Chapter One Problems

1. Unidimensional voting

1.1 Find the median voter on the following committees, with the ideal points as given:

   a. \( C_1 = 200, C_2 = 100, C_3 = 25, C_4 = 16, C_5 = 22, C_6 = 63, C_7 = 57 \)
   b. \( C_1 = 200, C_2 = 100, C_3 = 25, C_4 = 16, C_5 = 22, C_6 = 63 \)
   c. \( C_1 = 200, C_2 = 100, C_3 = 25, C_4 = 16, C_5 = 22, C_6 = 63, C_7 = 57, C_8 = 22 \)
   d. \( C_1 = 200, C_2 = 100, C_3 = 25, C_4 = 16, C_5 = 22, C_6 = 63, C_7 = 57, C_8 = 21 \)

1.2 Suppose that each of the preceding committees voted on the following alternatives: \( A_1 = 100, A_2 = 250 \). Assume that the utility curves are symmetrical and that voting proceeds under pure majority rule. Find the resulting policy outcome for each committee.

1.3 Figure P-1 shows the ideal points of five committee members, \( C_1, \ldots, C_5 \), along with their utility curves, \( U_1(X), \ldots, U_5(X) \). The Greek letter \( \phi \) indicates the status quo that obtains if the committee takes no positive action. Draw the win set against \( \phi \), \( W(\phi) \).

1.4 Repeat Problem 1.3 with the set of utility curves depicted in Figure P-2. How does the equilibrium outcome under pure majority rule differ between problems 1.3 and 1.4?

2. Multidimensional voting

For the next three problems, use the set-up provided in figure P-3. (You might want to make several copies of it.) In Figure P-3, three ideal points are given for three legislators, \( C_1, C_2, \) and \( C_3 \). The points labeled \( \phi_1, \phi_2, \) and \( \phi_3 \) will be used to indicate status quo points, where appropriate.

2.1 Using circular indifference curves, find the win set again all three status quo points.

2.2 Construct a voting agenda such that the committee in Figure P-3 can move from \( \phi_1 \) to the point labeled \( z \) using pure majority rule. (You will have to go “off the figure” to construct the agenda.)

2.3 Assuming elliptical indifference curves of the type described in the next sentence, draw the win sets for all three status quo points. The indifference curves are such that each committee member holds the y-axis dimension more salient than the x-axis dimension, so the ellipses look like footballs laid on their sides.

2.4 Figure P-4 shows the ideal points of seven committee members, \( C_1, \ldots, C_7 \), along with two status quo points, \( \phi_1 \) and \( \phi_2 \). Assume circular indifference curves. Show the regions that (1) a simple majority (2) a 2/3 majority, (3) a 3/4 majority, and (4) a unanimous majority prefer compared to each status quo.
3. Sincere and Sophisticated Voting

3.1 Assume there are three legislators who rank three alternatives, X, Y, and Z, as follows:

Legislator 1: X > Y > Z
Legislator 2: Y > Z > X
Legislator 3: Z > X > Y

a. Assume that the rules of the legislature specify that the first vote will be between X and Y, with the winning motion then put against Z. If the legislators vote sincerely, what is the outcome? What if they all vote strategically?

b. Assume that the rules specify that the first vote will be between X and Z with the winning motion put against Y. What are the sincere and strategic outcomes?

3.2 Rule 19 of the House of Representatives state the following:

When a motion or proposition is under consideration a motion to amend and a motion to amend that amendment shall be in order, and it shall also be in order to offer a further amendment by way of a substitute, to which one amendment may be offered, but which shall not be voted on until the original matter is perfected.

Now, assume there are five legislators with the following preference orderings:

<table>
<thead>
<tr>
<th>Preference orderings</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1: Q &gt; A &gt; A’ &gt; S &gt; S’ &gt; B</td>
<td>Q: Status quo</td>
</tr>
<tr>
<td>L2: A &gt; Q &gt; A’ &gt; S &gt; S’ &gt; B</td>
<td>B: Bill</td>
</tr>
<tr>
<td>L3: A’ &gt; S &gt; A &gt; S’ &gt; Q &gt; B</td>
<td>A: Amendment</td>
</tr>
<tr>
<td>L4: S’ &gt; B &gt; S &gt; A’ &gt; A &gt; Q</td>
<td>A’: Amendment to the amendment</td>
</tr>
<tr>
<td>L5: B &gt; S’ &gt; S &gt; A’ &gt; A &gt; Q</td>
<td>Q: Substitute</td>
</tr>
<tr>
<td></td>
<td>S’: Amendment to the substitute</td>
</tr>
</tbody>
</table>

a. What is the sincere outcome of the voting over a fully-formed amendment tree as specified in House Rule 19, given the legislators’ preferences?

b. What is the sophisticated outcome?

