UNIVERSIDAD ICESI

Departamento de Economía

Facultad de Ciencias Administrativas y Económicas

Economics Lecture Notes

Lecture Notes on Public Choice

Blanca Zuluaga, Johan Loaiza, Luis Eduardo Jaramillo y Juan Felipe González

Icesi ECONOMICS LN No. 19
Octubre 2023

Lecture Notes on Public Choice

Blanca Zuluaga, Johan Loaiza,
Luis Eduardo Jaramillo y Juan Felipe González

Icesi
ECONOMICS LN
No.19
Octubre 2023

Universidad Icesi

Editor:
Carlos Giovanni González Espitia
Profesor Titular, Universidad Icesi
cggonzalez@icesi.edu.co

Asistente editorial:
Valentina Perdomo

Gestión Editorial
Departamento de Economía - Universidad Icesi

www.icesi.edu.co
Tel: 5552334. Fax: 5551441
Calle 18 # 122-135 Cali, Valle del Cauca, Colombia

Lecture Notes on Public Choice

Blanca Zuluaga, Johan Loaiza, Luis Eduardo Jaramillo, and Juan Felipe González[1].

1. Introduction

In the study of economic policy, public choice theory plays a crucial role in understanding how governments function and make decisions. More specifically, public choice is a subfield of economics that examines the behaviour of individuals and groups in the public sector. It analyses the choices of politicians, bureaucrats, and voters and explores their implications for public policy and economic outcomes. The latter explains why public choice is closely related to public economics, which studies the government's role in the economy and political science.

The origins of the public choice school can be traced back to the mid-20th century, with seminal works by James Buchanan and Gordon Tullock. It emerged as a response to the prevailing view of government as a benevolent entity seeking solely for the social common good and emphasised that government actors, like individuals, pursue their self-interests (for instance, politicians may prioritise their re-election chances or pleasing influential interest groups over the welfare of the general public) and highlighted that the latter was something policymakers should keep in mind when discussing and analysing public policies. Moreover, public choice theory highlights the importance of institutions in shaping political outcomes. The game's rules, such as the voting system and government structure, can significantly impact how government resources are allocated, hence social and economic outcomes.

Students should acknowledge that public choice theory can be seen in practice in everyday politics and economics debates. The following are three real-world examples of public choice in action: the problem of government failure, the rise of rent seeking, and the budget deficit. Concerning the first, public choice theory predicts that government intervention in the economy can often lead to government failure. For example, government officials may be more likely to approve projects that benefit their constituents or increase their power, instead of projects that benefit society.

As for the rise of rent-seeking, the public choice theory predicts that politicians use government resources to obtain special privileges for a particular economically powerful pressure group (lobbies) in exchange of votes or economic support for political campaigns. Finally, public

[1] The authors currently teach or have taught in the past the Economics Policy course at Universidad Icesi in Cali – Colombia. These notes have been written specially for our students.

choice economists argue that budget deficit results from a political process in which politicians have incentives to spend more money than they collect in taxes, so they can use government spending to reward their supporters and to get re-elected.

In conclusion, public choice theory provides valuable insights into the complex world of political decision-making and its relationship with economic policy. Understanding the origins and implications of public choice is crucial for economics undergraduates to become adept at evaluating and proposing effective policy solutions in the real world. That was our motivation to write this lecture notes.

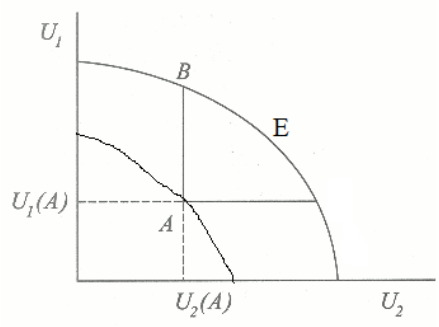
This document has six sections. The second explains why the collective choice is necessary, emphasising two specific reasons: public goods and club goods. In the third section, we refer to the properties of different voting rules, especially unanimity and majority rules. The fourth section focuses on the behaviour of voters. Fifth, we analyse some contributions related to the normative public choice theory. Finally, section 5 shows some empirical applications of collective choice.

2. Why Collective Choice?

Collective choice refers to making decisions that affect a group of individuals or society. There are several reasons why collective choice is necessary, including that it allows for the inclusion of diverse perspectives, beliefs, and interests; involving a group of people in decision-making can increase the perceived legitimacy and fairness of the outcomes. It helps to ensure that decisions are not biased toward the interests of a particular individual or group; instead, it guarantees that such decisions reflect the will of the group. Collective choice promotes shared responsibility, fostering greater cooperation and willingness to implement decisions effectively. In societies where collective choice is valued, the process can contribute to social cohesion and trust among community members.

