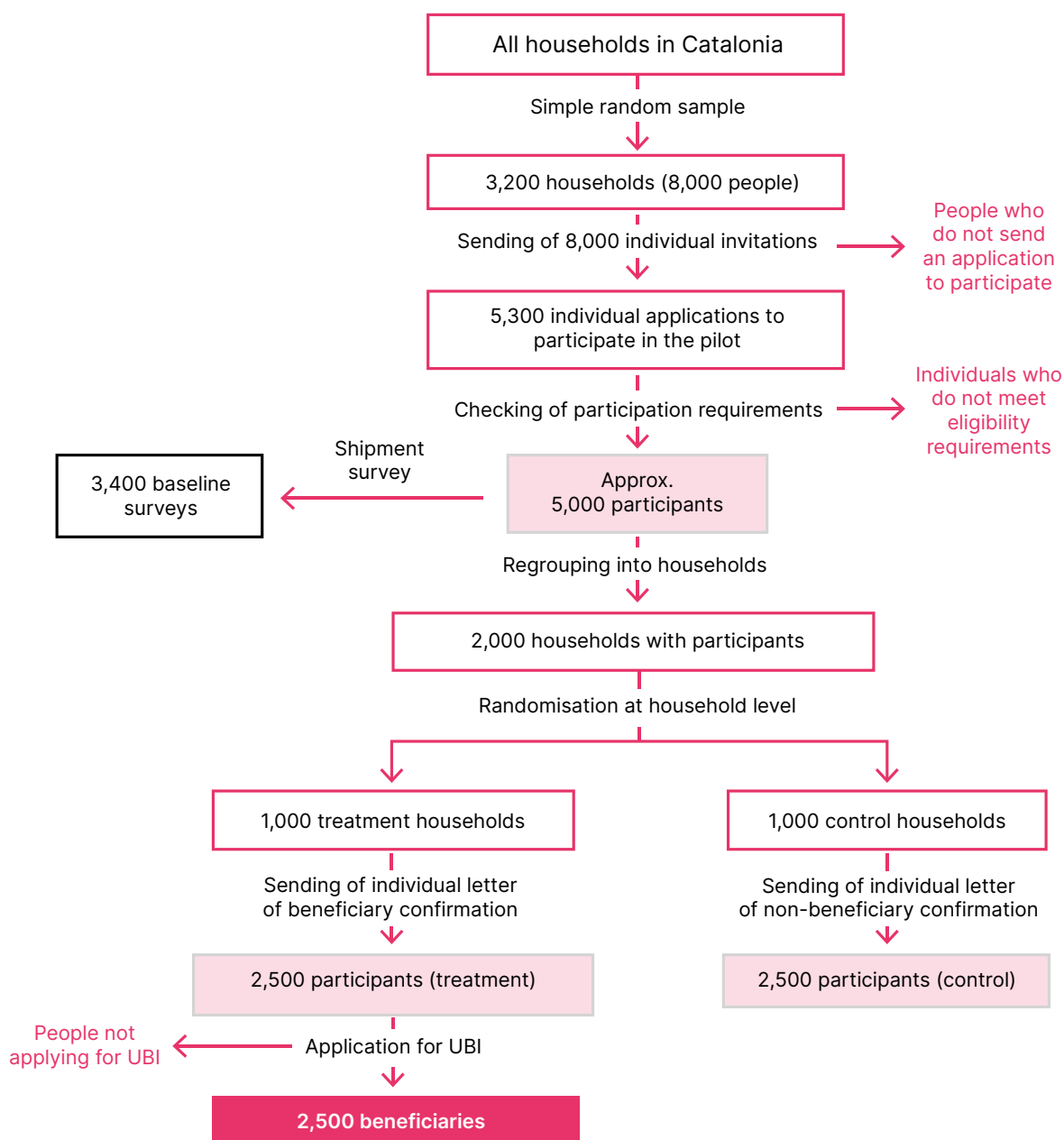
The selection of the sample of potential participants will be made from the register of residents with the collaboration of Idescat. The potential participants in the randomised trial are all those people with a registered residence in an address in Catalonia on the date established by the Pilot Project regulations. Randomisation will be carried out at the household level; therefore, the household will be the level of aggregation used to choose the units that will be treated, i.e. the individuals to whom the UBI will be offered. The **procedure for choosing these individuals will be as follows:**

1. The sampling frame will be the household-level register of the Population Register.
2. Idescat will select a random sample of addresses and will send the Pilot Project Office a list of all the people registered at the selected addresses. In the case of collective addresses, for example a nursing home, each registered person will be treated as a single household.
3. The Pilot Project Office will invite all the individuals registered at these addresses on the date established by the Pilot Project regulations to participate in the Pilot Project. The invitation to participate in the Pilot Project will be sent individually and via administrative notification to the postal address on the register.
4. Those interested in participating in the Pilot Project will complete the application form and give their consent so that the participation criteria can be verified as well as access to data for the assessment of the Pilot Project (defined in section 2).
5. For all participation requests received, the participation criteria (as defined in section 2) will be checked until a pool of participants for the Pilot Project is obtained. There will then be a draw using this pool of participants.
6. Ivàlua will randomly assign each household to either the control group or the treatment group in a notarised procedure. All the individuals in the control households will be assigned to the control group, and those in the treatment households will be assigned to the treatment group.

The groups resulting from this randomisation will be respected throughout the Pilot Project; i.e. as far as the assessment is concerned, all individuals assigned to the treatment group will be treated as such, regardless of whether they end up receiving the UBI or not, and the same will be true for the control group.

Figure 1 summarises the procedure for setting up the treatment group and the control group.

