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January 2011

LABSI WORKING PAPERS

N. 36/2011

Voting by Ballots and Feet in the Laboratory

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Abstract. This paper provides laboratory evidence on the efficiency-enhancing properties of the Tiebout model as a decentralized system of public goods provision. Tiebout (1956) shows that if a sufficient number of local communities exist to accommodate different types of preferences, individuals sort themselves in a way that provides an efficient allocation of public goods and taxes. Our experiment aims to disentangle the effect of voting participation and is composed of two treatments. In the non-participation treatment, local public good provision is chosen by only one subject, while the other members of the community can only stay in or moves to another community. In the participation treatment, all the community members have the right to vote as well as to move to another community and collective decisions are taken by majority rule. Our findings show that social welfare is greater in the participation than in the non-participation treatment. We conclude that voting with one's feet increases efficiency if all the community members vote and that the influence of voting participation on the allocation of local public goods should be taken into account to assess the viability of the Tiebout model.

Keywords: Tiebout model, local public goods, voting participation, federalism, experiment.

JEL Codes: C91, H41, C92, D23

* We acknowledge the Italian Ministry of Research for financial support under grant Prin 2007 and Francesco Lo Magistro (LabSi) for excellent laboratory assistance

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1. Introduction

The argument pointed out by Tiebout's (1956) pioneering paper that individuals vote with their feet has become the pillar of the theory of fiscal federalism. If households are free to move from one local community to another, they sort themselves into groups that are homogeneous in relation to their preferences for public goods. In this way, the local allocation tends to be efficient like the general equilibrium solution for the market economy.[3] By providing a means of ensuring efficiency, the Tiebout model set the agenda in the fields of public finance and urban economics inspiring a large body of theoretical and empirical research.

Most theoretical work is aimed at formalizing the analytical conditions under which community mobility results in the existence of stable and efficient equilibria (Richter 1978, Wooders 1980, Bewley 1981, Konishi 1996, Seabright 1996, Nechyba 1997, Kollman et al 1997, Coonly and Wooders 2001, Besley and Coate 2003, Kessler and Lülfesmann 2005, Zheng 2008). The implications of these conditions have been investigated empirically in numerous ways: according to the type, number and size of the local communities, the level of member heterogeneity, the features of political institutions, and the technology of public goods production (Dowding et al. 1994, Oates 1999, Rhode and Strumpf 2003, Dawkins 2005, Calabrese et al. 2006, Banzhaf and Walsh 2008, Hall and Roos 2010). More recently, the model has been investigated through laboratory experiments focusing on the methods of cost sharing and group formation (Hewett et al. 2001, Gailmard and Palfrey 2002, Brouhle et al. 2005, Ones and Putterman 2007, Ahn et al 2009, Gurerk et al. 2009)

This paper investigates a particular aspect not yet studied in the laboratory. The validity of the Tiebout model depends on the joint effect of voting by ballots and by feet. A common approach to modeling voting is to adopt the median voter's demand as the equilibrium outcome, which is to assume that all the residents express their vote. However, literature on ethnic diversity points out that income inequality and racial fragmentation are factors which decrease voting participation and which may consequently affect the efficiency of public goods provision. To investigate this issue, we have conducted two experimental treatments differentiated by the group decision rule. In the non-participation treatment, only one subject in each community determines which and how many

[3] "If consumer-voters are fully mobile, the appropriate local governments, whose revenue-expenditure patterns are set, are adopted by the consumer-voters. While the solution may not be perfect because of institutional rigidities, this does not invalidate its importance. The solution, like a general equilibrium solution for a private spatial economy, is the best that can be obtained given preferences and resource endowments." (Tiebout 1956, p. 424)

public goods to produce, while the other subjects can merely decide to stay in or move to another community. In this treatment members do not express their voting preference on local public good allocation. In the participation treatment, all the community members have the right to vote as well as to move to another community and decision are taken by majority rule.

The paper is structured as follows. In Section 2, background literature is reviewed. Section 3 illustrates experimental design and starting hypotheses. Laboratory findings are presented and discussed in Section 4. Section 5 concludes.

