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CITIZENS' implication in local public decision-making (CITIZENS)

Summary table of persons involved in the project

Partner	Name	First name	Current position	Role & responsibilities in the project (4 lines max)	Involvement (person.month) throughout the project's total duration
Univ. Lyon 2 GATE Lyon St-Etienne	PATY	Sonia	Professor	Scientific coordinator of the project Member of WP1, WP3	12
Univ. St-Etienne GATE Lyon St-Etienne	BAUJARD	Antoinette	Professor	PI for WP3 Member of WP2, WP3	9
Univ. St-Etienne GATE Lyon St-Etienne	CERON	Federica	Associate professor	Member of WP2	4.5
Univ. St-Etienne GATE Lyon St-Etienne	GONZALEZ	Stéphane	Associate professor	Member of WP2	4.5
Univ. Lyon 2 GATE Lyon St-Etienne	TARROUX	Benoît	Professor	Member of WP2, WP3	9
Univ. Grenoble-Alpes LIP	BOUVERET	Sylvain	Associate professor	Member of WP2, WP3	4.5
GATE Lyon St-Etienne	X	X	Post-doc to be hired	Member of WP2, WP3	24
CNRS CREM	MERLIN	Vincent	CNRS Researcher	Partner's scientific leader Member of WP1, WP2, WP3	12
Univ. Caen CREM	LEBON	Isabelle	Professor	Member of WP2, WP3	6
Univ. Rennes 1 CREM	LE MAUX	Benoît	Associate professor	PI for WP1 Member of WP1, WP3	9
CNRS LAMSADE	LANG	Jérôme	CNRS Researcher	PI for WP2 Member of WP2, WP3	9
Univ. Dauphine LAMSADE	SANVER	Remzi	CNRS Researcher	Member of WP1, WP2	4.5
CNRS LAMSADE	PETERS	Dominik	CNRS Researcher	Member of WP1, WP2	4.5
CREM	X	X	Post-doc to be hired	Member of WP1, WP3	12

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I.   Proposal's context, positioning and objective(s)

a. Objectives and research hypothesis

This project aims at studying citizens' involvement in local public decision-making and finding ways to improve it. Involvement or implication means not only turn-out in electoral democracy, but also an ability to participate in public decisions, empowerment, and feelings of closeness.

Over the last several decades, abstentionism has been a growing phenomenon in many democracies. The determinants of voting can be classified as individual and contextual factors, which consist of demographic, psychological, micro-economic, macro-economic and institutional variables (Blais, 2006). One objective of this project is to study the institutional determinants of citizens' involvement in public decision-making at the local level, including electoral democracy but not only. Decentralising by transferring power and resources to local authorities was meant to deepen democracy due to the expected expansion of popular participation, greater sensitivity to local knowledge and more responsiveness to local concerns.

After successive waves of decentralisation reforms by the end of the 20th century, many countries in Europe have tried to solve the excessive number of subnational jurisdictions and the resulting inefficiency by implementing institutional agreements for the joint delivery of local public services. This variety of institutional arrangements ranges from complete mergers or amalgamations to "functional" cooperative agreements between independent municipalities, such as inter-municipal cooperation (Di Porto *et al.,* 2017). We may wonder whether such "recentralisation" experiences had some consequences on citizens' concerns for public affairs.

Whether decentralisation promotes democracy hinges not only on the modalities of decentralisation (range of competences of local authorities), but also on how electoral systems or deliberation procedures at the decentralised level shape citizens' concerns for the public affairs in practice. Therefore, we may ask which modality of governance at the local level could increase participation, the latter covering not only turnout in elections but, also and importantly, citizens' empowerment.

The democratic empowerment of citizens in French local governments is based on electoral, participatory and deliberative devices, among which various existing and potential multi-winner rules, rules of participatory budgeting and forms of organizations of deliberative assemblies. The analysis of voting rules and other democratic devices involves not only theoretical, but also experimental and simulation expertise: this combination of competences is indeed necessary to determine the properties of the analysed rules on the one hand, and to test their applicability and their acceptability in context on the other hand (Madhavan *et al.,* 2017).

Since local jurisdictions have always been a field of experimentation for new forms of governance, our project aims at assessing how the different forms of decentralisation and the different modalities of local governance may reconcile citizens and politics at the local level.

Assessing the impact of various modalities of decentralisation

Before exploring how new forms of democracy could improve citizen's involvement at the local level, we first need to assess whether some categories of population are more distanced than others from their local institutions, and to evaluate the impact of decentralization reforms on the governance and voter turnout. We will consider three channels that matter for the research question at hand: the level of representation in local councils, the degree of officials' competences, and the fairness of the apportionment of municipal delegates.