The public choice theory deals precisely with these collective decisions. Some decisions benefit all the individuals involved, i.e., they represent Paretian improvements (movement from A to E in Figure 1). Other collective decisions benefit some individuals and affect others, i.e., they can be represented as movements over the Pareto frontier by redistribution (movement from B to E in Figure 1). The decisions in the first group are part of the positive Public Choice Theory, while the second ones belong to the normative Public Choice Theory (*dear student, explain why*).

Figure 1. Paretian Improvements versus redistribution



Collective decision-making requires establishing voting rules, which will be discussed in Section 3. To continue this section, we will analyse two examples of cases requiring public choice: public goods and club goods.

2.1 Public Goods

A public good is defined as one whose consumption is indivisible and can be shared by all community members without exclusion and with no rivalry on consumption. The government usually is the provider and/or the funder of public goods. Recall that they can be pure or impure (*dear student, be sure you understand the distinction between these two types of goods, think of some examples*).

The collective action of establishing laws and property rights is a necessary condition for a voluntary exchange system to work adequately. In the case of public goods provision, cooperation is necessary to reach Pareto optimality. The following payoff matrix illustrates a typical case where agents must decide whether to contribute to finance the public good (Figure 2).

Figure 2. Payoff Matrix, Financing a Public Good

		Individual 2	
Individual 1		*Contributing*	*Not contributing*
	Contributing	100, 100	50, 120
	Not Contributing	120, 50	70, 70

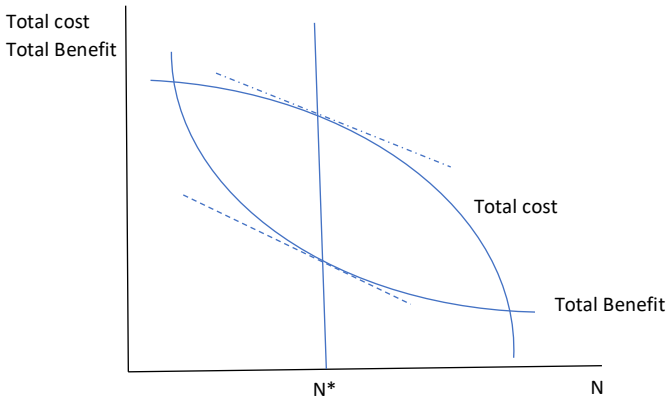
Everyone would be better off if all contributed to the provision of the public good than if none did; however, each would be even better off if he/she alone did not pay for the public good (*dear student, please do not continue reading until you completely understand the example of Figure 1*). In the case of a pure public good, for which the application of the exclusion principle fails, there are incentives for individualistic and non-cooperative behaviour; moreover, due to indivisibility in production and non-rivalry in consumption, there are incentives not to cooperate.

The possibility of obtaining a cooperative solution depends on the number of players (and their homogeneity) and the number of moves: with fewer players, predicting behaviour and detecting non-cooperators or free riders is more manageable. In large and heterogeneous communities, compliance may require the implementation of sanctions and rewards. They require formal voting procedures to make collective choices. On the contrary, in small communities, cooperation and contributions to collective decisions can be obtained only with publicity (or the priest or the teacher asking people to cooperate).

2.2 Club Goods

Club goods are non-rivalrous, but they can be excludable, unlike public goods. Examples of club goods include toll roads, cable television, cinemas, private parks, and the internet. In many cases, their provision comes from natural monopolies.

Figure 3. Club goods



There are benefits (the average cost of the good decreases - scale economies -) and costs (congestion) of adding a new user to the club. Thus, the optimal level of club members depends on the scale economies and the congestion costs. According to the Buchanan model for Club goods, at the optimum, each club has a certain number of members with homogeneous tastes, a unique quantity of public goods, and a size such that the marginal benefit of adding a new member equals the marginal cost (Point N* in Figure 3).

3. Properties of some voting rules

Voting rules make it possible to choose among alternatives and are necessary to provide public goods. Therefore, they are central to the exercise of governing. In the Colombian context, these rules could be applied at the neighbourhood level, for example, in decision-making at a meeting of members of a Local Action Board (*Junta de Acción Local, JAL*). However, these rules also apply at a larger scale, for example, at the regional or national level, in the context of decision-making in the legislative branch, in the sessions of collegiate bodies such as the *Congreso de la República de Colombia* or the *Asamblea Departamental del Valle del Cauca*.

3.1 Optimal majority rule

The optimal majority depends mainly on two factors. First, the size of the costs borne by the opponents of the measure being decided upon (or seen from the beneficiaries, the cost to the supporters of the measure in case it does not pass). Second, the optimal majority depends on the urgency with which the decision needs to be made.

