

Chapter 2

Original Theories and Current Studies

When the first author was a graduate student, some of his professors would argue about the five most influential works in formal political theory. Their lists included classics that affected a wide audience, not just works that were technically advanced. Kenneth Arrow's *Social Choice and Individual Values*, Mancur Olson's *Logic of Collective Action*, and Anthony Downs' *An Economic Theory of Democracy* frequently made the list. Others were discussed, but Buchanan and Tullock's *The Calculus of Consent* always seemed to be in the top five.

When it was first published, *The Calculus of Consent* contained a number of fresh ideas. Buchanan and Tullock argued that no voting rule is flawless because there is always a tradeoff between decision costs and external costs. Decision costs are the time and effort needed to make a decision. External costs are the losses an individual expects to endure as the result of the coercive actions of others. Majority rule imposes moderate amounts of decision costs and external costs. Unanimity rule imposes no external costs but considerable decision costs. Whether one of these voting rules, or perhaps a supermajority rule, should be adopted depends on the context.

This chapter reviews the arguments made by Buchanan and Tullock in their classic work, *The Calculus of Consent*. We first detail Buchanan and Tullock's argument for determining the optimal k -majority rule in a legislature. We examine legislative decision making first, before constitutional decision making, because it facilitates our descriptions of constitutional decision making in the next section. The constitutional stage contains potentially high external costs relative to decision costs, making it arguable different from legislative decision making. In this setting, unanimity rule is considered an ideal type. In the next section, we briefly describe Buchanan and Tullock's thoughts on some additional themes, such as vote trading and representative democracy. We then end the chapter with a very brief discussion of how their book influenced later works.

2.1 Legislative Decision Making

Central to Buchanan and Tullock's study of legislative decision making is the examination of various k -majority rules. Loosely, under k -majority rule a proposal needs k "yea" votes to pass; otherwise the proposal is rejected. These can range from the affirmative vote of one individual to the affirmative vote of all N individuals in the population. Buchanan and Tullock analyze the optimal k -majority rule using two types of costs: external costs and decision making costs. The optimal k -majority rule is the one that minimizes the sum of these two costs.

External costs are the expected costs an individual endures as the result of the actions of others (Buchanan and Tullock, 1962, p. 64). Buchanan and Tullock argue that these costs are a decreasing function of the number of individuals required to agree to group decisions. This is because members of the decisive coalition will consider their own marginal costs and can easily make decisions contrary to the interests of people outside their coalition. At one extreme, external costs will be greatest if a single individual can authorize action for the group. On the other extreme, external costs will be lowest, typically zero, if everyone in the group is required to agree. The latter occurs because individuals will not allow others to impose external costs on them if each has the power to reject decisions that can hurt them (Buchanan and Tullock, 1962, p. 64).¹

To illustrate the idea, Buchanan and Tullock (1962, pp. 66–7) consider a municipality issuing property taxes to pay for street repairs. If one individual is allowed to decide which streets are repaired, and that individual maximizes his/her personal net benefits, he/she would spend the money on the roads on which he/she travels and neglect the roads used by others. Of course, the individual who is dictating road repairs would not experience external costs. However, the individuals governed by the decision who are not in the decisive coalition would be likely to incur positive external costs. At the other extreme, if everyone in the municipality had to give their approval for street repairs, each individual would approve of the road repair only if it gave them positive net benefits. Without knowing whether an individual will be a member of the decisive coalition, an individual can expect large external costs if one individual is allowed to dictate repairs and zero external costs if all individuals must agree on repairs.

In describing external costs, Buchanan and Tullock clearly have the *expected* incurred by an individual in mind. Presumably no one knows *a priori* whether they will be a member of the decisive coalition or someone outside the decisive coalition. Instead, they have to make a decision about the most appropriate k -majority rule as if they could be in either position. For this reason, expected external costs should decrease as the number of individuals required to make a decision increases. Actual external costs may or may not decrease for each individual.