First, the question of the level of representation, *i.e.,* the number of seats in local councils, must be examined. Larger jurisdictions are in most cases governed by a higher number of representatives; yet this number is expected to increase degressively with the population, resulting in a representation level being lower in larger jurisdictions. For example, in France, the number of seats

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at the municipality level is defined by law according to demographic criteria: while municipalities with less than 100 inhabitants have one representative for 14 inhabitants, this population-to-representative ratio amounts to 4,347 for jurisdictions between 250,000 and 300,000 inhabitants. The consequence of those demographic criteria is a lower level of representation in larger jurisdictions. Our first task is to provide a better understanding of the factors influencing the size of local councils around the world and, then, to study on French data whether a larger council size matters for voter turnout and budget decisions.

Second, elections in jurisdictions with more competencies could induce more people to vote. Our objective is to contribute to the expanding literature on voter turnout by addressing a new institutional determinant of electoral participation – *i.e.,* jurisdictional fragmentation – using the French experience over the last two decades. Indeed, to circumvent economic inefficiencies due to jurisdictional fragmentation, France has implemented functional cooperation among local governments to supply local public services. Since less remains at stake at the municipal level to the benefit of the inter-municipal jurisdiction, we will test whether municipal voter turnout is lower in the most integrated inter municipalities.

Third, in France, a law required all the municipalities to join before 2014 an inter-municipal structure with tax autonomy (*Loi n° 2010-1563 de réforme des collectivités)*. It also provides based population rules for the determination of the number of delegates in the inter-municipal council. However, three sources of distortion may alter the fairness of the apportionment of the delegates. First, the power index theory emphasizes that the power of larger municipalities, broadly defined as the probability to affect an outcome, could be disproportionally large. Second, as French electoral laws give extra delegates to the winning list (that account for 50% of the total) for municipalities with more than 1,000 inhabitants, the votes-to-delegate ratio is often distorted. Third, similarly to the US Electoral College, obtaining a majority of delegates in the inter-municipal council depends upon the results in some "swing" municipalities. The same logic applies in any inter-municipal council, though it has been barely documented. We will assess the magnitude of these three distortions by analyzing the 2014 and 2020 French local elections results. Moreover, on this basis, we will identify which municipalities were "swing". As the closeness of an election remains a major factor that explains voter turnout (Cancela and Geys, 2016), we will be able to test the presence of this effect for French inter municipal councils.

To sum up, the project contributes to the debate on the optimal degree of decentralisation and its modalities. Discussions about the optimal size and cooperation of local jurisdictions traditionally lie in the arguments that, on the one hand, governments operating in smaller units are closer to their constituents and, therefore, have a better knowledge of local preferences, while larger units, on the other hand, could benefit from economies of scale and/or lower spillover effects (Le Maux and Paty, 2020). Our project will address those two arguments from a novel perspective by studying the effects of decentralisation reforms. Moreover, it will assess the impact of the distortion due to the new electoral laws.

Designing and analysing rules for electoral and direct democracy

Among the multi-winner electoral rules used in French local governments, there are two types of systems. In municipalities of less than 1,000 inhabitants, voters select up to k candidates in their ballot to elect k candidates; in particular, they can vote for independent candidates and/or for candidates who belong to various party lists. As said before, in larger municipalities, the rule is a party list proportional system with a majority bonus. Paris, Lyon, and Marseille are special cases, with a majority bonus applied at the district level to elect the municipal council. The same logic applies to the inter-municipal councils: small towns elect a single delegate (their mayor), while larger towns elect their delegates by a proportional system with a majority bonus.

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Is this system the best possible? Not necessarily, and from social choice theory we know other rules that could be implemented to select municipal or inter-municipal delegates. For instance, we could use proportional approval voting (with voters casting approval ballots over candidates), single transferable vote (with voters ranking the candidates), or bi-proportional rules (with voters voting for a party list) aiming at jointly fulfilling two proportional criteria (*e.g.,* Pukelsheim, 2017). A purpose of this project is to provide an assessment of various modalities of voting rules, which are either currently used in local elections, or could be potential alternatives.

The first key question is the choice of the informational content of ballots: they may consist of a single name, a single party list, a set or a ranking of names or lists. Lists may be closed, or open (with ballots allowing panachage, or voters being allowed to rank the candidates in the list). Giving citizens the possibility to cast more expressive ballots may lead them to enjoy the voting process more; on the other hand, too complex ballot formats may deter some citizens from voting.