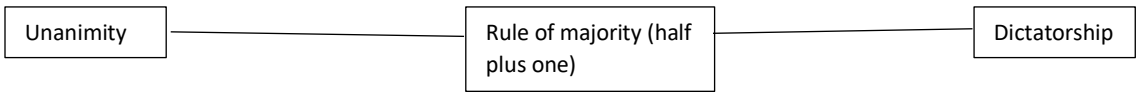
Depending on these factors, the optimal majority may be unanimity - if it is possible to wait for all people to agree and if the costs for opponents are very high -, or, at the other extreme, the optimal may be dictatorship - if the measure must be taken urgently or if the costs for those who benefit from the measure are very high in case it is not accepted -. Right in the middle of these two extremes of voting rules is the majority rule (half plus one).

In some cases, it will be optimal that a qualified minority decides. For example, monetary policy is exclusively decided by the board of directors of the Central Bank because they have the knowledge and the information required to make those decisions, unlike the majority. In other cases, it is optimal

that the decision is made by the minority directly affected by the measure or policy, for instance, communities affected by mining activities (Remember the mining referendum in Cajamarca-Colombia: only people from Cajamarca was allowed to participate in the referendum).

Thus, the optimal majority will be a rule between unanimity and dictatorship (including the extremes, see Figure 4) that minimizes the total cost of collective decisions. The total cost is the sum of the cost of adopting a decision (decreasing on the required majority) and the cost of the decision process (increasing on the required majority, because the larger the number of required votes to decide, the higher the negotiation time).

Figure 4. Optimal majority rule



The time required to pass a bill or policy increases with the size of the majority required to pass it. However, a less-than-unanimous majority imposes costs on those who lose with the adoption of the measure. There is no a unique optimal voting rule because such costs differ for each project. As mentioned, if the costs borne by opponents are low, a voting rule less strict than unanimity is appropriate. Conversely, if these costs are very high, higher majorities are required.

3.2 Unanimity rule

Whenever there is some benefit to all individuals from the provision of a public good, unanimous support is expected. However, since only some obtain the same benefit, the question of how much to provide and how much everyone should contribute offers multiple solutions. In this sense, two main mechanisms for revealing voters' preferences are identified, allowing for an outcome that improves everyone's position.

To understand schematically the mechanisms operating in this rule, we can consider the hypothetical case of a society composed of only two voters. The first mechanism consists of offering a certain amount of the public good and dividing the tax between the two individuals, with some weighting. This weighting does not have to be 50% for each. If the individuals accept, this new state

represents an improvement in welfare for both individuals. From there, additions to the level of public goods provided can be proposed with variations in the weighting of the tax. If both voters accept any new proposal, it again means there is an improvement in welfare. This mechanism can be iterated until a Pareto optimum is reached (equilibrium G in Figure 5), being an unanimous collective choice.

A second mechanism asks the two voters to choose all possible amounts of the public good for a given distribution of the tax burden. Again, the tax does not have to be the same for both. If there is no agreement, the exercise is repeated with a new distribution of the tax burden. If the voters agree on the level of public good, this will be the unanimous collective choice. This type of solution is known as a Lindahl Equilibrium and is an optimum in the Pareto sense (equilibrium L in Figure 5).

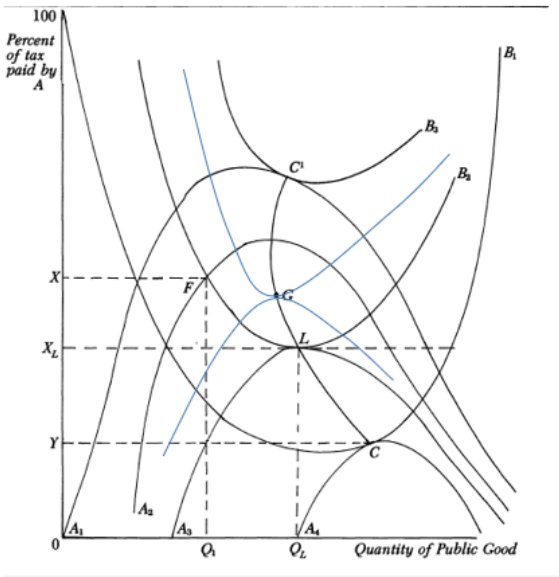
Figure 5 represents the two previously described equilibria, as shown in Mueller (1976). A1 and B1 are the utilities of individuals A and B without public good. C-C1 is the contract curve (the curve joining all points at which the indifference curves of A and B are tangent). Here, lower indifference curves imply higher utility because of the lower participation in taxes at any level of public good. C would be the equilibrium if A knows B's maximum willingness to pay and take advantage of this (C' is the opposite case).