In contrast, decision making costs are the costs resulting from the time and effort needed to reach an agreement. Buchanan and Tullock argue that such costs are an

¹ See Heckelman and Dougherty (2010a) for a crude test of whether larger k -majority rules have negative effects on various tax increases.

increasing function of the number of individuals needed to make a decision. Very little time and effort is needed for one individual to make a decision because that person does not have to negotiate an agreement with anyone else. More time is required as the number required to assent increases, partly because members of the decisive coalition will have fewer members outside their coalition to turn to if someone in their coalition opposes their proposal.

In the street repair example, requiring the approval of only one individual to make decisions may lead to quick decisions about street repairs. Requiring a few more individuals in the decisive coalition will require a little more time and effort to craft plans. If everyone must approve, a considerable amount of time and effort is required to make sure that everyone is satisfied with the plan and to thwart any jockeying for larger shares.

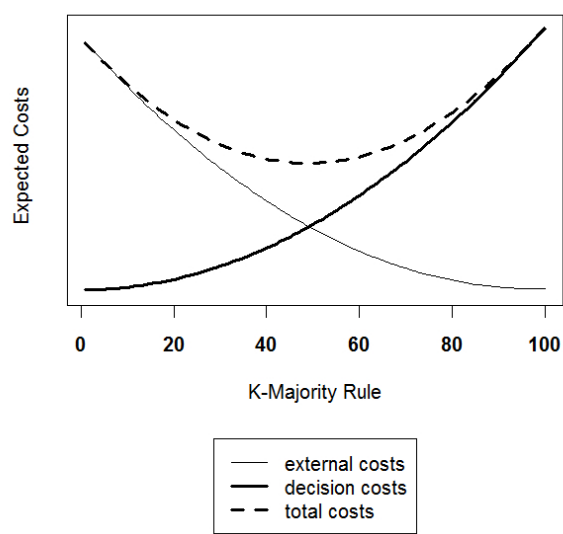


Fig. 2.1 Traditional External Costs and Decision Costs

Buchanan and Tullock (1962, pp. 65-71) represent such costs in a figure similar to the one depicted in [Figure 2.1](#). The expected costs of a particular decision are represented along the vertical axis and the number of individuals required to make a decision are represented along the horizontal axis. The thin line, which decreases from left to right, depicts external costs. The thick line, which increases from left to right, depicts decision costs. At the left extreme, the rule of anyone making decisions for the group produces potentially large external costs but minimal decision costs. No delays should be expected under that voting rule. On the right extreme, unanimity rule minimizes external costs but imposes extremely high decision making costs. Buchanan and Tullock suggest that the optimal decision making rule minimizes the sum of these two functions (depicted by the dashed line). This occurs at $k = 49$

in this particular figure. Here the sum of the expected costs from having a decision imposed on oneself and the expected costs of making decisions is minimized. If legislatures have to choose a voting rule from the set of k -majority rules, $k = 49$ would be optimal.

In making such claims, Buchanan and Tullock do not prescribe an ideal set of institutions for every society. Instead, they recommend that each country, town, or local club adopt their own set of institutions based on how individuals within their society value these two costs. In this sense *The Calculus of Consent* (1962) creates an interplay between positive observations about how rational individuals choose and normative recommendations about how they ought to choose. On the one hand, rational individuals make choices about which institutions to adopt. These choices are positive. On the other hand, Buchanan and Tullock's recommendations about how constitutional decisions ought to be made is very normative. Because different societies, and different individuals within societies, value different properties, it is logically consistent for different societies to choose different sets of institutions and for all of them to be fair. Furthermore, a society may find decision costs negligible for the constitutional phase and use unanimity rule to make a decision about the optimal k -majority for legislation, then adopt some less inclusive k -majority rule, such as majority rule, for the legislative decisions. As Buchanan and Tullock write, "there is no necessary inconsistency implied in the adoption of, say, simple majority rule for the making of certain everyday decisions for the group with respect to those activities that have been explicitly collectivized, and the insistence on unanimity of consensus on changes in the fundamental organizational rules" (Buchanan and Tullock, 1962, p. 251).

However, some properties may guide individuals in their choice of the optimal k -majority rule. Everything else equal, decision costs should be greater when there are a variety of opinions and information is scarce than when opinions are homogenous and the information is readily available. Similarly, larger communities may have greater difficulty making decisions than smaller ones, which means they have larger decision costs. Furthermore, communities that have well-written bills of rights might expect lower external costs than communities without such protections (Mueller, 2003, p. 76).

