Local Residential Sorting and Public Goods Provision: A Classroom Demonstration

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Abstract

This classroom exercise illustrates the Tiebout (1956) hypothesis that residential sorting across multiple political jurisdictions leads to a more efficient allocation of local public goods. The exercise places students with heterogeneous preferences over a public good into a single classroom community. A simple voting mechanism determines the level of public good provision in the community. Next the classroom divides in two, and students may choose to move between the two smaller communities, sorting themselves according to their preferences for public goods. The exercise places a cost on movement at first, then allows for costless sorting. Students have the opportunity to observe how social welfare rises through successive rounds of the exercise, as sorting becomes more complete. One may also observe how immobile individuals can become worse off due to incomplete sorting when the Tiebout assumptions do not hold perfectly.
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Keywords: public goods, Tiebout hypothesis, residential sorting, classroom experiments.

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I. Introduction

Students in undergraduate public finance courses learn that market provision of public goods is generally inefficient, due to the non-excludable and non-rival characteristics of such goods. Centralized government provision of such goods may also prove inefficient for public goods that are consumed locally, due to heterogeneous preferences or heterogeneous opportunity costs. By this argument, neither centralized nor market institutions can efficiently provide local public goods.[2]

In a seminal paper, Tiebout (1956) suggests that the problem of efficient local public goods provision can be solved through political institutions whose outcomes resemble those of competitive markets. Tiebout argues that if a sufficient number of communities exist to accommodate the different types of preferences, individuals can sort themselves into communities that provide their most-desired bundle of public goods and taxes. Competition between communities would ensure that local public goods are provided at the lowest cost. Tiebout assumes that each community would impose a head tax equal to the cost of provision divided by the population of the community. If there exist at least as many communities as types of consumers and an optimal community size for each pattern of tastes, if no externalities or economies of scale are present, if residents have full information about available options, and if sorting is costless,[3] the equilibrium allocation will maximize social welfare.

The following classroom demonstration is designed to illustrate the efficiency gains that can arise from decentralization and local sorting, as well as problems that arise when certain assumptions of the Tiebout model are not met. The classroom at first comprises a single community of students with heterogeneous preferences for a public good, and they determine the level of public-good provision via a simple voting mechanism. Next, the classroom divides into two communities, each of which determines its own level of public good provision. Then the students have the opportunity to relocate to the community with the level of public good closer to their tastes. At first some students must stay in their original location, but in the final

[2] The discussion is usually found in the context of fiscal federalism. For example, see Hyman (1993), Rosen (2002), or Stiglitz (2000).

[3] Tiebout also lists two other assumptions. He excludes employment factors from the analysis and also imposes the assumption that city planners try to achieve the efficient community size. This last assumption is equivalent to minimizing the average cost of production of the local public good in each community.

treatment all students become mobile. After each round of sorting, each community determines a new level of public good provision. Students see how welfare rises as sorting becomes more complete. This game illustrates the Tiebout sorting equilibrium and the possibility of an efficient provision of local public goods. It also highlights the usefulness of markets in general and the assumptions necessary for a well-functioning market to reach an efficient outcome. The third treatment may foster classroom discussion about "white flight" from inner-city school districts, as it shows how some immobile individuals become worse off when mobile individuals move.

II. Procedures

The classroom demonstration takes about 30 minutes, which leaves time for class discussion afterward. The demonstration will work in classes with as few as four students or as many as 100 students, but the ideal class size is probably between 20 and 40. For large classes, teaching assistants will be required to aid in the counting of "votes." The exercise, while designed primarily for a public-finance course, can be employed in any political science, public policy, sociology, or economics course that covers government provision of public goods or services.

Each student receives a packet that should be prepared in advance of the classroom discussion. The packet includes: (1) a colored set of instructions with record sheet (e.g., half the students receive red and half yellow), (2) a different colored ribbon or index card (e.g., half the students receive white and half blue), and (3 – optional) four ballots on which to write votes. The color of the instructions denotes each student's value for the public good, while the color of the ribbon or index card denotes each student's mobility (whether one may change communities). It works well to put all the materials into a large envelope in advance of the class.