Figure 1. Selection and randomisation procedure for participants in the randomised trial¹⁰



10 The diagram is based on the following assumptions: (1) On average, there are 2.5 people per household in Catalonia; (2) two thirds of the individuals receiving the invitation to participate will fill in the application; (3) 6% of applicants will be ineligible; (4) 15% of the participants will be under 16 years of

3.2. Synthetic trial at municipal level

One of the key questions to be addressed with the Catalan Universal Basic Income Pilot Project is what are the general equilibrium effects that derive from the universality of a UBI. In particular, we are interested in knowing: **“What are the aggregate effects of granting a UBI to an entire community on the local economy, social participation and cohesion, and the operation of public services in this community, as well as on the behaviours, decisions and well-being of the people living there?”**

To answer this question, a synthetic control study has been designed for experimental design that enables the estimation, based on the selection of two treatment municipalities and a reduced group of control municipalities, of the general equilibrium effects of the UBI on the main dimensions of interest of the Pilot Project Office (Table 4 and Table 5).

This section summarises the methodology used to select the two municipalities that will receive the UBI and the five municipalities that will form part of the Pilot Project as a control group. It also briefly explains what the main dimensions of interest are and how the comparison of the evolution of the two groups of municipalities allows us to make a robust estimate of the effects of the universality of the UBI. For a detailed technical description of the methodology, see Vives-i-Bastida (2023).

Synthetic controls for experimental design

The synthetic control method is a statistical method to assess the effect of an intervention in comparative case studies. This method estimates the effect of a policy by comparing the evolution of the units affected by the policy (*treated units*) with the evolution of what is called *the synthetic control group*: a group of units not affected by the policy (*control units*) where each unit is assigned a certain weighting with the aim of ensuring the synthetic control is as similar as possible to the treated units.

Generally, the synthetic control method has been used to estimate ex post facto the effects of policies or phenomena that have affected certain regions. For example, this methodology has been used by Abadie and Gardeazabal (2003) to estimate the economic cost of the Basque conflict or to estimate the effects of a large-scale smoking control programme implemented in California in 1988 (Abadie et al., 2010).

Recently, Abadie and Zhao (2022) have developed a **methodology that adapts the original idea of synthetic controls to experimental design to be applied in situations where some aggregate units are to be treated but it has not yet been decided which ones**. Thus, the main difference with respect to the original methodology is that in this case the units treated are not given, but are chosen in such a way that they are as representative as possible of the set of units to which we want to be able to extrapolate the results, understanding by “as representative as possible” that combined they are those that best reproduce the past evolution of the variable on which we want to measure the effect in the set of units to which we want to extrapolate the results.

age; (5) 80% of participants aged 16 and over will answer the survey, and (6) all individuals granted the UBI fill in the final application.

In the framework of this Pilot Project, **Vives-i-Bastida (2023)** has developed a methodology that adapts the one proposed by Abadie and Zhao (2022) to extend the same idea to **a situation in which we are not interested in a single variable of interest (or outcome) but in several**, as is the case of the UBI Pilot Project in Catalonia. Below we explain how this new methodology has been implemented in the case of the UBI Pilot Project to choose the municipalities that will receive the UBI and those that will act as a comparison group.

Synthetic trial of the UBI Pilot Project in Catalonia

This section explains how the methodology developed by Vives-i-Bastida (2023) has been applied to the case of the UBI Pilot Project in Catalonia. Specifically, it describes:

1. How the main outcomes of interest and the covariates taken into account in the synthetic control model for experimental design have been selected.
2. How the list of municipalities eligible to receive the UBI has been created.
3. How the target population of the study has been defined.
4. How the pair of municipalities that will receive the UBI and the five control municipalities have been chosen.

Variables of the municipality selection model

As mentioned above, one of the characteristics of the chosen methodological design is that it extends the experimental synthetic control methodology to take into account various dimensions of interest. Or, in other words, the “most representative possible” pair of municipalities is chosen to be assigned the treatment taking into account various outcomes of interest. This section **explains how these key outcomes** to be considered in the model have been chosen.

The selection of the key outcomes of interest is based on the key dimensions for which we want to study general equilibrium effects (see Table 5). Four have been selected¹¹: use of health services, use of social services, operation of education services and operation of the labour market. Next, for each of the key dimensions, an outcome variable has been chosen to be included in the model according to the following criteria:

1. **Representativeness**: within each dimension of interest, a variable has been chosen that is representative of the time trends of the set of variables of the dimension to which it belongs.
2. **Sensitivity to treatment**: variables have been chosen that we expect the UBI to have an effect on in a non-mechanical way. For example, we do not expect the UBI to affect the graduation rate in compulsory education and, therefore, it has been discarded as a possible variable selected for the operation of education services dimension.
3. **Availability of data**: variables have been chosen for which information was available for all municipalities eligible to be treated and for several periods prior to the start of the intervention.

Based on the above criteria, the outcomes chosen to incorporate in the model are listed in the following table:

11 Discarded as dimensions of interest are those that are mechanically affected by the UBI, such as the level of income in the municipality.

Table 8. Outcomes used in the synthetic control model

Dimension of interest	Variable	Available years	Source
Health Use of the services	Percentage of hospitalisations for the population of the municipality	2012-2021	Catalan Agency for Health Quality and Assessment (AQuAS)
Social services	Percentage of users of social services for the population of the municipality	2012-2014, 2016-2017 and 2019-2020	Ministry of Social Rights
Operation of education services	Upper secondary entry rate of graduates in state schools by municipality	2017-2021	Ministry of Education
Operation of the labour market	Unemployment rate	2012-2021	Idescat and the Ministry of Business and Labour

Additionally, a series of variables aimed at characterising the population and the economy of the municipality have also been included in the model as covariates. Although these (unlike the outcomes of interest) will not be taken into account to assess the fit of the pair selected by the model to receive the UBI nor the existence of a basic synthetic control group, in the case of the treated pair it helps us to select more representative municipalities as well as to construct a more appropriate synthetic control. The covariates used are listed in the table below:

Table 9. Covariates used in the synthetic control model

Dimension of interest	Outcome variable	Available years	Source
Age	Average age	2012-2021	Statistics from the National Statistics Institute continuous register
Nationality	Percentage of foreign population	2012-2021	Idescat municipal register of inhabitants
Income level	Average net income per person	2015-2019	National Statistics Institute Atlas of experimental statistics
Inequality	Gini index	2015-2019	National Statistics Institute Atlas of experimental statistics

All variables are constructed at the municipal level

Municipalities eligible to receive the UBI

Based on the aforementioned variables, the synthetic control model for experimental design chooses the most representative pair from a list of eligible municipalities, which is delimited by a **series of statistical and budgetary conditions** that restrict which ones can make up the chosen pair. This section lists and describes the criteria that have been used to define the list of eligible municipalities.

The criteria used to define the list of eligible municipalities are as follows:

- 1. Municipalities with between 1,200 and 1,400 inhabitants¹².** Budgetary criterion. Given the budget available for this part of the Pilot Project and the fact that two municipalities are to be treated, the two municipalities should together have a maximum population of around 2,800 inhabitants, so that, after excluding higher incomes and people who declare wealth tax, there are around 2,500 people eligible to receive the UBI (potential beneficiaries).
- 2. Municipalities with at least one main urban centre of 1000 inhabitants.** Methodological criterion. In municipalities where there is more than one singular population entity, if the population is very dispersed territorially, the general equilibrium effects that would occur would be smaller, less interesting and less representative than we would expect in less dispersed municipalities. Therefore, a population centre of at least 1,000 inhabitants is required as a criterion.
- 3. Municipalities that have not experienced a recent major income shock** Methodological criterion. For example, in municipalities where a large lottery prize has recently been won, it would be difficult to distinguish which of the observed effects in the municipality would be due to the inhabitants receiving the UBI and which would be due to this aforementioned income shock.

According to these criteria, the following municipalities have been selected as candidates: Al-moster, Anglesola, Bellcaire d'Urgell, Corçà, la Fuliola, Miralcamp, Perafort, Pla del Penedès, Puigvert de Lleida, Sant Julià del Llor i Bonmatí, Sant Martí de Tous, Térmens, Torà, Vallbona d'Anoia and Vila-rodona.

Target population

In synthetic controls for experimental design, the target population determines two things. First, **it establishes the scope of the study**, understood as the set of municipalities to which the results are expected to be extrapolated. Second, **it delimits the group of municipalities** that the synthetic control model will consider as possible municipalities **to form the synthetic control group**, called the *donor pool*.

Taking into account that the municipalities that will receive the UBI will have between 1,200 and 1,400 inhabitants, it has been decided that the target population will be restricted to municipalities that, according to Eurostat's classification of degree of urbanisation, are considered **towns and suburbs or rural areas¹³**. Therefore, cities in Catalonia are excluded, as the social and eco-

12 According to Idescat data for 2021.

13 Idescat, following Eurostat's classification of the degree of urbanisation (Eurostat, 2021), classifies the municipalities of Catalonia into cities, towns and suburbs, and rural areas according to the size and population density of the municipalities.

conomic dynamics in cities are significantly different from those in rural areas, towns and suburbs and, specifically, from those in municipalities of 12001400 inhabitants. Additionally, a number of small municipalities have been excluded from the target population and the donor pool for which information was not available for all years and outcome variables specified in Table 8.

After applying the above criteria, the **target population** of the study includes 852 of the 947 municipalities, **which contain approximately 40% of the population of Catalonia.**

Choice of municipalities participating in the Pilot Project

Once the target population, the list of municipalities that are eligible to receive the UBI and the variables (of outcome and covariates) to be taken into account have been defined, the rest of the parameters of the statistical model to be used to choose the pair of municipalities that will receive the UBI and the municipalities that will make up the synthetic control have been defined. This section **explains the decisions taken.**

First, the **number of treated municipalities has been limited to two.** Treating two municipalities instead of one ensures that, if there is an exogenous shock in one of the two municipalities (such as a Christmas lottery jackpot win or the installation of a large factory), the effects of the Pilot Project can still be assessed using only the municipality that has not experienced the shock, a situation that would not be possible in a scenario where only one municipality is treated and it receives an exogenous shock that makes it impossible to distinguish the impacts caused by the UBI from those caused by the shock. Also, having two municipalities instead of one increases the likelihood of reproducing the population mean by using the weighted mean of both municipalities to obtain a mean that is closer to that of the target set of municipalities. Finally, we have ruled out treating more than two municipalities because this would significantly reduce the size of the municipalities treated, which would reduce both the scope for generating interesting general equilibrium effects in terms of labour market dynamics, operation and use of public services, etc. and the ability to extrapolate the results obtained to a wide set of municipalities in Catalonia.

Second, **the objective function**, i.e. the evolution in time that we want the pair chosen to receive the UBI to be able to reproduce, has the following characteristics:

1. It is a **simple average** of the values of all the municipalities that make up the target population. In this sense, the use of a population-weighted average by municipality population has been discarded, given that the selection criteria for the target population already reduce the variability in the size of the municipalities that make up the target population and, therefore, the importance of explicitly taking it into account in the model.
2. The **four outcomes** (see Table 8) **have the same weight** and are included for all years, while for the covariates the average value of the years 2012-2018 is used and assigned one tenth of the weight of the outcomes. This implies that we attach greater importance to adjustment in the key outcomes than to adjustment in covariates.

Based on these parameters, the model assesses for each possible combination of eligible municipalities, i.e. for each weighted combination of two eligible municipalities, to what extent it deviates from the value of the objective function. And it chooses, among all the options evaluated, the pair of municipalities and weights with the smallest deviation. In other words, **it chooses the most representative pair**, understood as the one that best replicates simultaneously the evolution of the set of outcomes and the value of the main covariates in the target population as a whole.