To better understand the first mechanism of public choice explained before, assume that an impartial spectator proposes a tax distribution X and (1-X). With this distribution, F will initially be the *status quo*. However, this is not a Pareto equilibrium (dear student, *be sure you understand why*). Other tax distribution proposals will be launched until a Pareto equilibrium such as G is reached (no other proposal can improve the situation of both individuals)

As for the second mechanism, assume that voters are asked about the preferred quantity of public goods given a particular proposed tax distribution. If voters agree – if their indifference curves are tangent to that level of tax burden as in the point L, the Lindahl equilibrium is reached. Otherwise, another tax burden distribution has to be proposed.

Which mechanism is better? The first procedure (leading to G) has the advantage that any point on the contract curve can be selected (more voting options). L has the advantage that, in that equilibrium, the indifference curves of the two individuals are tangent to the tax-sharing line, this is, everyone is consuming just what they want, given what they pay.

Figure 5. Unanimity Rule



Source: Mueller (1976)

There are two main criticisms of these mechanisms. On the one hand, the time it may take to arrive at a proposal to which all voters adhere could be extended. On the other hand, strategic behaviour may occur where some individual knows the preferences of the other, forcing the outcome to obtain more significant personal benefits; in this same line of reasoning, the bargaining power of everyone will weigh on the decision. In summary, when public choice is a matter of efficiently allocating a public good, that is, when there is a combination of tax level and level of provision of the public good that improves the welfare of all, unanimity is attainable. Especially if there is enough time and as long as bargaining processes that delay the decision-making do not arise, if the issue involves redistribution, this rule will not be effective.

3.3. Majority rule

The majority rule states that at least half plus one of the voters must support the proposal for it to be imposed on the community. Rae (1969) and Taylor (1969) show that this rule minimizes the probability that a person will support a proposal that does not pass and oppose one that does pass. The critical assumption in reaching this conclusion is that the individual change in the utility of winners and the utility of losers is of the same magnitude: under majority rule, an equilibrium can be

reached by imposing equal-intensity solid constraints on the distribution of preferences (Plott, 1967). However, detractors of this rule reject this equal - intensity assumption and recognise that the change in utility could be greater for losers than winners. This might be the case of decisions such as the approval of a mining project (where victims lose their right to safe drinkable water) or the recognition of the rights of LGTBI people (where victims lose their right to a fulfilling life).

3.3.1 Issues of majority rule

As mentioned before, the unanimity rule is feasible in providing a public good. In contrast, majority rule is more plausible in redistributive policy, where the existence of losers and winners is more evident. However, this rule might present problems, such as voting cycles and voting trading or logrolling.

Cycling

Majority rule can lead to cyclical voting. From individual transitive orderings of policy alternatives, such as the level of public spending, the level of public good provided or a tax rate (X, Y and Z in the table), a social ordering can be obtained that violates the axiom of transitivity, as shown in the following example. Table 1 one shows an example of collective choice where the preferences of each individual are transitive (for instance, for voter 1, $X>Y,\ Y>Z \rightarrow X>Z$), but the social preferences are not transitive (*dear students, be sure you know how to demonstrate this statement*).

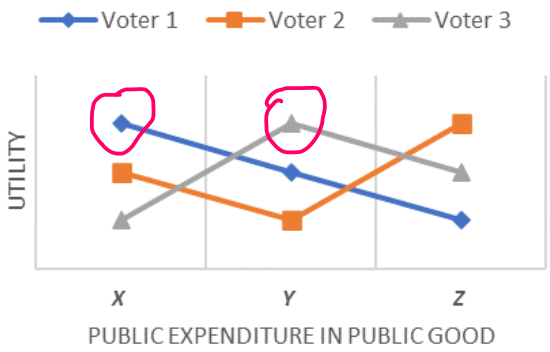
Table 1. Preferences on policy alternatives by voter and whole community.

Voters	*X*		*Y*	*Z*	*X*
1		>	>	<	
2		>	<	>	
3		<	>	>	
Community		>	>	>	

If, for example, options X, Y and Z in Figure 6 are ordered as levels of spending on a public good, the preferences of voters 1 and 3 are said to be single-peaked, while those of voter 2 have two peaks,

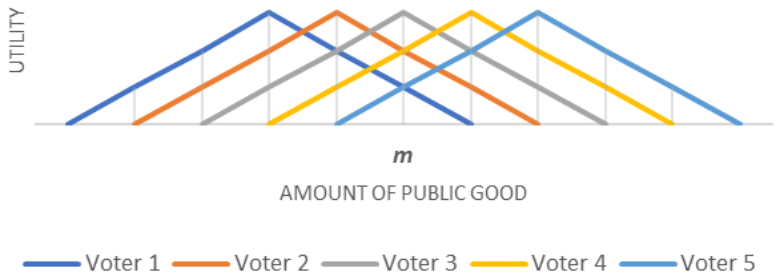
which generates the cycle. Preferences of voters 1 and 3 are unimodal, while voter 2 has bimodal preferences.