The overall distribution of packets in the class should be approximately half red and half yellow, but the red and yellow packets should not be evenly distributed between the two sides of the classroom. For reasons that will become apparent, we recommend that packets be unevenly distributed across the classroom after the students are seated. For example, two-thirds of the packets on the right side of the classroom should be red, while two-thirds of the packets on the left side of the classroom should be yellow. To do

this, we recommend ordering the packets a one red, two yellow, one red, two yellow, and so forth, to be handed out on the right, but one yellow, two red, one yellow, two red, and so forth to be handed out on the left). The distribution of

Students are asked to open their packets and follow along as the instructions are read aloud. The instructions include examples of how students calculate their individual welfare at the end of each of four "academic years." The only difference between the red instructions and the yellow instructions is the value each student has for the public good, dormitory parties and social events.

Each student begins Year 1 as a resident in a single dorm comprised of all students in the classroom. In order to calculate after-tax welfare (explained further below), each student is endowed with an equal spending allowance of $1000 per academic year. The dorm must collectively choose a level of taxation, *T,* between 0 and 100, that each student will pay equally. The taxes will be spent collectively to sponsor dorm parties and social events.[4] Students with red instructions (high valuation students) value enjoyment from the dorm social events as *2T*. Students with yellow instructions (low valuation students) value the social events as *0(T)* from the same level of *T* provision. Each type of student (red or yellow) receives instructions revealing the gross benefit he or she receives from parties and social events. By assumption, a unit of "social events" costs $1. Hence, the marginal benefit of contributing always exceeds the marginal cost to the high valuation students, while the marginal cost always exceeds the marginal benefit to the low valuation students.

In each year of the game, the entire class "votes" on a level of social event taxation.[5] The simple public choice mechanism, which is repeated in each year, works as follows:

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[4] We chose dorm parties as our local public good because they are provided locally (within a single dorm or hallway), and they come reasonably close to being both non-excludable and non-rival among the dorm residents. (The instructor may choose during the post-experiment discussion to elicit from students how parties might not be a "pure" public good – for example, while entertainment and decorations tend to be non-rival, refreshments tend to be rival in consumption.)

[5] Note, at this point, we abstract from the Tiebout model. In Tiebout's framework, there exist a multitude of community planners that compete for residents by setting the level of the local public good and corresponding tax level. Consumers, then, choose among the different communities to find their most preferred bundle of public good level and taxes. In our framework, we have replaced the community planners by eliciting consumer preferences. While this is technically not how Tiebout framed his model, it

The social planner (instructor) announces three possible choices of T on the ballot—\$0, \$50, or \$100. Residents are polled on their preferred level. Low valuation residents should prefer $T = 0$ while high valuation residents should prefer $T = 100$. The $T = 50$ option allows a choice for students who are either confused or altruistic and makes students less suspicious that the deck is stacked in favor of a certain outcome. After tallying votes, the social planner sets the level of T at the weighted average of the three options: $T^* = p_0(0) + p_{50}(50) + p_{100}(100)$, where p_i is the fraction of votes in favor of choice i.[6] Conducting this vote is the most complicated part of the exercise. In a class of 30-40, students can simply raise their hands and the professor and possibly teaching assistants can count the hands being raised. In large classes, paper ballots may facilitate the process.

The instructor enters the votes each option receives into a spreadsheet[7], which calculates the voted-upon tax level, T^*. Students calculate their after-tax welfare after each vote according to the T^* that has been chosen and announced. For high-valuation students, the calculation is $(2T^*)-T^* + \$1000$; for low valuation students, the calculation is $0(T^*)-T^* + \$1000$. After students have an opportunity to compute their after-tax welfare, the instructor should ask for a show of hands on the question: "How many of you are receiving after-tax welfare greater than your initial spending allowance of \$1000?" and, "How many less than your initial spending allowance of \$1000?" Individuals who raise their hand to the first question are high valuation types, assuming the students have computed their individual welfare correctly. The balance of the class is made up of low valuation types. The instructor will then enter the number of each type into the spreadsheet to calculate the social welfare (W_S) for the class; e.g., $W_S = (N_H)(1000 + 2T^*-T^*) + (N_L)(1000 - 0T^*-T^*) = (N_H)(1000 + T^*) + (N_L)(1000 - T^*)$, where N_H equals the number of high valuation consumers and N_L the number of low valuation students.

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accomplishes the same task as Tiebout's community planners and allows for more involvement by the students in a classroom setting.

[6] A median-voter setup could be employed here for advanced classes in political economy, with mayoral candidates committing to a level of T. However, endogenizing the platform choice of candidates would add time and complication to the demonstration.

[7] A spreadsheet for calculating social welfare is available at <www2.kenyon.edu/depts/economics/corrigan/stable/lpg.xls>.