Buchanan and Tullock's analysis suggests that if both external costs and decision costs are relevant to the decision, then the optimal k -majority rule will be between 1 and N . Majority rule is just one of the many candidates. There is no *a priori* reason why majority rule would be the k -majority rule that minimizes total costs.

Others have adjusted Buchanan and Tullock's argument in a way that makes majority rule much more likely to be optimal. For example, Mueller (2003, pp. 76-8) claims that there might be a "kink" in the decision cost function at $N/2$.² The reason is that for any $k \leq n/2$, it is possible for both policy A and policy $\sim A$ to pass. For example suppose k is set to 35 out of 100 voters. A proposal to increase school expenditures might first receive a winning majority of say 40 voters. After the measure passes, a counterproposal to cut school expenditures by the same margin

² By "kink" Mueller meant a jump discontinuity.

could also pass. This is because any k -majority rule with $k \leq 50$ allows a winning coalition to be found on both sides of the issue. An assembly that adopts such a rule can be deadlocked in an endless series of offsetting proposals. Such proposals would increase decision making costs dramatically. Since the argument applies to any $k \leq 50$, but not for $k > 50$, decision costs will jump upwards at $k = 50$, as depicted in Figure 2.2. The function remains continuous elsewhere. Such a jump discontinuity typically places the minimum at majority rule. Although the exact k -majority that minimizes total costs still depends on the shape of the decision cost curve and the relative value of external costs and decision costs by individual members, Mueller's argument provides an explanation for why majority rule is so common in practice (Mueller, 2003, pp. 76–8).

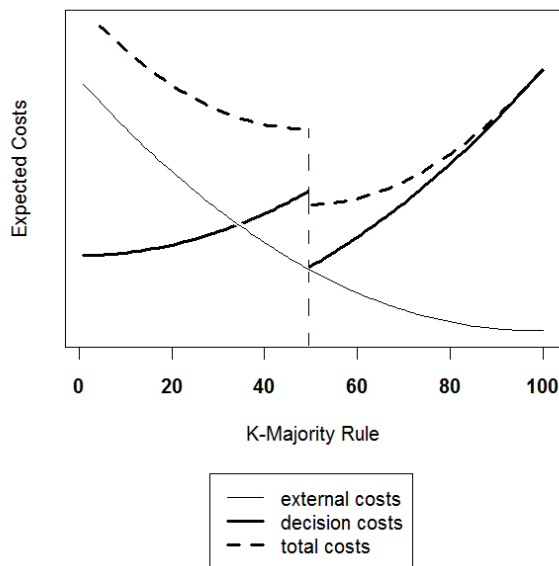


Fig. 2.2 Mueller's Big Jump Discontinuity

Others have expanded on Buchanan and Tullock's original ideas. In a separate work, Mueller (2003, p. 103) argues that vote cycling might make decision costs U-shaped with a minimum around 64% of the population.³ Combined with the previous argument against k -majority rules less than majority rule, this might make the optimal k -majority around 64% of the voters. Spindler (1990) argues that legislative decisions should also include rent-seeking costs. With rent-seeking costs included, total costs might be minimized closer to unanimity rule or to the rule of one than to majority rule. Guttman (1998) claims that the optimal k -majority rule should be

³ Caplin and Nalebuff (1988) show that 64% is the minimum size of the k -majority coalition that guarantees no vote cycling.

based on the Kaldor–Hicks criterion and concludes that majority rule is most suitable for that standard. Rae (1969) in contrast, defines the optimal k -majority rule as the one that minimizes the probability of society choosing against an individual. Analyzing two alternative cases in a probabilistic setting, Rae concludes that majority rule is most capable of making such choices.⁴ Finally, Brennan and Hamlin (2000) replace the external cost function with an agency loss function and apply a similar analysis to the optimal proportion of representatives in a representative democracy. In all of these cases, except perhaps the work of Rae, external costs and decision costs are not fully formalized. Instead, the argument is written as an analytical narrative. One of goal of this book is to develop more careful formalizations of these concepts.