Figure 6. Preferences on expenditure levels per voter



Black (1948) showed that and equilibrium with majority rule exists when all voters' preferences are single-peaked. If voter preferences can be expressed in a single dimension, the equilibrium would correspond to the peak of the median voter's preferences, m in Figure 7. Otherwise, majority rule will not produce a result and a cyclic voting will arise.

Figure 7. Single-peaked voter's preference



Logrolling or vote trading

When the intensities of preferences are unequal, the gains of the winning majority may be smaller than the losses of the losing minority. This situation encourages vote bargaining. The pattern of the exchange depends on the relative intensity of preferences. For example, the following table shows that if two policy actions, X and Y, are put to a vote, neither would pass. On the other hand, if B and

C exchange votes, which means that B votes also for policy Y and C does the same for policy X, both would pass.

Table 2. Utility changes per voter and policy alternative

	Example 1			*Example 2*	
Voters	*X*	*Y*		*X*	*Y*
A	-2	-2		-4	-4
B	5	-2		5	-2
C	-2	5		-2	5

Source: Mueller (1976)

In example 1 above, total welfare increases after the exchange, but this is not always the case, like in example 2. In this last case, logrolling encourages excessive and inefficient public spending.

3.3.2 Median voter theory and the rule of majority

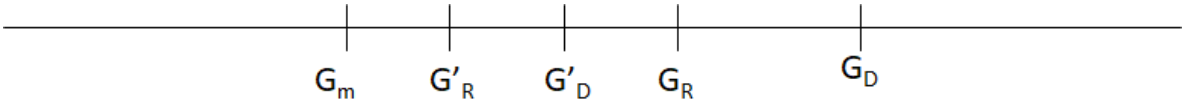
As in representative democracies, the presence of intermediaries between citizens and the outcome of their vote raises new questions regarding the characteristics and efficiency of the voting process. Hotelling (1929) and Downs (1957) pose the median voter theorem as the outcome of a two-party system. If everyone votes for the candidate closest to his or her favourite position, then the candidate who chooses the optimal position of the median voter would win.

> *Median voter theorem: When preferences are unimodal, majority voting will result in the option preferred by the median voter.*

This implies that the government should only know the median voter and implement the level of public spending that the median voter prefers.

Assume two political parties R and D. They want to maximise their votes, given the position of the rival. Gm in Figure 8 is the preferred expenditure of the median voter. The maximising objective of R and D will lead them to choose the median voter's position. If initially $G_D > G_m$ and R chooses a value between G_D and G_m (G_R), the candidate R will get more than 50% of the votes. But D also changes to G_D', until $G_m = G_R = G_D$

Figure 8. The median voter



Source: Stiglitz (2000)

The median voter theorem is based on three strong assumptions: unidimensionality, non-abstentionism and bipartisanship. If these assumptions are relaxed, the stability of the equilibrium is compromised, and cycles may occur as in majority rule.

4 Behavior of voters

4.1. Reaction function of voters

Let us think of public policies as the product of a market with demanders (voters and pressure groups) and suppliers (policymakers). They interact in a context of uncertainty, incomplete and asymmetric information, and transaction costs. Voters decide what candidate or political party are going to support. Their decision can be modelled by using the reaction or decision function in equation 1 (Mueller, 1976):

$$R=BP-C+D \qquad \text{(equation 1)}$$

The same function applies when deciding about the amount of a public good. B is the potential benefit from choosing the best candidate (or the potential benefit of the public good); P is the probability that the individual's choice makes a difference in the election (or the probability that the benefits of the public good accumulate if the action is made); C is the cost of acquiring information about the candidate (or the cost of the action); finally, D are extra benefits such as income or status (or complementary private benefits) (Mueller, 1976).

Concerning specific topics, the benefits of a voter from choosing a specific candidate can be high. In that case, the reduced benefit of a candidate supporting specific interests can be higher than that of a candidate supporting general interests with equal benefits for all citizens. This incentivizes the formation of minority coalitions and causes excess spending on projects of minoritarian interest.