In Year 2, the classroom is arbitrarily divided into two separate dorms (e.g., "North" and "South"). This is done by means of a volunteer in the back of the classroom, and a roll of toilet paper. The roll is tossed to the volunteer and allowed to unroll in the air, neatly dividing the class roughly in half, into "North" and "South" dormitories. Each half of the class now votes on a separate level of taxation, *T,* and hence public provision, *nT*. Again, students calculate their after-tax welfare and the instructor enters T_N* for North and T_S* for South into the spreadsheet. In each community, the instructor now asks: "How many of you have *improved* your after-tax welfare from the *previous* year's *after-tax welfare*?" In contrast to Year 1, this and all subsequent years frame the question in terms of after-tax welfare relative to the previous year. This is done so that students will see that more people become better off as communities separate into different types, *even for the low types who are receiving a net loss from taxation*. In each subsequent year, more people should now raise their hands, and reported social welfare will increase. Year 2 is complete.

If packets were initially distributed in an uneven fashion (such as the recommended split of two-thirds red in one half of the class and two-thirds yellow in the other half of the class), then social welfare will rise somewhat in Year 2. This occurs because the level of *T* chosen in the two communities will differ. Different levels of the local public good will provide a clear signal to residents about which communities they will want to choose in Year 3.[8]

In Year 3, certain individuals are permitted to leave their original community and move into the other in order to take advantage of the more acceptable package of public goods and taxes. Some students will physically change their location in the classroom during this year and the next. Those who have received a blue ribbon or index card are entitled to move freely. They can be thought of as having sufficient additional income to afford some fixed cost of moving, or as having no other non-financial constraints on moving. A toll bridge between the communities may be set up, in which the social planner collects a toll in the form of the blue card or ribbon from anyone who wishes to pass. Those without a blue pass must remain in their original community. Sorting

[8] If the division of the original community into two led to equal levels of *T* in both communities, coordination would be required to find the sorting equilibrium. This could be done, but would take additional time. Hence the recommended uneven initial distribution of types (packets).

commences, votes in North and South are again taken, and T^* for each community is calculated. Students again calculate their after-tax welfare, and the instructor again surveys the class and calculates social welfare. The instructor should repeat the question: "How many of you have *improved* your after-tax welfare from the *previous* year's *after-tax welfare*?" More people should raise their hand than at the end of Year 2. Year 3 is complete.

It is worth noting that while social welfare will have risen in Years 2 and 3, the welfare of some individuals may have fallen. These will be either low types whose taxes have increased over the previous round, or high types whose taxes have decreased. In the classroom discussion at the end, especially with regards to costly mobility, it is worth noting why the welfare of some individuals fell in Year 3.

In Year 4, individuals are now told that mobility is costless. Everyone is allowed to freely choose the community (North or South) that best suits him or her. Once again, some students will migrate across the classroom from one community into another. When students have settled into their chosen communities, T_N^* and T_S^* are determined, individual and social welfare are calculated, and results are posted.

As a final gesture, all students are asked at this point to hold up their colored record sheet. The students should observe that most, if not all, residents of each community now have the same colored instruction sheet, and hence the same valuation of the local public good. As the Tiebout hypothesis predicts, individuals sort themselves into communities made up of others with similar preferences for public goods and spending, signified by the different types represented by the red and yellow record sheets. They should also note that all individuals' welfare rose in Year 4, and that social welfare is at its highest level yet in the demonstration.

III. Discussion

This exercise can generate a rich class discussion. To begin, the instructor may use the game example to highlight the predictions and assumptions of the model.

Assuming the packets were distributed in an uneven fashion (as suggested), the two communities ("dorms") in Year 2 chose a different level of tax depending upon which preference type predominated. The dorm with more high types voted for higher

taxes; the other dorm, with more low types, voted for lower taxes. On average, more of each type had their preference more closely satisfied in Year 2 versus Year 1, increasing total social welfare. This is not to say, though, that everyone's individual welfare improved. "Low types" were stuck spending some of their allowance on dorm social events (more in one dorm than the other), when they would have preferred spending it on something else.

When mobility increased in Year 3, remaining only partial (only the people with blue cards could switch dorms), the equilibrium level of the local public good in the two communities further diverged. In each dorm, some individuals in the minority were able to move to the other community. Social welfare further improved.

Once mobility was completely free, the Tiebout predictions were realized: everyone[9] moved to the dorm of their choice. Those with preferences for spending their money on a community dorm parties and social events lived in a dorm with a high social-event tax, while the other students ended up keeping their entire spending allowance and getting no dorm social functions.

