Benefits of the highway construction project are 500,000 reduced hours of driving per year and 5 reduced fatalities per year. Value the savings in time to producers and consumers at $17 per hour. That gives time savings benefits of $8.5 million per year. The 5 lives saved are valued at $7 million each, so the total life saved value is $35 million. The total value of the project is $43.5 million per year. Apply the discount rate of 7% to benefits. That gives a present discounted value of 43.5/0.07 = $621.4 million. The cost of the project was found to be $258 million. As the benefit exceeds the cost, the project should be undertaken.

Common counting mistakes in cost-benefit analysis.

- counting secondary benefits. If the government improves a highway there may be an increase in commercial activity along the highway. This should not be counted as a benefit of the project, as it may be taking away from commercial activity somewhere else. What matters is the increase in total surplus from the new activity. If there is a net increase in commercial activity from the public project, then it should be counted.

- counting labor as a benefit. Wages are part of the costs of the project, not benefits. If there is unemployment, the opportunity cost of the workers is lower, but the cost does not become a benefit. Often a multiplier (usually 3) is used to count how much income is created by every dollar spent on the project. Assume prices are fixed and there is a lot of unemployment (both labor and capital). The government collects taxes on people who otherwise would have saved that money and spends it on hiring people and capital for a public project. Then the expenditure becomes income for the employees and they spend some of that income; their spending creates income for other agents in the economy.

Suppose 7/10 of each dollar of income to the workers gets spent. That becomes income for other people and they send 7/10 of that. That makes 49/100 of the additional income. The total additional income is (7/10) + (7/10)^2 + (7/10)^3 + ... = 1/0.3 = 3.3 for each dollar spent on the workers. There are several things that are wrong with this approach. Even if there was excess capacity, there wouldn’t necessarily continue to be excess capacity will all these additional levels of demand. Also, this extra income is not net benefit. At the beginning it is being taken away from saving. And at every stage, the income is being spent on goods that are costly to supply. You have to subtract away the marginal cost of providing these goods. Multipliers of close to 3 are commonly used in cost-benefit analyses. This is never appropriate. If there is full employment, then the multiplier should be 1. If there isn’t full employment and the project stimulates employment, there could be additional benefits; it depends on how rapid the price adjustment due to higher demand is. The extra benefit from that employment will be less than the total cost though.
-double-counting benefits. Public projects often lead to increases in values of some assets. Because workers save time driving to work due to the highway project, values of houses farther away from the city may increase. Because the rise in house values results from the reduction in travel time, they should not both be counted as benefits.

Distributional concerns

The benefits and costs of a project may go to different people. For example, when a highway is expanded commuters benefit but those living near it are hurt. In theory it would be possible for those benefitting from the project to redistribute the money to those who are hurt, but this rarely happens in practice. We may care about who is benefitted and who is hurt by a project. For example if the benefits go to the rich and the losses to the poor, we may want to discount the benefits and raise costs.

Political Economy - Chapter 9

Section 9.2

Methods for aggregating individual preferences - direct voting on policies.

Direct democracy refers to when citizens vote on policies directly, rather than voting for a representative who then decides on policies. In the United States, there is some direct democracy at the state and local levels. A state referendum allows people to vote on state laws or constitutional amendments that have already been passed by the state legislature. All states allow legislative referenda, where state legislatures or officials place measures on the ballot and citizens vote on them. 24 states allow popular referenda, where citizens have to collect enough petition signatures and then can place on the ballot a question of whether to reject or accept some state legislation.

24 states allow voter initiatives - these allow citizens to put their own legislation on the ballot if they can collect enough signatures. Proposition 13, which limited the property tax rates that local governments could impose in California, was a voter initiative passed in 1978.

When does majority voting work?

Usually the government does not require unanimous agreement for a measure to be passed - a majority vote is enough. Under what conditions does majority voting successfully aggregate individual votes into a social decision?

Success means that the aggregation mechanism satisfies these three properties.

1. Dominance - if one choice is preferred by all voters, it must be chosen by society.

2. Transitivity - if A is preferred to B and B is preferred to C, then A is preferred to C.

3. Independence of irrelevant alternatives (IIA)- if one choice is preferred to
another, then the introduction of a third independent choice should not change the ranking. If building a statue is preferred to building a park, then introducing the possibility of building a police station will not cause a park to be preferred over a statue if the police station is an independent alternative. Another way to formulate the IIA property is that changing some people’s preferences over C and B while keeping preferences over B and A constant should not change society’s preference over A and B.