4.2. Voting with the feet

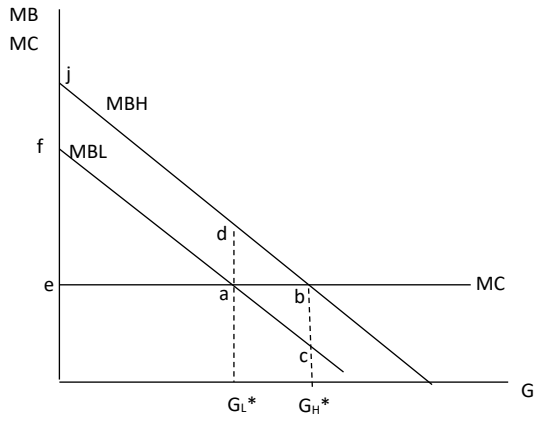
Charles Tiebout developed a model where individuals can reach the optimal amount of public goods by voting with their feet. They can express their preferences for certain public goods or services by choosing where to live or locate themselves (Tiebout, 1956).

When different local governments or communities offer varying levels of public goods (such as education, public safety, infrastructure, etc.), individuals can move to the community that best aligns with their preferences. By choosing to live in a particular area, individuals are effectively "voting with their feet" for the bundle of public goods and services that the community provides.

This movement of people helps to create an environment where local governments or communities compete to provide the most desirable combination of public goods to attract residents. Over time, this competition can lead to allocating resources that better match the population's preferences, potentially resulting in an optimal provision of public goods at the local level.

Figure 9 illustrates the case of a community with two heterogeneous groups (as in Hillman, 2003). Group H experiences high marginal benefit (MBH) for the public good G, while group L has low marginal benefit (MBL) for the good. Thus, each group has a different optimal level of G (G_H* y G_L* respectively).

Figure 9. Voting with the feet



abc is the deadweight loss experienced by L if the community produces G_H* instead of G_L*, and they remain in the community instead of going to a different one. In that case, H obtains the highest

possible benefit: *bej*. Likewise, *abd* is the deadweight loss experienced by H if the community produces G_L* instead of G_H*, and they remain in the community instead of going to a different one. In that case, L obtains the highest possible benefit: *aef*. Optimality will be reached if G and L divide into two homogeneous communities where each group produces public goods until the marginal benefit equals the marginal cost.

In summary, "voting with the feet" in public goods involves individuals choosing where to live based on the level and quality of public services. This creates competition among communities to provide the best possible mix of public goods to attract and retain residents. This concept aims to achieve a form of optimality by allowing people to self-select into communities that align with their preferences. Hence, voting with the feed is a preference (for public goods) revelation mechanism.

5 Normative Theories of Public Choice

In the same way that positive theory has developed explanatory and predictive theorems from the postulates of rational egoistic behaviour, normative theory's challenge is to develop theorems about the expression and realization of values based on generally accepted postulates.

5.1. Rawl's Theory of Justice

John Rawls bases his theory on the same rational, egoistic man assumptions as public choice and explicitly renounces human altruism. Rawls compares participation in society with participation in a game of chance. In other words, the position of individuals in society is by chance. Each individual is born to a generation, culture, social system, family, and set of personal attributes (the original position) determined by chance and that largely determines its happiness.

Rawls argues that individuals ought to adopt the position of a potential entrant or beginner rather than their actual positions and consider the social institutions and distribution of assets that would emerge if actual positions were unknown. From this original position, under the veil of ignorance, they choose the rules and institutions that constitute the social contract, which cannot favour any individual or group because specific information about individuals is missing.

Two principles derivate as the core of the social contract:

(1) Each person is to have an equal right to the most extensive essential liberty compatible with a similar liberty for others; and,

(2) Social and economic inequalities are to be arranged so they are both i. to the most significant benefit of the least advantaged citizens and ii. they are attached to positions open to all under fair equality of opportunity conditions.

What is essential to the theory of public choice is not the principles Rawls arrives at but the process by which he gets there: *individuals might be led to make unanimous agreements (or decisions) as if they were behind a veil of ignorance.*

5.2 The Constitution as a Social Contract: Tullock & Buchanan

Unlike the day-to-day decisions made, constitutional choice implies the selection of basic rules that affect social welfare for a long time. Therefore, individuals are assumed to be uncertain about the rule's impact on them because they are uncertain about their specific positions, tastes, etc., in the future.

Buchanan and Tullock postulate that individuals choose constitutional rules by placing themselves in the envisaged positions of all future citizens. However, a fully equal weighing of future utilities is doubtful, for it is difficult to envisage individual uncertainty over skin colour, sex, native tongue, and so on.

These authors describe a process of constitution-making quite analogous to Rawls's description of the social contract's formation; individuals would make the choices by weighing their impacts on all because of rational self-interest under uncertainty. Therefore, actual constitutions formed under unanimity rules become just political contracts.

5.3 The Constitution as a Social Welfare Function: Harsanyi

Likewise previous theorems, Harsanyi also assumes that individuals are uncertain about their future positions. Again, this uncertainty could be artificially created by mentally assuming a

place in Rawls's original position or be accurate due to the long-run nature of social welfare decisions.