2.2 Constitutional Decision Making

For Buchanan and Tullock constitutional decisions are quite different from legislative decisions because constitutional decisions establish the rules of the game and dictate the legislative process well into the future. In constitutional settings, individuals are less certain about their future circumstances and interests. This uncertainty makes them think more objectively and behave as if they were the average person in a constitutional setting (Buchanan and Tullock, 1962, pp. 77–80).

The argument is somewhat reminiscent of Kant’s categorical imperative, which suggests that individuals ought to make choices that apply to all similarly situated individuals. This does not suggest that individuals will always agree about which institutions are best. It only explains why Buchanan and Tullock believe constitutional decisions are more impartial than policy decisions. This impartiality causes decision makers to become more homogenous, which in turn reduces decision costs.

Moreover, when rational individuals consider the importance of constitutional decisions and note that one constitutional decision can govern thousands of policy decisions, they may be willing to ignore decision costs and evaluate constitutional decisions solely on the basis of external costs. Buchanan and Tullock believe that without decision costs, unanimity rule is clearly the best voting rule. They write, “this single decision-making rule acquires a unique position in our whole analysis which suggests that if costs of decision-making could be reduced to negligible proportions, the rational individual should always support the requirement of unanimous consent” (1962, p. 88).

Buchanan and Tullock recognize that decision making costs are likely to be positive at the constitutional stage of decision making (pp. 94–5). They simply argue that making decisions about the rules of the game implies potentially large external costs — so large that the relative importance of decision costs is negligible.

⁴ Rae assumes voters are equally likely to support or oppose a proposal and that everyone votes. If different assumptions are made, then his model does not necessarily predict that majority rule is optimal.

Requiring any threshold less than unanimity would leave the rational individual uncertain about whether they would be a member of the decisive coalition or the non-decisive coalition. It would make it possible for them to be made worse off by the creation of a collective with coercive powers. In contrast, unanimity rule includes everyone in the bargain and guarantees Pareto improvements. That is, it guarantees change that make at least one person better off and no one else worse off. A point where no additional improvements like this can be made is considered Pareto optimal.⁵

Pareto optimality is the most widely accepted measure of efficiency in welfare economics. By connecting consensual decision making to unanimity rule and unanimity rule to the concept of a Pareto improvement, Buchanan and Tullock are able to connect classic political philosophy to modern conceptions of efficiency. Buchanan and Tullock write, “[t]he welfare-political-economist approach indicates that a specific choice is Pareto optimal only if all parties reach agreement. ... [A]ll less-than-unanimity decision-making rules can be expected to lead to nonoptimal decisions by the Pareto criterion” (1962, pp. 94–95).⁶ In this sense unanimity rule becomes the “ideal” voting rule and deviations from unanimity rule are seen as necessary expedients (p. 96).

Some of the most important constitutional decisions are whether the legislature will be unicameral or bicameral (Buchanan and Tullock, 1962, pp. 233–48), the proportion of the population that will act as representatives (Buchanan and Tullock, 1962, pp. 205–8), and the method of election — either as a function of individual votes or some randomization device (Buchanan and Tullock, 1962, pp. 217–20). It also includes the choice of the k -majority rule used in the legislature. That choice is a re-occurring theme throughout *The Calculus of Consent*.

Because each legislative decision will create its own decision costs, individuals will choose the best k -majority rule for the legislative phase by considering both external costs and decision making costs at the constitutional phase.

As various institutions are proposed and discussed at the constitutional phase, individuals make decisions about whether they want to opt into the collectivization or opt out. In addition to arguing that requiring k -majority rules less than unanimity allow some individuals to coerce others, Buchanan and Tullock argue that k -majority rules with $k < N$ may cause too many resources to be allocated to the public sector. This does not mean that the collectivization will be over-extended into unnatural issue areas, though the collective could overextend; it means that too many resources will be applied to the activities that the community collectivizes (Buchanan and Tullock, 1962, p. 205).