2. Background literature

A survey of the empirical studies of the Tiebout model is beyond the scope of this paper, since such studies "are legion and multifarious" as argued by Dowding et al. (1994, p. 767) who hold that there are two main types of applied studies: firstly, research focused on testing the implications of the model, and secondly, on verifying its assumptions. Dowding et al. (1994) group this literature under five headings: community-size interpretations, homogeneity interpretations, migrations, micro-level tests, and tax capitalizations studies. Starting with Oates' (1969) seminal paper, the latter issue is probably the earlier and most frequent object of analysis, but the question of how taxes and local service discrepancies are capitalized into property values is an issue beyond the focus of our research. Our focus, rather, is on the impact that heterogeneity of preference and migration flows have on the efficient allocation of public goods.

Concluding their survey, Dowding et al. (1994) argue that the large body of research reasonably supports the conclusions that:

a) the number of local communities is a positive factor in relation to the level of satisfaction of the public goods provided;
b) community homogeneity enhances the efficiency of public goods allocation;
c) migration patterns are not apparently affected by differences in the types of taxes and locally provided goods.

More recently, a variety of empirical studies have tested these assessments with mixed results, summarized by Oates (2005). Introducing the survey, Oates emphasizes the passage from the first to the second generation of fiscal federalism, which is characterized by the inclusion in the field of public economics of new theoretical concepts and analysis methods borrowed from information economics and, particularly, from political sciences. Oates attributes this shift of focus

to the awareness that "participants in political processes (*both* voters and officials) have their own objective functions which they seek to maximize in a political setting that provides constraints on their behavior" (Oates 2005, p. 356)

The Tiebout model is indeed very informal and highly stylized in terms of institutional features. Tiebout's original intent was to extend to the local public sector the Pareto-efficient outcome of the competitive model, where contextual details are practically neglected.[4] However, an issue that is generally underestimated in literature is the huge impact that immigration flows have on local community heterogeneity and, consequently, on voting participation. In terms of the validity of the Tiebout model, even if the sorting process is actually in force, the increase of within-heterogeneity due to migration could be higher than the increase of between-heterogeneity due to foot voting.

This argument is strictly related to another issue mentioned in the introduction. Efficiency in the Tiebout model relies on the combined effect of voting with the feet and voting by ballot. A very common assumption, which has relevant normative properties, is that the equilibrium outcome is determined by the median voter model. By assuming that all residents are rational and choose fiscal programs by calculating individual benefits and costs, preferences for local public goods are revealed without the active intervention of politics (Sjoquist 1981, Alesina and Spolaore 1997, Fischel 2001). On the contrary, as pointed out by Kollman et al. (1997), Ross and Yinger (1999) and Congleton (2003), public good allocation is highly sensitive to assumptions about voting procedures and participation. Apart from being exceedingly simplistic and empirically non-testable, the viability of the median voter model is limited by the effect of immigration. Migration flows hamper voting participation, since there is an increasing percentage of residents in each community who do not take part in collective decision, either because they are marginal (ethnic minorities, illegal immigrants, abstensionists) or because they are very mobile and do not expect to stay in a given community long enough to benefit from participation.

These stylized facts have been investigated by a number of studies on the economic effects of ethnic diversity, the key assumption being that migration is a significant factor in decreasing the stock of social capital. The term social capital was employed by Putnam (1993) to describe the dense and strongly tied civic networks characterizing highly cohesive communities like the Italian industrial districts. In the 2006 Johan Skytte Prize Lecture, Putnam (2007) addresses the migration-led growth of ethnic diversity in most advanced countries as the key factor explaining the decline of social capital. With reference to the United States, Putnam provides evidence that greater

[4] Oates (2006, pp. 22-24) discusses this point extensively.

heterogeneity is associated with lower frequency of voter registration and lower confidence in personal political efficacy, that is, the individual perception of influencing the determination of public policies. The effect of immigration is that a fundamental requisite of social capital, voting participation, is increasingly restricted to the more stable community, which converges on a restricted set of public policies and hinders the participation of the other members of the community to electoral processes. By rephrasing Hirschman (1970), ethnically fragmented communities exhibit a tendency of the immigrants to waive the 'voice' option by not using their right to vote thereby limiting themselves to only exercising the 'exit' option.