Having chosen the pair to be treated, they were found to fulfil an additional **criterion: both municipalities belonged to different provinces**. As explained above, the main reason for treating two municipalities instead of one is to protect the Pilot Project from possible exogenous shocks. However, if the two municipalities that make up the chosen pair were in the same province, they would be subject to similar local shocks and, therefore, the likelihood of the same shock affecting the two municipalities in the pair would increase. This criterion therefore aims to ensure that the two municipalities that make up the pair are sufficiently far apart.

In this case, the pair chosen for the model meet the criterion and therefore they have been designated as the pair of municipalities that will receive the UBI, i.e. as the synthetic treatment group.

With the pair of treatment municipalities now selected, the next step was to choose the control municipalities. In terms of the municipalities that can make up the synthetic control group, the model has been restricted so that:

1. The number of municipalities that end up in the control group is **low**, as this facilitates the interpretation of the results and the collection of data in the control municipalities.
2. Municipalities belonging to the **same county** as the municipalities selected to receive the UBI **cannot be used**. This is because, we are interested in the two groups being part of different labour markets to avoid spillovers between treatment and control municipalities.

In this case, the model selects as the control group the combination of municipalities of the target population that meets the previous condition and that best replicates the characteristics (evolution of the outcomes and value of the covariates) of the pair of treatment municipalities, resulting in a group of five municipalities that make up the synthetic control group.

Design validity and inference

For the synthetic trial to be feasible, two conditions must be met simultaneously:

- **The pair of municipalities chosen to receive the UBI are capable of reproducing the past evolution of the variables of interest of the target population as a whole.** In other words, for each of the outcome variables included in the model, the weighted average of the two municipalities that make up the treated pair satisfactorily reproduces the evolution of the simple average of the variable in question of the set of municipalities of the target population, in the periods prior to the intervention.
- **The synthetic control group is able to reproduce the past evolution of the variables of interest of the treated units.** In other words, for the different outcomes included in the model, the evolution of the weighted average of the municipalities that make up the synthetic control group satisfactorily reproduces the evolution of the units treated in the periods prior to the intervention.

As can be seen in the graphs below, for three of the priority outcomes¹⁴, the evolution of the pair chosen to receive the UBI in the years prior to the intervention (black dotted line) is very similar to the average evolution of the population of interest (black solid line). Likewise, the synthetic control group (grey dotted line) also manages to reproduce previous trends very accurately.

14 The graph on upper secondary entry rate is not presented because data is only available from 2017, which makes it less informative.

Figure 2. Evolution in time of the hospitalisation rate 2012-2021

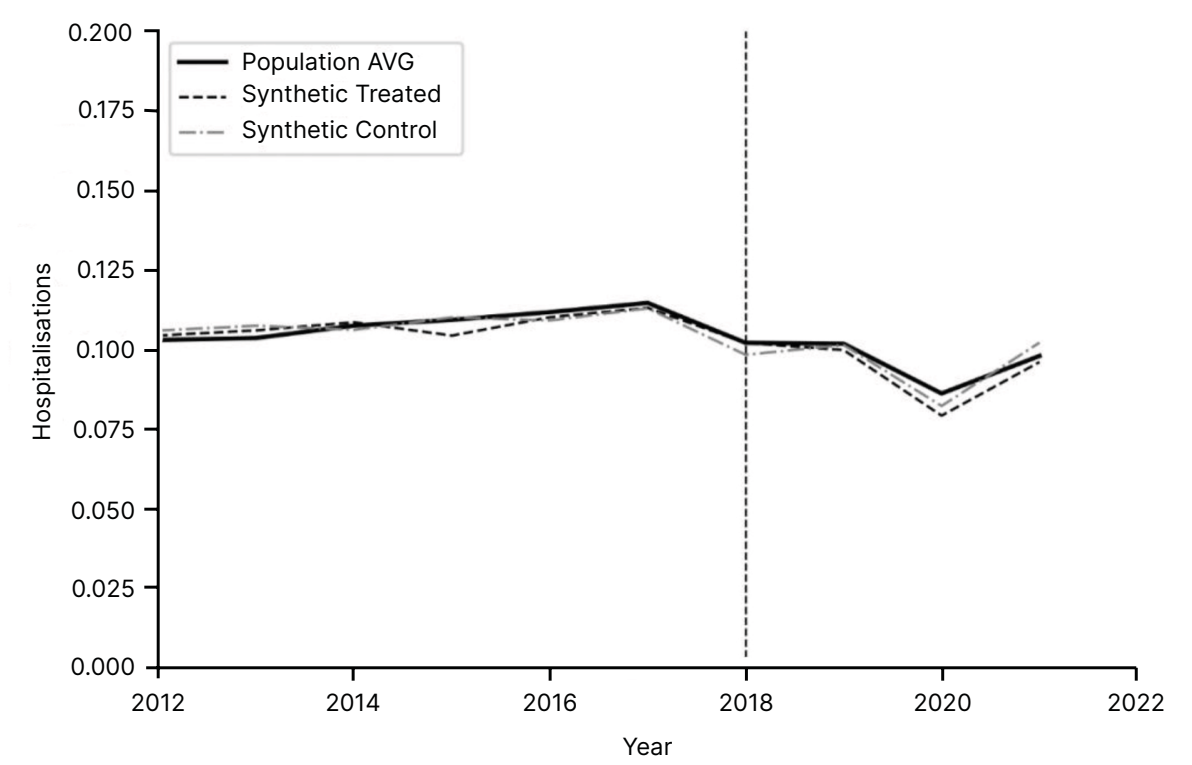


Figure 3. Evolution in time of the percentage of users of social services 2012-2020