Once a ballot format has been chosen, multi-winner rules based on these ballots' types have to be evaluated on a normative basis. When electing a municipal and inter-municipal council, the most obvious goal to pursue is representation. But representing the population faithfully, with regard to its geographic and sociodemographic diversity, in the elected council, presents some difficulties. These difficulties can be formalised and analysed through the lens of social choice theory, which also provides solutions to circumvent them. Currently used voting rules may fail to represent faithfully districts with smaller population. Furthermore, proportional representation in assemblies does not only bear on geographical districts but also on parties and gender. In particular, although parity is imposed by law in the constitution of the party lists, only 35.8% of the inter-municipal delegates after the French 2020 elections were women. Our objective is to propose novel voting rules which could perform better with respect to diversity of voters in the elected council.

A second line of research investigated in this project is concerned with direct democracy tools, as opposed to representative, electoral democracy. There is a growing interest for involving citizens in public decision making through participatory and deliberative devices. The Convention Citoyenne pour le Climat, composed of randomly selected French citizens, offers a recent example at the national level, but there are many examples at the local level. Another highly prominent direct democracy mechanism is participatory budgeting, consisting in choosing a set of collective projects subject to budget constraints. There is thus a growing concern for evaluating the performance of such devices, their ability to really increase citizens' empowerment, and the question whether and how they can be generalised. This project focuses on two ways of implementing direct democracy at the local level: deliberation procedures (as in citizens' assemblies) and participatory budgeting mechanisms. These two tools are interdependent, as participatory budgeting often contains a phase where proposals are publicly discussed before voting takes place.

A participatory budgeting process is generally viewed as a succession of five stages: (1) Project proposals by citizens, possibly followed by deliberation: citizens propose projects in a decentralised manner, for instance on an online platform; (2) project grouping and filtering: similar projects are merged together, and projects that cannot be implemented for legal or administrative reasons are filtered out; (3) voting; (4) selection of projects; (5) project implementation and ex-post evaluation of the mechanism.

Once the set of candidate projects is fixed (as the result of stages 1 and 2), the selection of projects from votes can be formalised and evaluated through the lens of social choice theory. Citizens can express their preferences (Stage 3) under several forms, such as approvals (most common), rankings, qualitative or numerical evaluations, or 'knapsack voting' (each agent approves a set of projects not exceeding the maximal budget). As for selection mechanisms (Stage 4), different methods (some already implemented and some new ones) should be analysed along efficiency, fairness and proportionality criteria. Proportionality is particularly important, as different neighbourhoods (or different towns in inter-municipal communities), or different groups of voters identified by their votes

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(*e.g.,* people interested in sports, in culture) should see "their" projects funded (roughly) proportionally to their numerical importance.

Which modalities of democracy can be applied at the local level?

Applying the modalities of democratic devices in context, so we claim, is likely to modify the normative properties which were highlighted by axiomatics or simulation for decontextualized cases (Baujard, 2022). Given our theoretical knowledge regarding the theoretically better devices, obstacles, bias, or novel relevant parameters for the specific context may emerge at the applied level. The project also aims to check whether the theoretical insights regarding the expected properties of democratic modalities are externally valid and whether they are likely to be applied at the local level. Therefore, WP3 seeks to identify whether and how we should adapt the framing of the devices so that they keep the better normative properties identified in WP2.

As highlighted by WP1 for local elections, and by a number of other sources at the national level (Braconnier *et al.*, 2017), some categories of population seem more distanced than others from their local institutions. Concretely, poorer people, younger, and less educated populations are characterised by a lower turn-out to the elections, as well as a lower participation to the deliberative and participatory devices. We want to focus on the ability of the studied modalities of local democracy to ease the empowerment of these categories of population.

We should expect that behavioural aspects may impact the performance of the democratic devices. Even when the desired properties of the electoral rules, or the rule used to organise participatory budgeting or deliberations are theoretically confirmed, they may well be practically invalidated, because small variations in the application of the rule or the context may have big impacts as confirmed by the behavioural literature on framing effects. In particular, how the deliberation process should be designed in practice remains an open question. Thompson (2008) points out that « The most promising approach for empirical research would therefore seem to be to continue trying to discover the conditions in which deliberative democracy does and does not work well. » We thus suggest to focus on the fine-tuning of the devices. Among others, we aim at investigating the interaction between the workings of deliberation and the voting rules (Goeree and Yariv, 2011), *e.g.,* whether the structure of discussion given the voting rule affects the efficiency and fairness of the outcome, and whether the voting rule affects how the discussion between individuals. We will also study the concrete architecture of choices impacts the ability of the discussion to be inclusive.