Buchanan and Tullock argue that orthodox arguments against unanimity rule as infeasible are based on choices between two mutually exclusive alternatives — such as a single status quo and a single proposal. They envision constitutional decision making that allows for bargaining over a whole array of alternatives (Buchanan and Tullock, 1962, pp. 253–4). To illustrate the point, they consider an example with

⁵ Such concepts are defined more carefully in the next chapter.

⁶ Also see Buchanan and Tullock (1962, pp. 94, 110)

three people deciding whether to collectivize fishing (Buchanan and Tullock, 1962, pp. 254–5). If the choice is to collectivize or not, one individual could be easily opposed to collectivizing fishing, perhaps because he does not like fish – in which case unanimity is very unlikely. However, if the decision also includes collectivizing the gathering of coconuts, then the three individuals may be able to logroll and find a collective agreement that make all three of them better off.

Of course, this logic extends to other activities as well. If they cannot find any agreement across all the possible activities that can be collectivized, collectivizing would not be in everyone's mutual interest and imposing a coercive collective agreement on all three would be wrong. "When trades can take place, the analogy with economic or market exchange is appropriate" (Buchanan and Tullock, 1962, p. 255). Vote trading and bargaining help social contracts become more like economic contracts.

2.3 Representative Democracy

Buchanan and Tullock illustrate just how broad this idea can be applied when they examine representative democracy in Chapter 15. This chapter is the closest their work comes to analyzing elections as a separate phase of decision making. In it, they identify four basic constitutional choice variables that individuals must judge simultaneously: (1) the voting rule used for choosing representatives (i.e., a k -majority rule applied to elections in various districts), (2) the basis of representation in the assembly (i.e., the proper mix of functional and random elements), (3) the degree of representation (i.e., the fraction of the population that will act as representatives), and (4) the k -majority rule used in an assembly to make decisions. Having already discussed the costs associated with the fourth variable, Buchanan and Tullock apply the same analysis to the other variables.

Consider the third variable. At one extreme, only one representative makes decisions on behalf of the voters. At the other extreme (direct democracy), the number of representatives equal the number of eligible voters. When constitutions enumerate the minimum number of representatives allowed in a population, they codify a choice about the degree of representation. That is, the proportion of the population that will be elected as representatives. Buchanan and Tullock argue that choosing the optimal number of representatives is similar to choosing the optimal k -majority rule — except in this case, the independent variable is the ratio of number of representative to the number of individuals in the population. Decision costs increase with larger proportions because the time it takes to make decisions increases as a greater proportion of individuals act as representatives. At the same time external costs should decrease as the proportion of the population acting as representatives increases.

The second variable, the basis of representation, determines the composition of representatives. At the one extreme, representatives will be elected as a function of individual votes. At the other extreme, all representatives may be drawn by say

random lots as in ancient Athens. In the latter cases, political officials may still be considered representative, though in a different sense. Most democracies chose to keep random elements at a minimum, but that does not mean that the second variable is not a constitutional choice (Buchanan and Tullock, 1962, p. 218–9).

Buchanan and Tullock bring these four constitutional elements together and argue that at the constitutional stage, individuals attempt to minimize the sum of the combined costs in equilibrium. If others successfully propose to increase the k -majority rule used in elections, then decision costs will increase, external costs will decrease, and citizens may want to decrease the k -majority thresholds in variables two through four. If others propose a shift from a functional basis of representation to a more random one, expected decision costs will probably increase and expected external costs decrease. Individuals may then want to decrease the thresholds in variables one, three, and four to compensate (Buchanan and Tullock, 1962, p. 227–9). This suggests that the simple analytical model used to analyze voting thresholds in an assembly may be more general. It also demonstrates the complexity of decision making that Buchanan and Tullock hope individuals can handle.

2.4 Vote Trading and Other Themes

The proceeding sections represent the parts of Buchanan and Tullock's book that are most closely related to our current study. But Buchanan and Tullock touched on several other themes. Vote trading, in particular, is traditionally considered one of the central themes in Buchanan and Tullock's work. Buchanan and Tullock analyze a few numerical examples of vote trading under majority rule and draw several conclusions. First, they conclude that there are more advantages to vote trading if individuals receive different benefits from a collective good than if they all receive the same benefit. If they all receive different benefits, members of a minority with intense interests on issue A will have stronger incentive to vote trade with members of a minority with intense interests on issue B than if all members benefit equally.