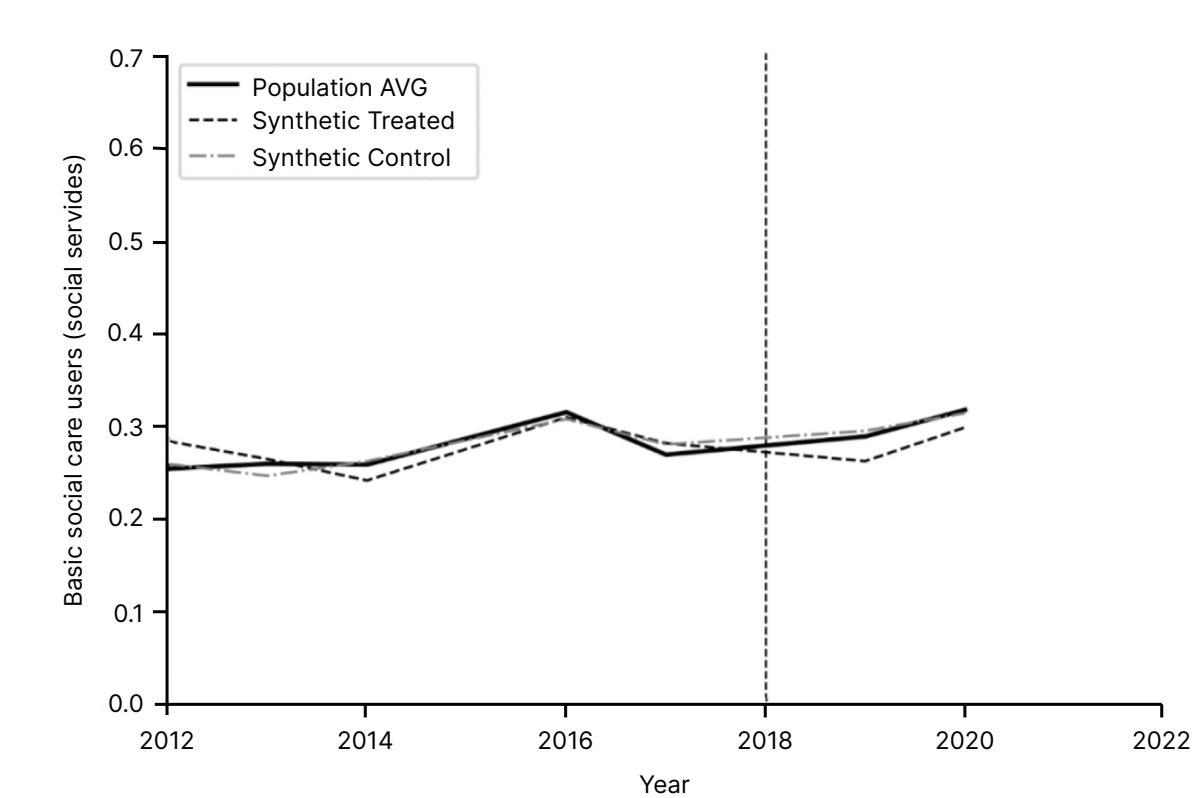
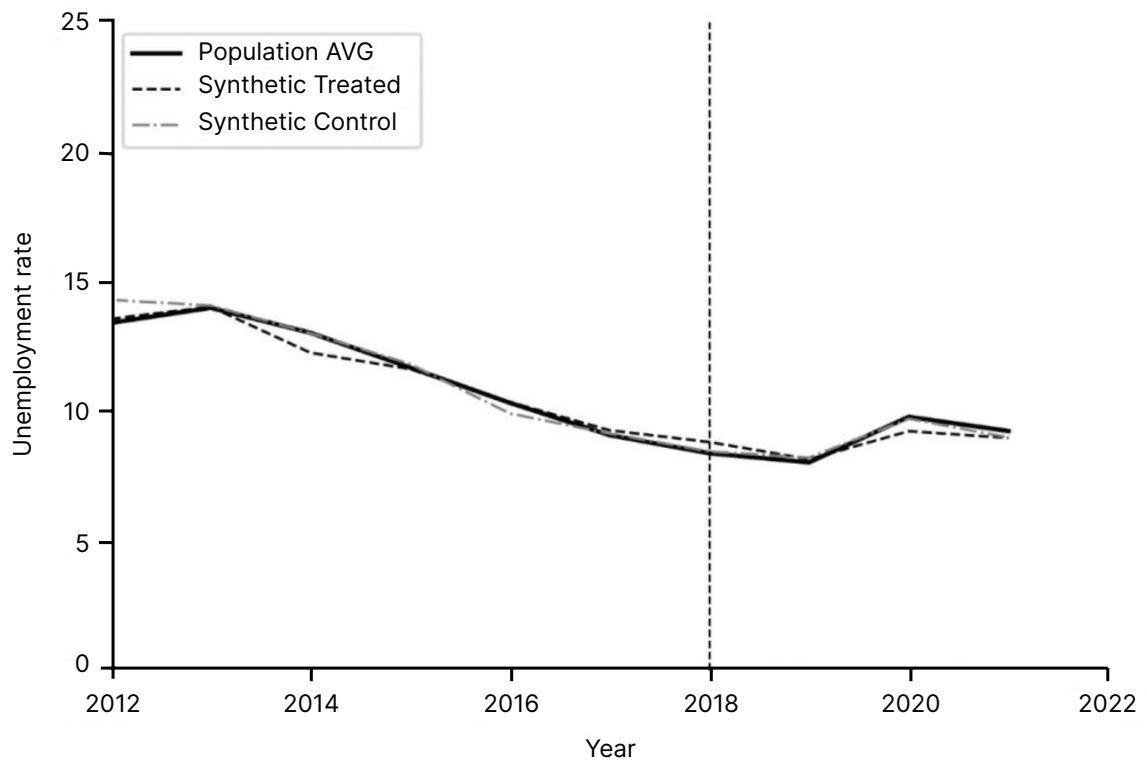


Figure 4. Evolution in time of the unemployment rate 2012-2021



Since both conditions are met in the case of the synthetic trial, the effects of the universality of the UBI can be estimated by simply comparing the evolution of the synthetic treatment group (pair of municipalities that will receive the UBI) with that of the synthetic control group (group of municipalities that will not receive the UBI).