The relatively weaker performance of some democratic devices in practice, compared with their theoretical properties, may also be explained by the distance of citizens to their local institutions, resulting from the fact that the current devices rules are poorly known, understood, or far from their own concerns (van Wessel, 2016). Understanding the rules, besides being aware of the electoral system, becomes an all the more burning issue for the local elections as the systems are new and may seem complex, or as they experience frequent reforms, as this is the case in inter-municipal associations, and all the more in Paris, Lyon and Marseille. Rules, also regarding deliberative and participatory democracy, may be difficult to understand and not always be acceptable as such from part of the voters. Another issue is that democratic reforms are hardly acceptable because people would not perceive or value their potential involvement, or because they support other normative criteria than those which characterise the chosen devices. While they constitute a major criterion of success of democracy, understanding, awareness and satisfaction, as well as the involvement of all categories of citizens with the democratic devices are too often forgotten in standard approaches. The project aims at filling this gap.

b. Position of the project as it relates to the state of the art

Assessing the impact of various modalities of decentralisation

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According to the rational voter hypothesis, the benefit of casting a ballot is positively associated with the probability of affecting electoral outcomes (Downs 1957, among others). Under that perspective, we could expect the participation rates to be higher at the local level, since each individual vote is being reduced to a fraction of a smaller population. Indeed, it has been observed in France in the long term that only the presidential elections have a higher turnout than the municipal elections. Thus, an issue that particularly needs attention is how close a local democracy is to its constituents.

First, a larger number of elected officials may improve the representation of citizens' preferences (Gerring and Veenendaal, 2020) but, in the meantime, it may induce larger decision-making costs (Buchanan and Tullock, 1962; Le Maux, 2021). Hence, a balance must be found between political representation on the one hand, and the ability to govern on the other hand. Empirically, a small set of contributions show that the number of representatives increases with population size, yet those studies focus on national representation only, *i.e.*, examine the share of deputies and/or senators in the total population. Outliers are evidenced such as France that shows a degree of national representation higher than other countries with equivalent population size (*e.g.,* Auriol and Gary-Bobo, 2012). Unfortunately, little is known about the degree of heterogeneity in local representation worldwide. The possible effects of a larger council size at the local level also deserve investigation. Not only the expected influence of a vote cast is likely to increase under better representation (Lyytikäinen and Tukiainen, 2019), but the quality of governance itself could be affected (Freire *et al.*, 2020). The literature focusing on district sizes (*e.g.,* Jacobs and Spierings, 2010) also provides additional explanations to why council sizes matter for voter turnout, *e.g.,* through clientelism or electoral competitiveness.

Second, our project aims at characterising the causal impact of jurisdictional fragmentation on voter turnout in local elections. As argued by Andersen *et al.* (2014), most theories of voter behavior predict that electoral participation will be higher in elections where more is at stake. However, one cannot simply assume a strict equivalence of turnout determinants irrespective of the type of election, either local or national (Blais *et al.*, 2011; Cancela and Geys, 2016). Addressing functional cooperation between French municipalities (*Loi n° 2010-1563 de réforme des collectivités)* as a determinant of voter turnout would allow us to be the first, to our knowledge, to investigate the impact of a « recentralization » experience on electoral participation at the municipal level. Also, the existing literature often highlights the benefits of inter-municipal cooperation and amalgamation programs in terms of economic efficiency (Di Porto *et al.*, 2017) while the political consequences of such arrangements are not much studied and discussed.

Last, inter-municipal councils, by using two-tier voting mechanisms, suffer from many sources of distortions that may affect the fairness of representation. Banzhaf (1965) proposed an index, which shows that population-dominant municipalities might be over-represented. In a study initiated in the ANR SOLITER « Négocier la solidarité territoriale dans les intercommunalités » (ANR-08-GOUV-0058), to which Vincent Merlin was a member, Abidi *et al.* (2020) used this index, and observed a drastic increase in the power of the population-dominant before and after 2014 in three western French regions. The literature also studies other distortions in representation, like the election inversions, which occurred in 2000 and 2016 in the US electoral college (*e.g.,* Geruso *et al.*, 2021). Whether those distortions affect governance and voter turnout has yet received little attention: the rational voter hypothesis suggests that turnout should be higher in swing municipalities while it should be lower in cities with low Banzhaf index.