In the process of a classroom discussion, certain conclusions should be emphasized. First, both types of individuals experience welfare gains by the end of the game. Low-valuation students start with a negative net benefit and end with a net benefit of zero.[10] High-valuation students start with a positive net benefit and also experience an increase in successive years. What changes result in increases in individual welfare over time? Does welfare only go up for an individual when the individual moves? What about individuals who never move? Does their welfare change as a result of other people moving? When does the migration of other people raise an individual's welfare, and when does it lower it? Does the situation improve in aggregate? What about for each individual or family?

The classroom discussion should focus on how individual and total welfare change over the successive years of the demonstration, and emphasize changes in social welfare. It is worth projecting or writing on a chalkboard the social welfare calculation from the spreadsheet for each year, so students can observe the progression. By the end

[9] Or nearly everyone, depending on the alertness of the students.
[10] For those students troubled by zero net benefit being a "good" outcome, this may be a good point to clarify the idea of ordinal utility.

of Year 4, most students realize that when similar individuals perfectly sort together into communities according to their taste for a public good, social welfare is maximized (assuming the Tiebout assumptions hold).

After presenting the predictions, one might also discuss the conditions (assumptions) of the model. There are no economies of scale in production, no spillover effects between dorms, and the good exhibits both non-rivalry and non-excludability within the dorm.

The game and the above discussion of it should vividly illustrate the concepts of the Tiebout model for the students. With that accomplished, a broader discussion can begin regarding the complexities of public goods and the importance of the assumptions of the model.

A good place to start might be having students discuss their own experience with residential choice and the communities in which they have lived. How did their family decide where to locate? Did the quality of the schools or other local public goods like overall safety (police, fire protection) or amenities (parks, libraries) matter to their decision? Do they believe everyone in their community wants exactly the same thing from the local government? In other words, just how complete is the residential sorting they observe in the real world? The instructor can list the different moving factors on the board and then ask whether the assumptions are likely to hold in the real world.

For example, the instructor could ask how the model might apply to education. A concerned student might argue that segregation by education would be unfair if income were unequal. Although incomes were assumed equal at $1000, the restricted mobility in the demonstration might imply lower overall wealth levels for the immobile residents. This could be taken as an illustration of "white flight" from inner cities to suburbs. A more savvy student might add that educational sorting could be inefficient if the assumptions of the model are violated. For example, there are positive spillover effects if better educated citizens make more intelligent voters. There may also be positive spillover effects of integration,[11] or threshold levels of efficient provision (school size).

In general, it is important to emphasize the implications of relaxing the model's assumptions. There are many questions the instructor could pose. What happens if we

[11] See Johnson et. al for a sorting game with this structure.

have more than two types of residents, but only two communities? Can welfare be perfectly maximized by costless sorting? Or, what if there are differences in the efficient size of the community for the provision of different local public goods? In this case, a single household would belong to multiple local-public-good communities (for example, the city provides police protection, a district provides schools, and a county provides parks). Will the efficient level be reached?

Perhaps most important is a discussion of the costless mobility assumption. Students should be able to come up with several reasons why moving might be difficult. Perhaps the need to locate near the jobs of both parents restricts a family's mobility, or maybe it is simply too costly to pay the broker's fees involved in buying and selling a house. Maybe obtaining information on alternative location choices is costly. Or perhaps the restrictions on mobility are subtler. Housing discrimination may preclude families from living in certain areas that more closely match their level of demand for such government services as K-12 education. In this case, the equilibrium may be far from efficient. In fact, the equilibrium cannot be expected to Pareto dominate the Year 1 allocation if high-valuation residents remain stuck in a location into which low valuation voters migrate. A discussion of state and federal grants and subsidies to local education can follow from this, as well as school voucher programs.

V. Further reading

The starting point of the literature on the provision of public goods is Samuelson's seminal piece "The Pure Theory of Public Expenditure" (1954), which shows that the private production of public goods is inefficient. Since markets are unable to provide public goods, attention focused on the possibility of government provision of these goods. However, without market prices as signals, the fundamental problem is to ascertain individual's valuation of a public good. Clarke (1971), Groves (1973), and Groves and Ledyard (1977) made important contributions to this literature by designing preference revelation mechanisms. Tiebout (1956), on the other hand, argued that we could return to the principles of the market to uncover consumer's valuation for some types of public goods. For local public goods at least, competition among local jurisdictions can lead to an efficient provision. Consumers, facing a number of

communities with different levels of taxes and local public goods, reveal their true valuation of the local public good by moving to the community that most closely mirrors their preferences. This approachable article demonstrates to undergraduates that important innovations in economic theory can be conceived and expressed in a non-technical way. For a good general discussion of the Tiebout model in the context of fiscal federalism and an undergraduate public-finance class, see Hyman (1993) or Stiglitz (2000).