More generally, ethnic heterogeneity reduces civic engagement and political participation. Broadly speaking, political participation includes not only voting, but also taking part in establishing and running political organizations, running for office, performing duties in representative and consultative bodies, campaigning, and taking part in protests. Borck (2002) provides theoretical arguments to show that political participation increases with income and decreases with population size and, consequently, is inversely related to immigration growth. Costa and Kahn (2004) survey and produce empirical evidence that in United States and European communities heterogeneity lowers civic engagement and, specifically, voting participation. Alesina and Ferrara (2000) argue, first theoretically, that the increase of population heterogeneity induces less political participation, and then, empirically, that ethnic fragmentation is inversely related to organizational membership. However, there is wide consensus in literature on the benefits of democratic regimes to temper the negative economic effects of community fragmentation (Collier 2000, Alesina and Glaeser 2004).

To address this issue in the laboratory, we conduct an experiment consisting of two treatments. In the non-participation treatment, only one subject, randomly chosen, determines in each community the type and the quantity of provided local public goods, while the other subjects are only free to stay in or to move to another community. In the participation treatment, all the residents have the right to vote and to move to another community and decisions are taken by majority rule. The two treatments are intended to compare the case of one community where the median voter equilibrium is applied due to the fact that all the participants vote with another community in which a majority of members is so cohesive that collective choices are reached in such a way so as to seem representative of one sole individual. From the comparison across treatments, we expect to asses the effect of voting participation on social welfare in the standard Tiebout framework.

3. Design and hypotheses

The experiment was run at the Universities of Florence and of Siena between January 2009 and December 2010 and consisted of two treatments, each composed of three sessions. Subjects were recruited from the Political Science Faculty in Firenze and the Economics Faculty in Siena. Each subject spent about 80 minutes in the lab and earned on average 12.4 Euros. The laboratory of experimental economics LabSi (http://www.labsi.org) provided the technical and practical support for the experiment, which was computerized using Z-tree software. During the sessions the subjects were positioned at computer terminals in separate seats to prevent communication or visual contact between participants. For each treatment we conducted pilot tests. The experimental instructions are available upon request. Table 1 summarizes the experimental design.

Table 1. Summary of the Design

Session	Preference set	Treatment	Participants (women + men)
1	A	Participation	15 (7 + 8)
2	B	Participation	15 (6 + 9)
3	C	Participation	15 (7 + 8)
4	A	Non-participation	15 (8 + 7)
5	B	Non-participation	15 (9 + 6)
6	C	Non-participation	15 (7 + 8)
Total			90 (44 + 46)

Both treatments were made up of 10 periods. In the first period, subjects were randomly divided into communities, each of which was allowed to provide only one of four possible public goods. Individual preferences over the four public goods were randomly allocated at the beginning of the session to each subject. To allow for comparison, the same preference sets (A, B, C) were repeated identically in both treatments, making subject heterogeneity identical across treatments.

In the participation treatment, all the members of each community determined the type and the quantity of the public good provided by majority rule and, after each period, all the subjects could decide whether to stay or to move to another community. In the non-participation treatment, only one member in each community was randomly selected as the decision maker to decide the type and the quantity of the public good provided, while the other members did not vote and were only able to move to another community after each period.

Each session started with the random allocation of fifteen subjects to five communities of three members each. In the first period, subjects were given four random playing cards, which

represented the individual preferences over the four possible types of public goods for all the session (Table 2). The cards randomly selected in each session of the participation treatment were the same exact cards used in the corresponding sessions of the non-participation treatment.

The suit of the cards, diamonds (♦), hearts (♥), clubs (♣), and spades (♠), determined the type of public good, while the number on the cards, from 1 to 5, the intensity of preference for the public good. The level of preference for each public good was given by the sum of the number of cards for each suit. For example, in preference set A subject 1, who received a three of diamonds, a three of spades, a two of clubs, and a one of spades preferred the public good spades, because he obtained a benefit of four (three plus one) from spades which was higher than the value of diamonds (three), hearts (zero) and clubs (two).