Designing and analysing rules for electoral and direct democracy

From the point of view of social choice theory, the axiomatic approach allows to characterise which properties each voting rule has and does not have, and probability computations measure the frequency of paradoxes. There exist now a number of contributions analysing the properties of multi-

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winner rules (e.g., Faliszewski *et al.*, 2017; Pukelsheim, 2017). Besides, driven by a substantial experimental literature on the major stakes of balloting information (Balinski and Laraki, 2010; Igersheim *et al.*, 2016), the debate recently shifted from the exclusive focus on the aggregative properties of a voting rule and now consider seriously the informational content voters express in a ballot – e.g., a single name, a ranking, or an evaluation of each candidate (Gonzalez and Ceron, 2021). The computational aspects of social choice have received an enormous attention these last 20 years (Brandt *et al.*, 2016).

In addition to axiomatic results, simulations will help us to answer better the question of representation. Simulations – also called *in silico* experiments – are especially adapted to analyse the complexity and the potential diversity of the rules used in multi-winner elections. For instance, Blanch and Bouveret (2018) and Cohendet *et al.* (2018) have provided simulations to anticipate the impact of the use of different versions of proportional rules on the impact of political representation for a range of different scenarii contemplated by the potential reform of the National Assembly; so have Le Breton et al. (2017) for local assemblies.

As for participatory budgeting, the reference from a political science viewpoint is Cabannes (2004). Aziz and Shah (2020) give a survey of recent developments in social choice and computer science. Some recent papers focus on the expressiveness of ballots (Laruelle, 2021; Benade *et al.,* 2020) while some others focus on the mechanism itself (Talmon and Faliszewski, 2019; Peters *et al.*, 2020). Portioning (a continuous version of participatory budgeting where one has to decide which amount of money to give to each project) has been considered in Airiau *et al.* (2019) and Freeman *et al.* (2021). In the vast majority of these papers, the analysis is independent of the type of jurisdiction they are applied to; although proportionality issues are dealt with in Aziz *et al.* (2018) and Hershkowitz *et al.* (2021), we do not know any analysis of participatory budgeting in hierarchical structures such as inter-municipal communities. Finally, a newly released platform for participatory budgeting http://pabulib.org/ contains lots of data, some of which may be useful to us.

Approaches to study how to improve local democracy in practice

Electoral democracy relies on the properties of voting rules. Voting rules in practice are typically studied in experiments, both in the field and in the laboratory (*e.g.,* Igersheim *et al.,* 2016), none of which provide the proper conditions for full representativeness of the population. By contrast, polls can be conducted online with the help of polling institutes, allowing to catch either representative samples of the populations, or to focus on specific populations. Among others, Blais *et al.* (2021) have studied the satisfaction with rules on the basis of a representative poll. The protocole set by the operation « Voter Autrement 2022 » is currently meant to study citizens understanding with various voting rules. Understanding comes at different level, which should be disentangled: citizens know more or less how to fill in a ballot, how to count the votes and compute the results of the election, how to vote strategically (Laslier, 2011). We wish to study understanding and satisfaction of local voting rules using the standard polling methods.

The ability of citizens to recognize themselves in the normative criteria of the used rule is typically studied in normative experimental economics, in line with the seminal paper of Yaari and Bar-Hillel (1984). Another inspiration come from the literature on the co-construction of science, where meeting with some citizens can help to identify their potential reactions to our proposal (Millet and Ducoulombier, 2021). In particular, Whale (Which Alternative is Elected?, Bouveret, 2017) a web application dedicated to collective decision making and everyday life voting, has been presented at Le Dôme, a popular science centre that hosts a living lab, where the public can participate in the design of social innovations. Sylvain Bouveret, Jérôme Lang, Isabelle Lebon and Vincent Merlin have been involved in such co-construction sessions for the ANR project CoCoRICo-CoDeC (2014-2019).

By contrast with the aggregative rationale of voting, deliberative democracy is a political association governed by the public deliberation of its members. Many collective decisions, through

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participatory budgeting, involve a deliberative stage before an aggregative device eventually ranks the projects. Deliberation is meant to make individual positions evolve on the basis of reasons: its conditions should guarantee equality and respect for all, the expression and the public discussion of reasons (Girard, 2019). We expect that individual positions should evolve towards, ideally, more compassing preferences, avoiding the standard paradoxes of collective aggregation (List, 2018). While there exists a profusion of empirical studies on deliberative polls or online deliberation (Fishkin, 2018), not much is known on the framing of the deliberative devices so far. Experiments, either in the lab and in the field, enable to study the performance of alternative forms of discussions, while controlling the context and especially the modalities of the discussion.

If there exists a literature in experimental economics on the effect of communication on individual and group decisions (Brandts *et al*., 2019), the question of the organization of the deliberation and its effect has not received much attention. In a Condorcet jury framework, Goeree and Yariv (2011) report experiments in which free-form deliberation improves the efficiency of collective choice irrespective of the voting rules (simple majority to unanimity). Ferreira *et al.* (2021) have highlighted that collective discussions drive individuals to become more egalitarian. By considering various treatments, *e.g.,* alternative concrete conditions of discussions, we intend to assess and compare their relative impacts, using methods of preferences elicitation.