Implementation plan for the synthetic trial

Once the pair of municipalities that will receive the UBI and the municipalities that will act as a control group have been defined on the basis of the results of the model, we **proceed as follows**.

Regarding the treatment municipalities:

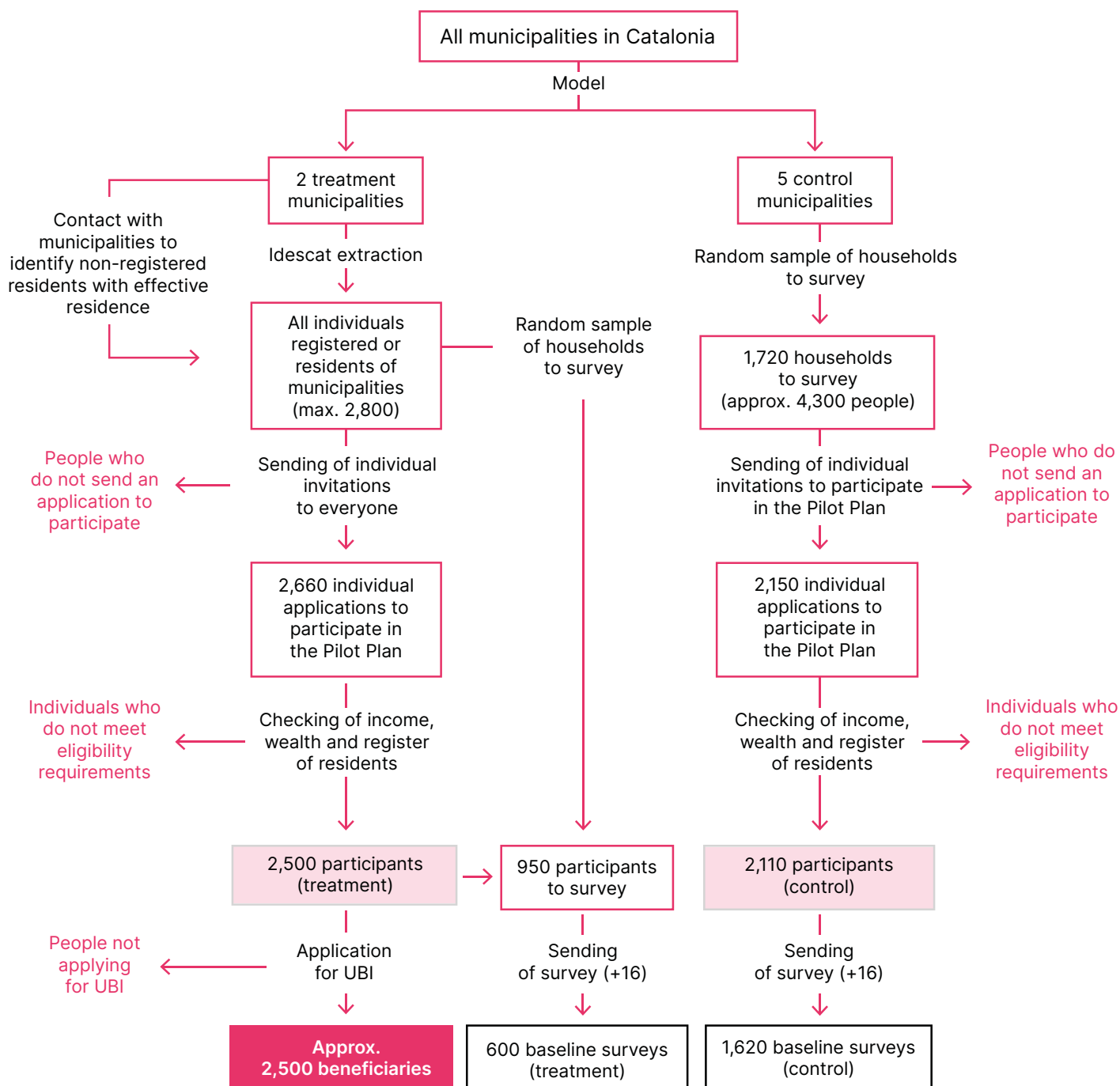
1. The Pilot Project Office will invite all the individuals registered as residents, or with proof of actual and continuous residence (see section 2), in the treatment municipalities (i.e. the municipalities chosen to receive the UBI) on the date established by the Pilot Project regulations to participate in the Pilot Project. The invitation to participate will be sent individually and by administrative notification to the postal address on the register.
2. Those interested in participating in the Pilot Project must complete the application form and give their consent so that the participation criteria can be verified as well as access to data for the assessment of the Pilot Project (defined in section 2).
3. The Office will check that applicants meet the criteria for participation in the Pilot Project.
4. At the same time, Idescat will be asked to provide a sample of households to be surveyed in these municipalities.
5. The list of participants will be cross-referenced with the list of people registered at the addresses chosen to be surveyed, and people who are on both lists will be sent the baseline survey.
6. Subsequently, applicants who have met the participation criteria will be able to apply for the UBI.