Table 2. Cards Allocation by Preference Set

		Set of Preferences											
		A				B				C			
Subject	Group												
1	1	♦3	♠3	♣2	♠1	♦1	♣4	♦2	♠1	♥3	♣2	♥1	♣4
2	1	♠4	♦5	♥1	♥3	♦1	♠2	♥4	♦2	♣1	♦3	♥4	♣1
3	1	♣5	♥3	♥3	♥2	♦1	♠2	♥4	♦2	♥4	♠1	♥2	♥3
4	2	♣5	♥2	♣5	♦1	♥3	♣2	♣3	♥1	♥1	♠3	♦1	♣4
5	2	♥3	♦1	♦5	♠1	♦4	♠4	♦5	♣2	♠2	♦1	♥1	♦2
6	2	♣5	♠4	♣3	♥4	♥4	♥1	♦5	♥2	♦4	♠3	♦3	♣2
7	3	♦5	♠4	♥4	♦5	♣5	♣3	♠2	♥4	♦3	♥5	♦3	♥1
8	3	♠2	♠4	♠2	♥1	♦3	♦2	♦5	♣3	♣1	♣5	♣2	♥2
9	3	♥1	♠1	♦1	♥2	♥1	♥5	♣2	♠1	♠2	♥5	♣3	♠2
10	4	♣2	♣1	♣2	♠2	♠3	♠2	♦3	♣1	♣4	♦2	♦4	♦2
11	4	♣3	♥5	♠3	♥2	♣1	♦3	♣1	♠1	♣2	♣3	♦2	♣5
12	4	♦3	♣2	♦1	♦3	♣3	♦3	♠1	♦1	♦1	♣4	♦4	♦1
13	5	♦2	♣3	♦5	♣1	♦5	♦3	♥4	♥1	♦1	♦1	♠3	♥4
14	5	♥3	♣1	♦3	♦5	♠3	♠2	♣3	♥1	♥3	♦4	♥1	♥5
15	5	♠4	♣2	♣1	♣4	♣1	♠1	♣4	♦2	♣4	♥1	♠1	♣1

The individual benefit was determined by the level of public good provision chosen by the community. In the example above, if the community of subject 1 chose a quantity of the public good “spades” lower than 4, i.e. 3, subject 1 obtained a benefit equal to 3, which represented the

non-rival part of the benefit given by the public good. If the chosen quantity was equal or greater than 4, the subject's benefit was exactly four.

Formally, the individual benefit (B) for a provided *k* quantity of the local public good *i* was given by:

B = Min {*k*, sum of cards of suit *i*}

In this way, excess provision over the quantity *k* increases taxes but not benefit. The total cost (TC) of the public good provided by each community was determined by the product of the chosen quantity (k) and the unitary fixed cost (FC). This cost was shared evenly among the members of the community (N).

Thus, the individual payoff (P) was given by the difference between the community level provision and the individual tax cost (TC/N) paid.

P = B – TC/N = Min {*k*, sum of cards of suit *i*} – (*k*)(FC)/N

Note that the payoff P could also be negative in the event that the public good *i* had been overprovided in relation to the sum of the cards having the suits *i*.

Lastly, the welfare (W) of each community was obtained by the sum of the payoffs P of all the community members, and the social welfare (TW) was calculated by summing the welfare W of all the communities.

At the end of each period, after determining community public good provisions, subjects were informed of their own individual payoff, the type and quantity of public goods provided, the individual tax costs and the number of components in all the communities[5]. After the first period, in the participation treatment all participants were free to stay or to move to a different community, while in the non-participation treatment the decision-maker could not move and all the other subjects were free to stay or to move to another community. At the end of the ten periods, total individual payoffs were computed and subjects were paid in cash according to the predetermined conversion rate.

In the participation treatment, public good provision was decided within each community by majority rule. The voting procedure was divided into two phases. In the first phase, each member was asked to express their preference for the chosen suit/public good. Afterwards, all the votes expressed by the members of the community were shown on the screen and each subject was asked to confirm or to change their vote by observing in real time the decisions taken by the other

[5] In the no participation treatment, there were five communities during all the periods, one for each decision-maker. In the participation treatment, after the first periods the number of communities could change according to the subjects' decision to stay or to move.

community members. In the second phase the same procedure was repeated to determine the quantity of the chosen public good to be produced.

4. Results

The discussion of results is organized as follows. First, we compare social welfare across treatments by looking at the dynamics of cost per capita and produced quantity. Then, we analyze subjects' choices to verify if they adhere to predictions of the Tiebout model. In this way, we intend to verify if heterogeneity of public good preferences and of voting participation invalidates the efficiency enhancing property of Tiebout's sorting.

A. Social Welfare

Result 1. Voting participation increases social welfare.