However, as they often reduce the population tested to small, sociologically non-diversified samples, laboratory experiments are not adapted to assess devices in their ability to tackle specific categories of populations in the context of usual interactions with other categories of population. By contrast, field experiments are able to cope with a high number of more diverse participants, and offer a higher external validity (*e.g.,* Esterling *et al.*, 2021). The latter is favored to study fine-tuning of rules in context.

c. Methodology and risk management

Our project combines different approaches to address citizens' involvement in local public decision-making, both from a positive and normative perspective. From a positive perspective, the quasi-experimental approach allows to measure the causal impact of decentralisation on voter turnout at local elections, and to see whether the different forms of decentralisation have influenced electoral participation in France. Recently social choice and computational social choice experts have proposed tailored designed voting mechanisms for specific voting situations. Experiments will enable us to assess the expression of citizens at the local level, their concern to the local public affairs, and their perception of empowerment. This project offers indeed a unique opportunity to combine quasi-experimental and axiomatic approaches, and to contribute to this rapidly evolving field of research on the quality of democracy at the local level.

WP1. Assessing the impact of various modalities of decentralisation. PI: Benoît Le Maux

Task 1.1: Voter turnout at the local level in France

Most empirical analyses about voter turnout appear to follow an a-territorial approach without any particular attention to the level of government under analysis or cross-territorial differences (Cancela and Geys, 2016). A necessary step of this workpackage thus consists in analyzing the extent to which voter turnout differs across local jurisdictions in France. Special attention will be given to the role of territorial characteristics (total area, population density, number of sub-units, type of local cooperation) and socio-demographic factors (age categories, unemployment rate, mean income, etc.). An extensive review of the literature will efficiently complement this descriptive work.

Task 1.2: The level of representation in local councils

Our methodology is twofold. First, we aim to apply a strategy similar to that of Auriol and Gary-Bobo (2012) in order to compare the degree of local representation in various countries. The idea is to

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provide documentation on the formula that are used to determine the size of local councils and search for potential associations with socio-economic characteristics such as the population size. There exists no such comparative study about the size of local assemblies so far. The main question to be addressed is the following: is the link between jurisdiction size and local representation similar across countries? Second, we aim to address the question of the causal effect of representation on voter turnout and budget decisions using a specific identification strategy. The population size acts as a confounding factor that may not only affect the council size of the jurisdiction, but also the individual benefit of casting a vote. In order to control for this potential bias, we will focus on the case of France and exploit the discontinuity that exists in the demographic criteria used to define the number of municipal seats. The approach, known as Regression Discontinuity Design, aims to compare municipalities around cut-off points (here, cities lower and larger than x inhabitants) to assess the impact of the extra seats on electoral participation and spending levels. Given the population cutoffs that exists in France, assessing whether the mobility of voters matters for council sizes is of interest and, therefore, will be subject to empirical tests (e.g., McCrary test for manipulation).

Task 1.3. The degree of officials' competences

We will address the role of local competences on local voter turnout using data sets on cooperation choices made by local municipalities. Where functional cooperation between municipalities is implemented voluntarily, municipalities may end up in two possible situations: (i) a highly integrated case where municipalities lose most of their competencies, or (ii) an isolated or a low integrated situation where most competences remain in the hand of the mayors. From a methodological perspective, we will combine a theoretical microeconomic approach with applied econometrics using French data sets on electoral participation and fiscal decentralisation on the time period 2000-2020. To deal with causality, we will study the effect of the electoral system on local voter turnout using an exogenous variation: whereas inter-municipal counsellors were elected by an indirect suffrage before 2014 in France, citizens got the opportunity to vote directly for them at the same time as municipal elections. We will compare the impact of this direct suffrage on turnout in municipalities depending on their level of integration within the inter-municipal communities.

Task 1.4. The effects of the apportionment rules on the elections of inter-municipal delegates: influence, fairness and swing municipalities

Using data from the 2014 and 2020 elections, we will evaluate the extent of several distortions in French inter-municipal communities. First, we will extend Abidi *et al.*'s study (2020), by estimating the power of cities using the Banzhaf power index, and measuring to which extent the major cities are over-presented. Secondly, we will check the existence of electoral inversions, that is, situations in which a party attracting the most votes across all the jurisdictions fails to win the most delegates in the intermunicipal council, and therefore loses the election. In the US, the existence of inversion is linked to the existence of swing states. In our case, a municipality or a group of municipalities is swing if: (i) the election is close, (ii) changing the winner may alter the results in the inter-municipal council. Combining these ideas, we will go a step further, and identify which municipalities were swing in each intermunicipal council. The rational voter hypothesis (Downs, 1957) suggests that, as more is at stake in these municipalities, the turnout there should be higher. We will incorporate this element into the analysis of Task 1.1 and Task 1.2, to check whether the "swing" effect is present or not in French local election data.