Regarding the control municipalities:

1. Idescat will be asked to provide a random sample of addresses in each of the control municipalities, and the Pilot Project Office will invite all those registered as residents on the date established by the Pilot Project regulations at the addresses included in the sample to participate in the Pilot Project. The invitation to participate will be sent individually and by administrative notification to the postal address on the register.
2. Those interested in participating in the Pilot Project must complete the application form and give their consent so that the participation criteria can be verified as well as access to data for the assessment of the Pilot Project (defined in section 2).
3. The Office will check that applicants meet the criteria for participation in the Pilot Project.
4. Applicants who meet the criteria for participation in the Pilot Project will be sent the baseline survey to answer.

The following figure summarises the implementation plan.

Figure 5. Procedure for selecting participants in the synthetic trial at municipal level¹⁵



15 The diagram is based on the following assumptions: In the treatment municipalities, (1) 95% of those who receive the invitation to participate will apply; (2) 6% of the applicants will not be eligible; (3) all eligible individuals will apply for the UBI; (4) 15% of the participants will be under 16 years of age, and (5) 70% of the people to whom the survey is sent will respond. In the control municipalities, (1) 50% of those who receive the invitation to participate will apply; (2) 2% of applicants will be ineligible; (3) 15% of the participants will be under 16 years of age, and (4) 90% of the people to whom the survey is sent will respond.

3.3. Sources and gathering of information

To analyse the results of the randomised controlled trial and the synthetic trial, the assessment will use mixed methodology and combine data from primary and secondary sources.

Administrative data

To reduce the amount of information requested from participants via a survey, and to avoid as far as possible problems arising from non-response rates or differential response rates between the two groups in the trials, data will be taken from administrative records. Specifically, the plan is to access to the following sources of information¹⁶:

1. Data on health status, medicine consumption and use of health services available in the administrative records of the Ministry of Health.
2. Data on the use of social services from the administrative registers of the Ministry of Social Rights.
3. Data on educational performance, dropout and absenteeism available in the administrative records of the Ministry of Education.
4. Data on income, earnings and wealth available in the records of the Tax Agency.
5. Data on employment, job applications, working conditions and entrepreneurship available from Contrat@, the Observatory for Labour and the Productive Model, and the Ministry of Business and Labour.

In parallel, aggregate data will be requested in the following areas:

6. Data on the use of services for women and migrants from the Ministry of Equality and Feminisms.
7. Data on aid for rent from the Catalan Housing Agency, Ministry of Territory.

Surveys

To complement the data from administrative records, **in the case of the randomised controlled trial, surveys will be conducted with all participants aged 16 years and older**. The survey questions prioritise obtaining information that cannot be obtained via administrative records, either because these records do not exist, because their structure makes it difficult to extract the data, or because there is no agreement with the unit that owns the data allowing it to be accessed. The questions also focus on information that is closely linked to the theory of change generated by the UBI, i.e. for which we have a defined hypothesis that we want to test on how the UBI may affect the variable we are capturing, and questions that are particularly relevant because they allow us to fill gaps in the existing literature.

In the case of the synthetic trial, a survey will be sent to a representative sample of people in the municipalities that are part of the study, as this is important in order to understand the mechanisms that explain the effects at the aggregate level that could be observed through

16 This list is subject to expansion if other sources of information that provide relevant information are identified in the future.

the administrative data. Furthermore, **insofar as we can compare the individual effects that we find in the synthetic trial and in the randomised trial, we will explore which effects arise directly as a result of receiving an income and which arise via spillovers and general equilibrium effects**¹⁷, a question directly related to the universal characteristic of the UBI that we want to study through this Pilot Project.

A total of 4 surveys will be carried out during the Pilot Project: one before the UBI payments start (baseline), one the year after the first payment (first follow-up), one two years after the first payment (second follow-up), and the final one a few months after the Pilot Project has ended.

Baseline survey

The baseline survey will be online and will comprise:

- **An individual questionnaire:** to collect individual-level data from all persons aged 16 and over taking part in the trial. The following topics are covered: employment situation; emotional well-being and autonomy; health; savings, debt and investment; gender and intra-household relations; uses of time and participation, and values and attitudes.
- **A household-level questionnaire:** only the reference person of the household will answer, and it will serve to collect household-level data for all households to which at least one person participating in the trial belongs. The following topics are covered: housing, debt, expenses, living conditions, use of social services and dependent children. This section is specifically for collecting data from persons under 16 years of age; it will be answered by the reference person of the household and will be complemented with data obtained via administrative records.

The baseline survey will be used to construct households from the selected addresses. In order to choose the person responsible for responding to aspects of the household, the baseline survey will ask respondents to group the people living at their address into households and indicate those persons who can provide information on household-level variables.

As indicated in Figure 1 above, in the case of the randomised trial, the baseline survey will be **conducted before the draw takes place and, therefore, before participants know whether they are part of the control or treatment group**, in order not to bias their responses. In contrast, in the case of the synthetic trial, when answering the survey, people will already know whether or not their municipality has been selected to receive the UBI.

Responding to the baseline survey will not be a necessary condition for participation in the Pilot Project, as doing so would imply that potentially people who do not usually respond to surveys or, as the survey will be online, who do not have sufficient digital skills to answer it, may be excluded. In order to avoid certain profiles being less likely to participate and not to limit the willingness to take part, it has been decided not to make participation conditional on anything other than the fulfilment of the criteria. In addition, not making participation conditional on answering

17 The synthetic trial has been designed to be representative of non-urban municipalities in Catalonia. As a consequence, the results will be comparable only to the results of the randomised controlled trial for the subgroup of UBI beneficiaries of the randomised controlled trial living in these non-urban municipalities (i.e. excluding beneficiaries living in large urban areas). By making this comparison, we will be able to distinguish direct effects from general equilibrium effects.

the survey makes it possible to argue that the personal data collected in the questionnaire has been given in a completely free and voluntary manner, which also promotes its veracity. Otherwise, although there is no legal obligation to respond to the survey, making it conditional on participation would have been a sine qua non condition for receiving the UBI. All this implies that not all participants are likely to complete the survey. However, in order to **maximise response rates**, behavioural methods will be used to motivate the response of individuals in the treatment groups and behavioural methods and monetary incentives in the case of the control groups, to compensate for the fact that, since they will not be receiving the UBI, their response rate is expected to be lower to begin with.