Findings confirm that voting with one's feet increases efficiency only if all members are allowed to vote by ballot. Table 3 and Figure 1 show the dynamics of social welfare for the two treatments and the three preference sets.

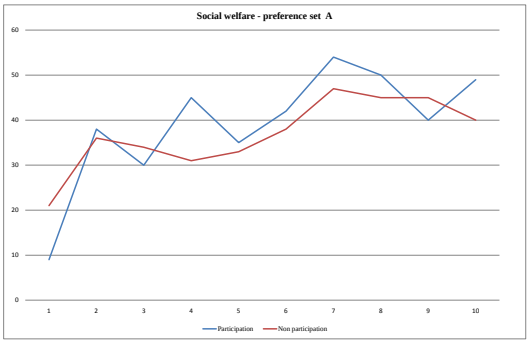
Table 3. Social Welfare by Preference sets and Treatments

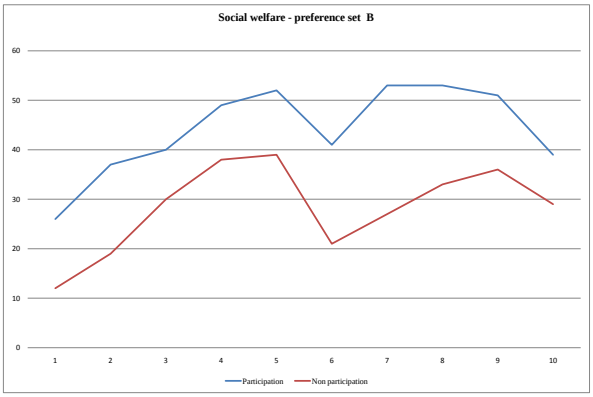
	Preference sets					
	A		B		C	
Round	Participation	Non-Participation	Participation	Non-Participation	Participation	Non-Participation
1	9	21	26	12	25	23
2	38	36	37	19	30	43
3	30	34	40	30	33	17
4	45	31	49	38	32	24
5	35	33	52	39	32	29
6	42	38	41	21	33	32
7	54	47	53	27	34	7
8	50	45	53	33	23	28
9	40	45	51	36	31	22
10	49	40	39	29	49	28
Mean	39.2	37.0	44.1	28.4	32.2	25.3

The increase of social welfare is greater (in absolute value) with the participation treatment than the non-participation treatment. Data analysis shows that, although the hypothesis of an

increasing trend of social welfare is rejected for both treatments[6], the mean of social welfare is significantly different in the two treatments. The t-values for the two-sample mean comparison test are -0.46 for preference set A, -3.94 for B and -1.86 for C, which allows us to reject the null hypothesis that the mean of the two samples are equal at least for the preference sets B and C.

Figure 1. Social welfare by treatment and preference set





[6] The Cuzick's (1985) test on the social welfare obtained by each group gives the following z-values for the participation and non participation, respectively: z=0.03 (p=0.979), z=0.91 (p=0.364) for the preference set A, z=-0.91 (p=0.851), z=0.41 (p=0.684) for B, and z=-1.15 (0.684) z= 0.19 (p=0.846) for C.

*Result 2. The greater increase of social welfare in the participation treatment is achieved mainly by reducing cost per capita than by changing quantity***.**

Voting participation lowers the per capita cost of public goods provision, whereas in the non-participation treatment the average cost per capita is nearly constant along all the experiment. On the contrary, the provided quantities do not differ significantly across treatments.

Table 4 shows that in the participation treatment the per capita cost increases in the first half of the session and then decreases for all the preference sets at the $5^{th}/6^{th}$ round. The cost per capita of the last round is equal to or lower than the average cost and reaches its maximum at the third (preference set A and B) or fourth round (C). In the non participation treatment the cost per capita reaches its maximum level in the 7^{th} round (A) and in the last round (B and C).