Harsanyi proposes that if each individual is indifferent between two states of the world implies social indifference between the states. The social welfare function (W) can be defined as a weighted sum of individual utilities (equation 2)

$$W = \sum_{i=1}^{n} a_i \cdot U_i \qquad \text{(equation 2)}$$

Where a_i represents an equal probability of being any other individual in society, or of being in his/her position, or having his/her utility function, etc. Such an equal weighting would emerge if individuals were uncertain about future tastes and positions and adopted the principle of insufficient reason to assign probabilities.

The equiprobability assumption gives an ethical content to this Utilitarian Welfare Function, allowing achieve the same uniformity of opinion and choice as in social contract (Rawls) and constitution (Buchanan & Tullock) theorems.

5.4 Arrow

Kenneth Arrow proposes five (5) axioms, which he argues every social welfare function might obey. These desirable axioms state the basic value judgments of the community as embedded in the social contract or constitution. Together, they reflect value judgment and individual and collective rationality assumptions. The assumptions are listed as follows (Muller, 1976; Morreau, 2014):

I. *Unlimited (or unrestricted) Domain*: Social welfare function can handle any combination of individual preferences.
II. *Social ordering or Transitivity*: The social welfare function consistently orders all feasible alternatives.
III. *The Pareto Postulate or Unanimity*: A social welfare must satisfy that if every individual in a society prefers A over B, society must prefer A over B.
IV. *Nondictatorship*: No individual enjoys a position such that whenever he/she expresses a preference between any two alternatives and all other individuals

express the opposite preference, his/her preference always prevails in the social ordering.

V. *Independence of Irrelevant Alternatives*: The social choice between the two alternatives shall not be affected by preferences over other alternatives.

Arrow discovered that the five previous conditions are incompatible except in the simplest of cases. This is what is called the Arrow's Impossibility Theorem (1951). The theorem proves that, given these minimal assumptions, it is impossible to construct any procedure that results in a collectively rational expression of individual desires, and, at the same time, basic democratic principles are respected (Amadae, 2015).

To avoid the impossibility result, these must be relaxed. The focus will be on modifications of relevance to public choice (Mueller, 1976).

1. *Relaxing unanimity and no dictatorship*. This modification can be problematic for the ideas of individualism and citizen sovereignty predominating in democratic republics. Nevertheless, since old age, the elitist theories of collective choice have been attractive. About, Plato suggested as "good forms" of government the monarchy and aristocracy, besides democracy. Hobbes defended the monarchy, arguing that life under anarchy would be terrible and inferior to life under an unanimously accepted dictator. Combined with the other postulates, this idea constructs a new defense of autocracy.
2. *Relaxing transitivity*. This modification implies declaring that society is indifferent to all choices along the Pareto frontier, which can be an arbitrary choice process. In practice, such rules introduce and favour the status quo as a choice.
3. *Relaxing Unlimited Domain*. Single-peakedness (unimodal preferences) ensures that majority rule produces an outcome. Issues must be of the one-dimensional variety, and the voters cannot simultaneously consider, for example, the number of guns, the number of school books, and their preferences must be single-peaked in this one dimension. If some individuals have multiple peaks, they must be isolated and excluded from the community, or an impossible result can emerge. In this way, a

community can be formed only with homogeneous preferences individuals, just as in club goods and in the process of "voting with feet".

4. *Relaxing Independence Axiom*. Without this condition, there is the possibility of strategic misrepresentation of preference or using bargaining abilities to increase the chances that the preference option being chosen. Some voting rules can be considered. One is the rank order method of voting first; here, the alternatives are allocated points, inversely to their rankings in individual preferences, and the alternative with the most points wins. Logrolling, or vote trading, would be a second method to reveal individual intensities on issues.

6 Some empirical applications of public choice theory

As economics students, bridging theoretical concepts with real-world data is essential. Empirical evidence constitutes a powerful tool to validate and deepen our understanding of public choice theory, collective choice, voting behavior, and related topics. This section provides a general outlook of relevant studies developed within the public choice and political economy frameworks. The primary purpose is for the student to recognize how the theoretical concepts discussed can be seen in real-life phenomena and why the latter is fundamental when assessing economic and public policies. Some examples of how theory and evidence meet each other are:

1. Median Voter Theorem: Researchers may analyse the positions of candidates on key policy issues and the corresponding voter preferences, showing a convergence towards the median voter's viewpoint to maximize electoral appeal.

2. Redistribution Policies and Voter Behavior: Empirical studies can explore how redistribution policies influence voter behavior and help us understand how voters consider their economic interests against broader societal concerns.