Second, Buchanan and Tullock argue that under majority rule vote trading can make winning outcomes more efficient. To illustrate the point, they first introduce a simple three-person game without side-payments and show that the solution set depends on which individuals are in the winning coalition. They then compare this result to one with "full" side-payments to show that there can be dramatic improvements in efficiency. They argue that with full side-payments the winning coalition allocates resources to the individuals who benefit the most (whether they are members of the winning coalition or not) and redistribute payments from those who receive the resources to members of the winning coalition in a way that maximizes the return to the winning coalition. Such side-payments may be in dollars or discriminatory taxes on those who receive the good.

For example, Buchanan and Tullock ask us to consider a township with 100 farmers trying to decide which roads to repair (Buchanan and Tullock, 1962, p. 135–9). The first third of the farmers benefit \$10 for every dollar spent on the repair

of their roads (call these the first coalition), the second third benefit \$5 for every dollar spent on the repair of their roads (the second coalition), and the last third benefit \$1 for every dollar spent on their roads (the third coalition). To keep the example simple, assume that the marginal productivity of road repair is constant and the township receives a \$33 grant to pay for road repairs. If a winning coalition forms between all members of the third coalition and eighteen members of the second coalition, the winning coalition will not allocate road repair to their own roads. Instead, they will allocate road repair to the most productive allocation — the members of the first coalition — and require the first coalition to transfer just less than \$10 per member to the winning coalition. Buchanan and Tullock conclude that such side-payments assure that funds will be invested in the most productive manner (to those who value them most) and that gains are shared more symmetrically in terms of benefits than if there were no side-payments. They claim this is true even if the actual allocation of road repairs is nonsymmetric (Buchanan and Tullock, 1962, pp. 154–5).⁷

Although they do not offer formal examples of vote trading, Buchanan and Tullock argue that vote trading produces an outcome between the two extremes of no side-payments and full side payments (Buchanan and Tullock, 1962, p. 155). For them, vote trading is simply an indirect means of making side-payments (Buchanan and Tullock, 1962, p. 156).

Buchanan and Tullock also analyze bicameralism and claim that bicameralism may be an effective means of reducing expected external costs without incurring too many decision making costs (1962, p. 236). Such institutions add to the breath of their analysis but also add to the complexity of decisions expected from individuals at the constitutional stage.

2.5 Conclusion

The *The Calculus of Consent* was one of the first economic studies of constitutional formation. Its recurring themes of decision costs, external costs, and Pareto efficiency were simple, and they had an effect on future studies. Since it was written, social scientists have asked questions about what causes a nation to seek a new constitution (Greif and Laitin, 2004), how constitutions are made (Lijphart, 1999; McGuire, 2003), and what factors allow for corruption in constitutional decision making (Shleifer and Treisman, 2001; Laffont, 2000). They have also re-examined the efficiency of governmental institutions throughout history (North and Weingast, 1989) and studied conditions that allow democracies to succeed (Przeworski, 2005; Lijphart, 1999; Lipset, 1963). These studies have been combined with more traditional themes in public choice about the effects of logrolling (Riker and Brams, 1973), bicameralism (Riker, 1992; Diermeier and Myerson, 1999), agenda setting

⁷ For a criticism of the generality of these claims see Riker and Brams (1973).

(Koford, 1982), and legislative size (Crain and Tollison, 1977; Dougherty and Edward, 2009).

Because *The Calculus of Consent* had such broad effects on a wide range of research questions, we have found it useful to revisit some of its central themes. Many of them may now seem commonplace, but only because Buchanan and Tullock made them so. Before we examine these themes carefully, we must first define terms and examine the relationship between unanimity rule and several Pareto concepts. This shows that simple ideas such as the apparently close relationship between unanimity rule and Pareto improvements may not be as close as they seem.



<http://www.springer.com/978-0-387-98170-3>

The Calculus of Consent and Constitutional Design

Dougherty, K.; Edward, J.

2011, XII, 120 p., Hardcover

ISBN: 978-0-387-98170-3