Table 4. Average Cost per capita

	Preference sets					
	A		B		C	
Round	Participation	Non-participation	Participation	Non-participation	Participation	Non-participation
1	1.60	2.22	1.53	2.36	1.33	1.94
2	1.57	2.24	3.15	2.33	1.50	1.94
3	4.98	2.21	3.33	2.32	1.78	1.95
4	1.44	2.24	1.65	2.46	3.63	1.98
5	1.93	2.27	1.56	2.54	3.42	1.94
6	0.88	2.33	1.13	2.59	1	1.84
7	1.29	2.34	1.33	2.87	1.43	1.95
8	1.58	2.28	1.25	3.01	2.05	2.18
9	1.15	2.27	1.29	3.25	1.04	1.95
10	1.83	2.34	0.75	4.23	1.78	2.51
Mean	1.83	2.27	1.70	2.80	1.90	2.02

Average costs per capita are lower in the participation treatment than in the non participation treatment for all the preference sets. In contrast, the provided quantities do not differ significantly across treatments (see Table 5). On average, the quantities produced are significantly different only for the preference set B (t-value=2.219), but not for A and C (t-values, respectively, equal to -0.171 and -0.642).

Table 5. Average Quantity per capita

	Preference set					
	A		B		C	
Round	Participation	Non-participation	Participation	Non-participation	Participation	Non-participation
1	4.8	5.2	4.6	3.0	4.2	5.6
2	5.6	5.6	5.2	6.0	5.8	5.4
3	7.4	3.8	6.2	3.2	7.4	5.0
4	3.6	4.0	5.3	3.8	5.8	4.8
5	4.8	3.6	6.7	4.4	4.8	5.0
6	3.2	4.6	4.0	3.6	1.8	4.0
7	4.2	5.2	6.3	4.2	3.6	2.8
8	4.0	4.2	5.0	4.2	6.4	4.4
9	3.2	3.4	6.0	4.2	4.0	3.0
10	4.6	5.0	4.0	6.4	4.0	4.0
Mean	4.5	4.5	5.3	4.3	4.8	4.4

B. Individual Choices and Group Heterogeneity

Result 3. Moving decisions are positively related to individual payoffs.

The number of individual displacements has a positive relation to the increase of individual payoffs in both treatments, whereas in the non-participation treatment the increase of welfare has a positive correlation with the correct choice of moving or not moving only if the community is appropriately chosen.

We analyze the relation between voting with one's feet and the individual payoff in three ways. Firstly, we run an OLS regression, in which the dependent variable is the difference between the individual payoff of the first and the last round. Secondly, we estimate a Probit model to investigate the individual moving decisions. In particular, we test the hypothesis that subjects decide to change community by comparing the individual payoff with the payoffs attainable in the other communities. Finally, we check if the chosen community is the optimal choice for each subject.

Table 6 shows that the number of individual displacements has a positive relation to the increase of individual payoffs for both treatments and all preference sets, with the only exception of the preference set C in the non-participation treatment. The OLS model also shows that in both treatments the relation between the increase of welfare and the appropriately taken decision of moving or not moving is positive, although in the non-participation treatment the relation also depends on the chosen community. This finding may be interpreted as a consequence of the differences in the moving decision across the two treatments. Differently from voting subjects, subjects who are not allowed to vote should condition their choice using a double calculation: firstly they have to assess if their payoffs may be higher in a different community, secondly they need to choose the appropriate community to obtain the increased payoff.

Table 6. Welfare Differences between the Last and the First Round – OLS estimation

	Preference sets					
	A		B		C	
Round	Participation	Non-participation	Participation	Non-participation	Participation	Non-participation
Nr of moving decisions in all rounds	1.019***	0.295**	0.278***	0.380***	0.325***	-0.480***
	(0.098)	(0.142)	(0.103)	(0.088)	(0.070)	(0.090)
Nr. of rounds in which one subject with an opposite Spearman coefficient is met	-0.439***	-0.168	-3.320***	2.440***	-0.813***	0.447***
	(0.063)	(0.120)	(0.593)	(0.275)	(0.242)	(0.084)
Nr. of rounds in which at least two people with an opposite Spearman coefficient are met	-0.576***	-0.091	-0.096	-0.419*	-0.729***	0.511***
	(0.045)	(0.119)	(0.113)	(0.229)	(0.099)	(0.127)
Moving/non moving decisions taken rightly	1.106***	-1.003***	4.795***	-0.481***	-0.544***	0.076
	(0.147)	(0.289)	(0.275)	(0.148)	(0.172)	(0.364)
Community in which the individual move is chosen rightly	-0.291***	1.625***	-5.218***	0.577***	0.783***	0.060
	(0.102)	(0.241)	(0.317)	(0.158)	(0.115)	(0.165)
Constant	-4.460***	-3.230***	4.991***	-1.552	2.729**	0.615
	(0.765)	(1.223)	(0.806)	(1.023)	(1.254)	(1.960)
Observations	150	100	150	100	150	100
R-squared	0.764	0.685	0.787	0.667	0.762	0.444

*** p<0.01, ** p<0.05, * p<0.1 (standard errors in parentheses)

By looking at disaggregate data, the Probit model (Table 7) shows that a negative payoff is associated with the decision to change community. Data analysis also confirms that most moving decisions are taken in the first five rounds, particularly in the participation treatment.