The conceptual ideas presented in Tiebout have made a lasting contribution in many different areas of the social sciences. In the field of economics, one can find the Tiebout hypothesis playing an important role in questions of school choice (Rubinfield et al., 1987) and tax capitalization (Bloom et al., 1983; Mieszkowski and Zodrow, 1989). In addition, Tiebout's basic idea that communities compete for residents has been borrowed in the literature about firm location and tax competition policy (Brueckner, 2000). The idea of sorting in a non-spatial dimension is also important in Buchanan's (1965) work on clubs.

The contribution of Tiebout also extends to other fields. In particular, political scientists have explored whether the Tiebout results apply in different political or voting regimes (Kollman, Miller, and Page, 1997). The Tiebout model also underlies research on the political implications of devolution, especially the expectation that state governments will "race to the bottom" in their provision of social welfare benefits, competing for productive capital and avoiding redistributive policies (Brace, 1993; Peterson, 1981; Donahue, 1997). Political scientists have also investigated the micro-foundations of the Tiebout model, especially whether individuals are sufficiently informed and mobile to sort themselves (Bickers and Stein, 1998; Lowery, Lyons, and DeHoog, 1995; Peterson and Rom 1989; Schenider, Teske, Mintrom, and Best, 1993).

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Appendix 1. Instructions for Low-Value Residents

Instructions for the Local Public Good Game

Suppose you live in a dorm that's deciding how much money to raise for a collective fund that will be spent on parties and social events for your dorm. Your dorm is voting on the amount of money that each resident will equally contribute to the fund for the current school year.

Your room, board, and tuition are already paid for, and you have a spending allowance of $1000 at the beginning of each year that you may use freely for entertainment, books, etc.

The dorm will decide on a level of per-capita taxation, *T*, between 0 and 100, which will be paid out of your $1000 spending account. The level of taxation will represent the number of dollars in taxes that you and everyone else in your dorm must each pay. These taxes will be used to sponsor social events in your dorm. Residents of your hypothetical dorm enjoy these social events differently. As a result, you have each been assigned a personal value multiplier.

Your personal value multiplier is 0.

To calculate the value you derive from your dorm's parties and social events, take your personal value multiplier times *T*. In your case, the value you derive would be $(0 \times T)$. As other people may have different values, we ask that you *keep your value private*.

In addition to these instructions, you have received a record sheet. You will be using this sheet to record the level of taxes, *T*, imposed by the dorm, as well as the value that you receive from the parties that are funded by these taxes. You will also calculate your after-tax welfare: that is, the value of your spending account ($1000), minus the taxes you pay, plus your own personal value of the social events. Here's the way your record sheet will look:

Level of taxation chosen (*T*): _____

Your spending account	$1,000
PLUS	
Your value of the social events $(= 0 \times T)$	_____
MINUS	
Your tax payment for the social events $(= T)$	_____
EQUALS	
Your after-tax welfare	_____

To determine the taxation level, the dorm's governing committee will survey its residents. They will ask which of three possible taxation levels you prefer: 0, 50, or 100. They will then calculate the average of your choices and impose that average as the taxation level.

Are there any questions so far?

Let's work through an example.

Imagine that there are 10 residents in your dorm, and that 2 of them vote for a level of 0 taxes, none vote for 50, and 8 vote for 100. The average choice is then

$$\frac{(2 \times \$0) + (0 \times \$50) + (8 \times \$100)}{10} = \$80,$$

so the taxation level will be \$80 for everyone in the dorm. We have used this information to calculate your after-tax welfare on the following practice worksheet:

Level of taxation chosen (T): \$80

Your spending account	\$1,000
PLUS	
Your value of the social events ($= 0 \times T$)	\$0
MINUS	
Your tax payment for the social events ($= T$)	\$80
EQUALS	
Your after-tax welfare	\$920

Are there any final questions before we begin?

Your local government will now conduct its first survey. Take a moment to think about which of the following three options you prefer:

- Taxation of \$0
- Taxation of \$50
- Taxation of \$100

After the vote is taken, we will announce the results and will then proceed to the next year.