4. Structure-induced equilibrium
For the questions in this section, we will use the following definitions:

*Gate-keeping power:* the power of a committee to determine whether a piece of legislation changing the status quo will be let onto the floor.

*Open rule:* when the legislature votes on a proposal, any members of the legislature may make an amendment under pure majority rule.

*Closed rule:* when the legislature votes on a proposal, no amendments are allowed, only an up-or-down vote is allowed.

Figure P-5 maps the preferences of seven members of a fictional legislature, members A, . . ., G. Three members, A, B, and C, are members of Committee X while three members, E., F., and G., are on Committee Y. (Member D is the Speaker, and therefore on no committee.) Committee X has the right to propose changes in policy along the x-axis, while committee Y has the right to propose changes in policy along the y-axis. There are three status quo points, $\phi_1$, $\phi_2$, and $\phi_3$, which will be used in the problems. For all these problems, assume policy can move only in “one dimension at a time.”

4.1 Assume committees do not have gate-keeping power and that voting in the legislature is via an open rule. What is the equilibrium policy on each policy dimension for each status quo?

4.2 Assume committees have gate-keeping power and that voting is by open rule. What are the equilibrium policies?

4.3 Assume committees have gate-keeping power and that voting is by closed rule. What are the equilibrium policies?

5. Substantive problems

5.1 Sometime in the distant past a (unicameral) Democratic Congress legislation regulating the amount of relative power that managers and workers would have in collective bargaining. The law was named after its sponsors, Sen. Smoot and Rep. Bullwinkle. The Smoot-Bullwinkle Act was moderately pro-labor, setting the relative power of labor at the point marked $H$ in Figure P-6. In subsequent years, a Republican president has come into office and replaced all the members of the National Labor Relations Board (NLRB), which oversees the implementation of Smoot-Bullwinkle. Through its decisions, the NLRB has announced that the proper interpretation of Smoot-Bullwinkle is more pro-management than a simple reading of the statute would imply. The current NLRB interpretation of the law can be characterized at point $A$ in Figure P-6. Because Congress is still controlled by the Democrats, there are increasing cries in the legislature to “do something!!!” Analyze
the ability of Congress to “do something” under the following scenarios.

a. All bills are considered under open rule, there is no presidential veto.
b. All bills are considered under closed rule, there is no presidential veto.
c. All bills are considered under closed rule, there is a presidential veto.

Here are the constitutional and legislative rules that this political system operates under: (1) the committee has gatekeeping power and there are no procedures to discharge the committee from its consideration of legislation; (2) when there is a presidential veto, the veto serves to return policy back to the status quo; (3) If a bill is enacted, its location *in fact,* becomes the new policy—there are no problems of interpretation or implementation.

5.2 Imagine an agency created to regulate the environment in the “public safety and convenience.” Imagine, too, that when the agency regulates, it can choose to spend its time pursuing either Major Polluters (e.g., Heavy-Metals-R-Us) or Minor Polluters (e.g., Elvis-Look-Alikes-R-Us, a minor source of visual and aural pollution). The preferences of the Senate Committee (SC), the House Committee (HC), the Senate (S) and House (H), and the President (P) are graphs on Figure P-7. (Assume away collective choice problems in these various collectives; assume the agency shares the president’s preferences; assume everyone has circular indifference curves; assume the president has no veto.) How can the agency divide its attention between Major Polluters and Minor Polluters to maximize its utility? (Notice that I haven’t mentioned all the structural details one might talk about, so it’s up to you to add the other structural elements)
Figure P-1.
Figure P-4
Figure P-5.
Figure P6

C H A P

Pro-labor Pro-management

C = committee
H = House
A = agency interpretation
P = presidential ideal point
Figure P-7

- SC
- HC
- S
- H
- P