Risk Management

In Task 1.2, the sample of countries used for the comparative analysis will be adjusted in accordance with data availability. In Task 1.4, our analysis will rely upon the classification of the party lists on the political spectrum by the French ministry of internal affairs, which could be imprecise. Hence, it may not be easy to identify which municipalities are swing players; we may have to focus on

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a sub sample of inter- municipalities where the results are clear enough or to use results of national elections to have a proxy of closeness.

Deliverables.

D.1.1.1: A descriptive analysis of voter turnout at the local level in France. D.1.2.1: An article comparing local council sizes across countries. D.1.2.2: An article on a quasi-experimental test of the effect of higher representation on voter turnout and budget decisions in France. D.1.3.1: A database on electoral participation and fiscal decentralisation in France. D.1.3.2: An article addressing the causal impact of jurisdictional fragmentation on voter turnout. D.1.4.1: A database characterising the main power indices for the French inter-municipal structures in 2014 and 2020. D.1.4.2: An article that analyses the extent to which major cities are over-presented. D.1.4.3: A database identifying electoral inversions and swing municipalities for the French inter-municipal councils for 2014 and 2020 elections. D.1.4.4: An article analysing the likelihood of electoral inversions in French inter-municipal councils.

WP2. Designing and analysing rules for electoral and direct democracy. PI: Jérôme Lang

Task 2.1. Rules for inter-municipal elections

Various voting rules have been designed for multi-winner elections, with various ballot formats, but inter-municipal elections have not been considered so far. We will start by an extensive bibliography on existing work on multi-winner elections, which we will structure as a taxonomy of rules along various parameters and normative criteria. In line with the facts observed in Task 1.3, we will then make a critical examination of the existing rules in their applicability to inter-municipal elections.

We will design new rules, which satisfy the proportionality and fairness properties that need to be fulfilled. Various ballot formats will be considered, which vary along two parameters: (1) whether they express preferences over names, or over lists (slate vote); (2) whether they consist of approvals, evaluations, or rankings. In addition, we will consider the possibility of vote-splitting, and of allowing multiple apportionment requirements at the same time (gender and other diversity representation constraints, in line with Pukelsheim, 2017).

We will then study these rules from a normative and axiomatic point of view, focusing on the representative objective.

Task .2.2. Algorithms, programs, and simulations

We will study the rules from a computational point of view, by assessing their computational complexity, as well as designing and implementing algorithms for computing them. The rules will be implemented on the Whale platform.

Thanks to the development of powerful algorithms, we will study the effect the introduction of alternative voting rules on the composition of the inter-municipal councils and will compare how well different rules perform at representing political parties and genders. First, since some rules could also alter the formula that transforms vote counts into seats numbers with the fairer bi-apportionment systems, we can test whether the new voting rules could reduce the occurrence of election inversions compared to the existing rules. Second, in the case of enforced gender equality in the composition of the lists, we will measure the effect on unequal gender representation, which are due to the current apportionment methods used in the electoral process, and we will check which alternative rule(s) are likely to improve ex-post gender equality.

Task 2.3 Direct democracy at the local level: mechanisms for participatory budgeting

We will start by an extensive, synthetic review of the state of the art on participatory budgeting. This will pave the way for the analysis of new method and proposals. In particular, we will focus on two types of innovations. First, the possibilities of new rules permitted by the shift to more sophisticated ballots that have been observed in some cities (*e.g.,* Paris) are not

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yet fully have not been fully identified yet. Secondly, the inter-municipal context offers new challenges, as the proportionality principles developed in the literature have not been adapted to such hierarchical structures. We will evaluate the new proposals with different social choice normative criteria (maximization of welfare, egalitarian principles, proportionality, strategy proofness, core stability). We will also investigate their computational aspects. These tasks will mainly use (classical and computational) social choice notions and tools and will be mostly theoretical. At last, we will add a selection of participatory budgeting functionalities (at least the most popular ones) into Whale.

Risk management

The theoretical analyses are not especially at risk. The only risk we envisage is to have some real data of insufficient or heterogeneous quality, but given that most data we need are public, the risk is low.