Qualitative interviews

Survey data and administrative records will be complemented with qualitative data to ensure a better understanding of the deployment and effects of the UBI. The purpose of the qualitative analysis will be twofold. On the one hand, it will focus on collecting beneficiaries' perceptions on how the UBI has been implemented, how it has worked, any difficulties encountered, coordination, etc. These insights will be very useful in understanding how the UBI has worked in practice, which is key to explaining the results it has had. On the other hand, the qualitative analysis will seek to contextualise the quantitative results and capture factors that have positively or negatively influenced the achievement of the outcomes of interest and assess whether the impacts vary or are valued differently among different beneficiaries, gathering the perceptions of key actors on the effects of the UBI. In order to assess the effects throughout the programme, **initial fieldwork will be carried out halfway through the intervention and further fieldwork in the final months.**

4. Limitations of the UBI Pilot Project

The design proposed in this paper has the advantage of allowing us to draw conclusions on the effects of a UBI on individual and household-level decisions for Catalonia as a whole, while allowing us to test aggregate effects derived from universality in two municipalities that are representative of rural municipalities, towns and suburbs in Catalonia. However, it also **has some limitations**.

First, while the design is based on a given UBI model, the Pilot Project does not aim to answer questions related to the **integration of the UBI in the current welfare system** – the reform of the benefit or tax system, the powers that any administration wishing to implement the UBI should have, etc. Similarly, the **options for financing a UBI** are not the object of study of the Pilot Project.

Second, the analysis of the potential effects of the UBI also has some limitations stemming from the design of the Pilot Project. In particular, three aspects stand out:

- **The duration of the Pilot Project is finite.** The fact that UBI payments are limited to two years has implications for the outcomes and effects that might be detected. People receiving the UBI will adapt their decisions to this time horizon and therefore the pilot may over- or underestimate some effects. In addition, certain effects of UBI that would only be observable in the long term and therefore these are not taken into account.
- In a real UBI implementation situation, there would be beneficiaries and taxpaying contributors. The design does not allow for the effect of financing the UBI through taxes and therefore does not **simulate the existence of these taxpayers**. In this sense, the individual and collective effects will not take into account the behaviour and reactions of all those who could be net contributors to the UBI.
- As it stands, the design does not allow us to know what the general equilibrium effects would be if we were to grant a UBI to everyone in Catalonia, since the aggregate effects that can be detected in municipalities of 1,200-1,400 inhabitants in the synthetic trial are unlikely to be extrapolated to large urban centres. Indeed, the synthetic trial has been designed to be **representative only of the rural municipalities, towns and suburbs** of Catalonia. Consequently, the results will be comparable only to the results of the randomised controlled trial for the subgroup of UBI beneficiaries of the randomised controlled trial living in these non-urban municipalities (i.e. excluding beneficiaries living in large urban areas).

5. Final considerations

The Pilot Project implementation has been designed so that it very closely resembles a real UBI project. It fulfils almost all the characteristics of a universal *basic* income, in the sense that it is a basic income, with an amount close to the at-risk-of-poverty threshold; *individual*, paid to each individual and not by household; *unconditional*, i.e. not subject to any conditions (such as actively seeking employment, etc.); *stable*, paid monthly, and *monetary*, i.e. paid in cash and not in kind. While it cannot be considered universal, it could be considered quasi-universal, and it is important to note that the design allows for testing aggregate effects at municipal level, which is one of the most interesting points of universality.

The Pilot Project focuses on understanding the effects of a UBI derived from two of its essential characteristics: its *basic* nature and its *universal* nature. **The design responds to this specific interest by dividing the Pilot Project into two distinct trials. On the one hand, a randomised controlled trial** that will allow the effects at the individual and household level to be observed i.e. what employment, educational, relational, consumption, investment, etc. decisions individuals make as a result of receiving a UBI for two years. **And on the other hand, a synthetic trial at the level of the municipality**, which will allow, in addition to the observation of the effects at the individual and household levels as a consequence of receiving a UBI for two years, the observation of the effects at the aggregate level on the use and operation of public services, civic participation, economic activity, etc. Additionally, the design allows the results of both trials to be compared to discern the direct effects of receiving a UBI and the general equilibrium effects of it being universal.

Taking into consideration other basic income pilot plans that have been carried out around the world, Catalonia's plan **is innovative both in the design of the intervention and that of the methodology.** In terms of the design of the intervention, there are few pilots that provide a monetary amount close to the poverty line given such a large number of participants – 5,000 people will receive the UBI – making it one of the largest in the world. The target population also sets it apart from many of the other pilot plans carried out so far, as it is not aimed at specific groups, but rather prioritises (quasi) universality. Thus, the criteria for participation will exclude individuals only on the basis of income and wealth, so as not to include in the Pilot Project approximately the richest 10% of the Catalan population. In terms of the design methodology, the Pilot Project is innovative in that it separates the sample into two trials in order to provide results at the individual and household level as well as at the aggregate level, and because it uses the already innovative synthetic control method to choose the treated units, and not only to analyse them *ex post facto*. The Pilot Project offers an opportunity to apply the theoretical development of this experimental method, published as a working paper in 2021 (see Abadie and Zhao, 2022), in a real case, and, at the same time, it also allows for further development of the theoretical model (see VivesiBastida, 2023).

The conclusion is therefore that the UBI Pilot Project in Catalonia will be of great use in answering some of the unresolved questions about the effects of UBI and the universality of public policies, and will be able to do so with the robustness that its design provides.

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