At the beginning of each year, you will be given verbal instructions related to that particular year. Please listen carefully and do not hesitate to ask questions if you have them.

Year 1

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events ($= 0 \square T$)	_____
MINUS	
Your tax payment for the social events ($= T$)	_____
EQUALS	
Your after-tax welfare	_____

Year 2

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events ($= 0 \square T$)	_____
MINUS	
Your tax payment for the social events ($= T$)	_____
EQUALS	
Your after-tax welfare	_____

Year 3

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events ($= 0 \square T$)	_____
MINUS	
Your tax payment for the social events ($= T$)	_____
EQUALS	
Your after-tax welfare	_____

Year 4

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events ($= 0 \square T$)	_____
MINUS	
Your tax payment for the social events ($= T$)	_____
EQUALS	
Your after-tax welfare	_____

Appendix 2. Instructions for High-Value Residents

Instructions for the Local Public Good Game

Suppose you live in a dorm that's deciding how much money to raise for a collective fund that will be spent on parties and social events for your dorm. Your dorm is voting on the amount of money that each resident will equally contribute to the fund for the current school year.

Your room, board, and tuition are already paid for, and you have a spending allowance of $1000 at the beginning of each year that you may use freely for entertainment, books, etc.

The dorm will decide on a level of per-capita taxation, *T*, between 0 and 100, which will be paid out of your $1000 spending account. The level of taxation will represent the number of dollars in taxes that you and everyone else in your dorm must each pay. These taxes will be used to sponsor social events in your dorm. Residents of your hypothetical dorm enjoy these social events differently. As a result, you have each been assigned a personal value multiplier.

Your personal value multiplier is 2.

To calculate the value you derive from your dorm's parties and social events, take your personal value multiplier times *T*. In your case, the value you derive would be $(2 \times T)$. As other people may have different values, we ask that you *keep your value private*.

In addition to these instructions, you have received a record sheet. You will be using this sheet to record the level of taxes, *T*, imposed by the dorm, as well as the value that you receive from the parties that are funded by these taxes. You will also calculate your after-tax welfare: that is, the value of your spending account ($1000), minus the taxes you pay, plus your own personal value of the social events. Here's the way your record sheet will look:

Level of taxation chosen (*T*): _____

Your spending account	$1,000
PLUS	
Your value of the social events (= $2 \times T$)	_____
MINUS	
Your tax payment for the social events (= T)	_____
EQUALS	
Your after-tax welfare	_____

To determine the taxation level, the dorm's governing committee will survey its residents. They will ask which of three possible taxation levels you prefer: 0, 50, or 100. They will then calculate the average of your choices and impose that average as the taxation level.

Are there any questions so far?

Let's work through an example.

Imagine that there are 10 residents in your dorm, and that 2 of them vote for a level of 0 taxes, none vote for 50, and 8 vote for 100. The average choice is then

$$\frac{(2 \times \$0) + (0 \times \$50) + (8 \times \$100)}{10} = \$80,$$

so the taxation level will be \$80 for everyone in the dorm. We have used this information to calculate your after-tax welfare on the following practice worksheet:

Level of taxation chosen (T): \$80

Your spending account	\$1,000
PLUS	
Your value of the social events ($= 2 \times T$)	\$160
MINUS	
Your tax payment for the social events ($= T$)	\$80
EQUALS	
Your after-tax welfare	\$1080

Are there any final questions before we begin?

Your local government will now conduct its first survey. Take a moment to think about which of the following three options you prefer:

- Taxation of \$0
- Taxation of \$50
- Taxation of \$100

After the vote is taken, we will announce the results and will then proceed to the next year.

At the beginning of each year, you will be given verbal instructions related to that particular year. Please listen carefully and do not hesitate to ask questions if you have them.

Year 1

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events (= 2□T)	_____
MINUS	
Your tax payment for the social events (= T)	_____
EQUALS	
Your after-tax welfare	_____

Year 2

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events (= 2□T)	_____
MINUS	
Your tax payment for the social events (= T)	_____
EQUALS	
Your after-tax welfare	_____

Year 3

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events (= 2□T)	_____
MINUS	
Your tax payment for the social events (= T)	_____
EQUALS	
Your after-tax welfare	_____

Year 4

Level of taxation chosen (T): _____

Your spending account	$1,000
PLUS	
Your value of the social events (= 2□T)	_____
MINUS	
Your tax payment for the social events (= T)	_____
EQUALS	
Your after-tax welfare	_____