Deliverables.
D.2.1.1: One article on a survey and taxonomy of existing rules for multi-winner elections. D.2.1.2: One methodological article on the normative study of multi-winner elections for inter-municipal elections. D.2.2.1: Algorithms and simulations devices various multi-winner voting rules. D.2.2.2: An implementation of multi-winner rules in Whale. D.2.2.3: One article on proportional representation in practice with respect to gender equality under various multi-winner voting rules. D.2.2.4: One article on proportional representation in practice with respect to party representation and majority inversions under various multi-winner voting rules. D.2.3.1: One article on a survey and taxonomy of existing rules for participatory budgeting D.2.3.2: One article on new participatory budgeting mechanisms tailored to inter-municipal communities. D.2.3.3: One article on new participatory budgeting mechanisms which explores the possibilities offered by more expressive ballots. D.2.3.4: An implementation of participatory budgeting rules in Whale.

WP3. Designing the modalities of local democracy in practice. PI: Antoinette Baujard

Task 3.1. Fine tuning and specific design of the devices

First, we will conduct series of laboratory experiments to study how the performance of deliberation varies with its design. Considering the richer literature in distributive issues and the relevance of the distributive issue in the society, the protocol shall focus on a discussion between a few numbers of participants preceding a vote for an allocation of resources. Beside one control treatment where participants vote without deliberation, the treatments vary with the parameters describing the parameters of the discussion: duration, composition of the groups by categories, free vs. directed discussion, voting rule (majority, unanimity, approval vote). We can measure how individual preferences evolve and whether they converge or diverge, and assess the final decisions for every treatment.

Second, we wish to identify what is important to the eyes of the population when they are confronted to new voting mechanisms. Indeed, the rules and the choice of the criteria can be co-constructed with people. We will use the newly developed modules of Whale dealing with multi-winner voting rules in WP2. Pilot sessions will be held at Le Dôme, a science centre in Caen described above, which hosts a living lab, where the public is invited to imagine the design and the use of innovations. We will run sessions in year 1 on the different uses of Whale for multi-winner elections. These sessions will provide feedback from the public, and help us to design scenarios we can propose later for science fairs. Sessions in year 3 focuses on the participatory budgeting extension of Whale.

Third, in continuity with the Voter Autrement operation, we wish to build a website dedicated for dissemination on the state of the art regarding single-winner and multi-winner voting rules, as well as participatory budgeting voting rules. We aim to display not only texts and videos to explain and critically assess the different rules, but also to offer the public for institutional or personal use an

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opportunity to experiment the rules with fictitious elections, besides on links to the novel Whale modules.

Task 3.2. Involvement of every category of population

First, we aim at conducting a field experiment on deliberative democracy to study how different categories will react to different conditions of discussions. Interesting cases may emerge, potentially in collaboration with the Direction du dialogue public et de la prospective of the Lyon Metropole, regarding the deliberative stage of participatory budgeting called "ateliers d'émergence" in the city of Lyon. Besides one control treatment of status quo conditions, we will apply various treatments on different groups of discussion, *e.g.,* duration, changing the position of tables and chairs, changing the rules of allocation of time in a group, free vs. directed discussion. We will assess the performance of each treatment regarding the involvement of the different participants based on their socioeconomic characteristics. We aim to study how and whether the participation of the youngest, less-educated, poorest, from outlying territories could be enhanced.

Second, we will study the degree of understanding and satisfaction associated with the novel voting rules. Polls enable to select a representative sample of the French population, or of the local population concerned by a potential reform. Citizens will be able to experience various rules in a fictitious online voting process. Surveys will then be implemented so we can check the degree of participants' understanding of the rules: a number of questions and exercises are intended to disentangle between the ability of citizens to know how to fill in the ballots, compute the result of the election and vote strategically. We will also assess the expression of their satisfaction for every rule (on a pre-given scale), and their preference over rules (by asking them to rank the different rules).

Risk management

In case of restrictions due to sanitary reasons or terrorism threats, the risk is not null that *field* experiments scheduled in Task 3.2 as well as co-construction dissemination events scheduled in Task 3.1. may not be allowed. The organisation of online experiments would constitute a satisfying alternative, however suboptimal.

Deliverables.
D.3.1.1: One article on the performance of various voting rules and deliberative devices based on laboratory experiment; D.3.1.2: Dissemination events using the Whale new module, inviting the public to co construct the application; D.3.1.3: One website for dissemination purpose on voting rules. D.3.2.1: One article on the relative performance of deliberative device to favour categories of persons based on field experiments; D.3.2.2: One article on the understanding and satisfaction of novel voting rules in local elections based on polls.

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