Table 7. Moving / Non-Moving Decisions – OLS estimation

	Preference sets					
	A		B		C	
Round	Participation	Non-Participation	Participation	Non-Participation	Participation	Non-Participation
Individual loss in the previous round(dummy)	1.972***	**2.160*** **	1.174***		2.004***	**1.642*** **
	(0.374)	**(0.550)**	(0.268)		(0.422)	**(0.378)**
Decision taken in the first five rounds(dummy)	0.564**	**0.889*** **		**0.529***	1.398***	**-0.229**
	(0.263)	**(0.313)**		**(0.276)**	(0.388)	**(0.310)**
Presence of at least one subject with an opposite Spearman coefficient	1.137***	**-0.540**		**0.425**		**1.063*** **
	(0.308)	**(0.418)**		**(0.388)**		**(0.352)**
Presence of at least two people with an opposite Spearman coefficient	0.744**	**0.033**		**-0.596**		**0.010**
	(0.336)	**(0.398)**		**(0.651)**		**(0.483)**
Different individual vote on the type of good produced			1.278***			
			(0.487)			
Different individual vote on the quantity of good produced			0.623**			
			(0.243)			
Constant	-1.700***	**-1.184*** **	-1.277***	**-0.698*** **	-2.277***	**-0.639*** **
	(0.265)	**(0.251)**	(0.205)	**(0.197)**	(0.368)	**(0.219)**
Observations	150	**100**	150	**100**	150	**100**

*** p<0.01, ** p<0.05, * p<0.1 (standard errors in parentheses)

Result 4. Heterogeneity within groups is not statistically significant or related with the social welfare if Subjects are not allowed to vote.

In the participation treatment, the increase in social welfare is negatively related to the number of rounds in which subjects met a person with a Spearman coefficient of the opposite sign, while in the non-participation treatment the within-group heterogeneity is not significantly correlated with the welfare increase.

The effect of preferences heterogeneity on public goods provision is also assessed by calculating the Spearman rank correlation coefficients among subjects. In this way we test if the presence of one or two subjects with a correlation coefficient with the opposite sign in one's own community explains the difference in individual welfare attained between the first and the last round of treatments.

The variable "number of rounds in which a person (or at least two people) with an opposite SC is (are) met" in the OLS model shows that heterogeneity in preferences for public goods among

members of the same community is an obstacle to the increase of social welfare only in the event that subjects are allowed to vote. Table 6 displays the negative and significant sign of the coefficients of these variables for all the preference sets. In contrast, in the non participation treatment heterogeneity does not directly affect the social welfare, given that the sign of the coefficients of the two variables changes and such variables are not always statistically significant. In other words, if the source of heterogeneity is two instead of one, i.e. not only public goods preferences but also voting participation, the decentralization and the sorting people option do not necessarily increase welfare.

5. Conclusions

In this paper, we investigate in the laboratory the effect of voting participation on the validity of the Tiebout model. By comparing the participation and the non-participation treatments, we find that, in a pure Tiebout framework, social welfare is increased by voting participation. Moreover, in the participation treatment the increase of individual welfare has a positive relation to the number of moving decisions and has a negative relation to within-community subject heterogeneity. In the non participation treatment, the increase in welfare has a positive correlation to the correct decision of moving only if the community is correctly chosen.

Our findings support the view that the processes of ethnic fragmentation and decline of social capital due to migration flows can affect the effectiveness of voting with the feet if participation in the voting process is low. The increase of individual heterogeneity within local communities makes the efficiency-enhancing property of the Tiebout model dependent on promoting civic engagement and political participation. The option voice should be exercised jointly with the exit voice to temper the negative economic effects of community fragmentation.

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