3. **Public Choice and Government Spending**: Empirical investigations into government spending patterns across countries provide insights into how public choice theory translates into real-world outcomes. Researchers analyse budget allocations, identifying the role of interest groups, political competition, and voter preferences in shaping government expenditures.

4. **Collective Decision-Making in Referendums**: The empirical study of collective choice extends to referendums and policy initiatives. By analysing voting behavior and campaign strategies, researchers can evaluate how collective decisions are made on contentious issues like tax reforms or social policies.

The academic literature on public choice and political economy is extensive. It has been growing during the last decades, taking advantage of the intersection of political science, economics and even constitutional law. In this last section, we will discuss some papers and the relevance of their main findings associated with the main topics we just discussed:

- Political cycles, electoral manipulation and government spending in Colombia: Eslava (2005) uses data on government expenditures and electoral outcomes in Colombia and tries to identify if the latter is consistent with voters' preferences towards certain types of public expenditure, especially infrastructure. According to her findings, voters positively acknowledge fiscal equilibrium but tend to reward incumbents who increase public investment before the elections.

- Redistribution and the size of the state: Larcinese (2007) applies a regression analysis on panel data for 41 countries in the period 1972-1998 to analyze the Downsian theory focused on the role of turnout when discussing median voters and preferences towards redistribution. His results state that turnout positively correlates with income, implying that the pivotal voter may have a higher income than the

median income in the population and, therefore, demand for redistribution may be biased.

- Interest groups and policy decisions: Choi (2014) is interested in analyzing not only "pre-vote" but also "post-vote" lobbying, and he founds that after the U.S. House of Representatives passed the Emergency Economic Stabilization Act (EESSA) of 2008, which positively affected the financial sector, monetary contributions for politicians who voted in favor increased.

- Public goods and collective risks: Cárdenas et al. (2017) developed an empirical study to understand how smallholder agricultural communities make collective decisions in a public good issue. The authors found that integrating 118 small-scale rice producers with the broader economic system resulted in a lower investment in public goods when facing collective risks.

In conclusion, integrating empirical evidence with theoretical concepts is a cornerstone of the study of public choice theory, collective choice, and voting behavior within economics. This synthesis allows us to bridge the gap between abstract ideas and real-world phenomena, enriching our comprehension of economic and public policy dynamics.

References

Amadae, S. (2015). Impossibility Theorem. Encyclopedia Britannica. https://www.britannica.com / topic/impossibility-theorem. Accessed 18 August 2023.

Black, D. (1948). On the Rationale of Group Decision-making. Journal of Political Economy, 56(1), 23–34.

Cárdenas, J., Janssen, M., Ale, M., Bastakoti, R., Bernal, A., Chalermphol, J., Gong, Y., Shin, H., Shivakoti, G., Wang, Y., & Anderies, J. (2017). Fragility of the provision of local public goods to private and collective risks. Proceedings of the National Academy of Sciences of the United States of America, 114(5), 921–925. https://doi.org/ 10.1073/ pnas.1614892114

Choi, S. (2014). Do interest groups reward politicians for their votes in the legislature? Evidence from the recent financial crisis. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2404240

Downs, A. (1957). An economic theory of democracy. Harper an Row. New York.

Eslava, M. (2005). "Political Budget Cycles or Voters as Fiscal Conservatives? Evidence from Colombia," Documentos CEDE 3343, Universidad de los Andes, Facultad de Economía, CEDE.

Hillman, A. (2003). Public Finance and Public Policy. Cambridge University Press

Larcinese, V. (2007). Voting over Redistribution and the Size of the Welfare State: The Role of Turnout. Political Studies, 55(3), 568–585. https://doi.org/10.1111/j.1467-9248.2007.00658.x

Morreau, Michael (2014). Arrow's Theorem. Stanford Encyclopedia of Philosophy: N/A.

Mueller, D (1976). Public choice: a survey. Journal of Economic Literature, Vol. 14, Issue 2, 395-433

Hotelling, H. (1929). Stability in Competition. The Economic Journal, 39(153), 41–57.

Plott, C. R. (1967). A Notion of Equilibrium and its Possibility Under Majority Rule. The American Economic Review, 57(4), 787–806.

Rae, D.W. (1969). Decision-Rules and individual values in constitutional choice. American Political Sciences Review, 63 (1), 40-56.

Stiglitz, J. (2000). La economía del sector público. Antoni Bosh editor.

Taylor, M.J. (1969). Proof of a Theorem on Majority Rule. Behavioral Science, 14, 228-31.

Tiebout, C. (1956), "A Pure Theory of Local Expenditures", Journal of Political Economy, 64 (5): 416–424, doi:10.1086/257839