An example of a social ranking function where IIA is violated. There are 3 voters and 4 alternatives A, B, C and D. Voters rank the alternatives 1st, 2nd 3rd and 4th. Society adds the individual ranking numbers up across people. The first-place choice is the one with the lowest sum. Suppose person 1 ranks A first, B second, C third and D fourth. The two others rank B first, A second, C third and D fourth. Then society ranks B first, A second, C third and D fourth. Now suppose person 1 ranks instead A first, C second, D third and B fourth. Then every voter’s preference between A and B is the same as before, but society now ranks A first. This violates IIA.

Majority voting satisfies these three conditions only if preferences are restricted to take a certain form.

Consider a town that is deciding how much to fund its public schools. Schools (an impure public good) are funded by property taxes, so the higher the funding, the higher the property taxes. The town chooses among H, the highest level of funding, M, a middle level of funding, and L, a low level of funding. There are three types of voters with equal numbers in each group:

Parents, whose main concern is having a good quality education for their children. Their first choice is H, second choice is M and third choice is L.

Elders, who don’t care about quality of local schools. Their first choice is L, second choice is M, third choice is H.

Young couples without children, who don’t want to pay high property taxes now but want schools to be good enough when their future children attend. Their first choice is M, second choice L, third choice H.

The town uses majority voting, comparing one alternative with another through a series of pairwise votes until there is a clear winner. The town could proceed as follows, comparing each pair.

First vote on H versus L. Elders and young couples both vote for L, so it wins. Then compare H and M. Elders and young couples both vote for M, so it wins. Finally vote on L versus M. Parents and young couples both vote for M, so it wins. Since M wins the most of the pairwise votes, it is the overall winner. No matter what ordering is used for the pairwise votes, M will win.

But in some cases majority voting doesn’t work. Suppose the town is the same except that the elderly are replaced by couples with children who are thinking of sending their children to private school. Their first choice is low property
taxes so they can afford public school, so their first choice is L. Their second choice is H, because with either M or H they have to send their kids to public school so they prefer for it to be good. Their last choice is M.

Now if the town uses the pairwise voting approach, there will be no clear winner:
First vote on H versus L. L will get 2 votes and win.
Then vote on H versus M. H will get 2 votes and win.
Then vote on L versus M. M will get two votes and win.

Each choice has won one time, so there is no clear winner. In the aggregated preferences, L is preferred to H, H is preferred to M and M is preferred to L, so they are not transitive. In this case, majority voting does not consistently aggregate the preferences of the town’s voters.

Each individual in the town can have a consistent set of preferences, yet the aggregate preferences are not consistent. When aggregate preferences are not consistent, the order in which the voting is done can significantly affect the outcome, thus the agenda setter has a lot of power.

Arrow’s impossibility theorem.

In the previous example there is no voting system that will produce a consistent outcome. Arrow’s impossibility theorem states that there is no social decision rule that converts individual preferences into a consistent aggregate decision without either restricting the type of preferences allowed for voters or assuming a dictatorship. No matter what the voting rule is, there is an example of preferences which can’t be turned into a consistent aggregate preference by the voting rule unless you either impose restrictions on the structure of preferences or impose a dictatorship (one person gets their way).

Restricting preferences

Single-peaked preferences can be imposed to solve the impossibility problem. Single-peaked preferences have only one local maximum - a point such that preferences decrease as you move away from it in any direction. If preferences are single-peaked majority voting will give consistent outcomes.

Assuming single-peaked preferences is usually reasonable. But it can be a problem if there is a private substitute for a public good.

Median voter theory

The median voter theorem states that if preferences are single-peaked, majority voting will yield the outcome preferred by the median voter. The median voter is the one whose tastes are in the middle of the set of voters.

In both examples, the median voters are the young couples. Their first choice is the middle option, and there is one group that prefers the high option and one group that prefers the low option. In the first example, where preferences are single-peaked, their preference was chosen. In the second case, where preferences
were not single-peaked, no outcome was chosen.

Potential inefficiency of the median voter outcome.

Median voter outcomes do not reflect the intensity of preferences. Social efficiency requires that the social marginal benefits of a public project equal its social marginal costs. The marginal benefits of a public good are the sum of the private marginal benefits each individual derives from the good. If some people derive enormous benefits from the provision of a public good then that should be accounted for in determining whether to provide the good. But the median voter is found only by ranking voters’ preferences.

Suppose a town is considering building a monument. There are 1001 voters. The monument will cost $40,040 and will be financed by a $40 tax on each voter. The town votes on whether to build the monument. Everyone in the town has single-peaked preferences, so the median voter’s preference is implemented. 500 voters are willing to pay up to $100 each for the monument. 501 voters are not willing to pay anything for the monument. The social marginal benefit of the monument is $50,000. The social marginal cost of building the monument is $40,040. So it is socially efficient to build the monument. But in the vote, the monument would lose 500 to 501.

Section 9.3

Representative democracy

Need a theory for how politicians behave. Median voter theory for representative democracies - politicians will choose the outcome preferred by the median voter.

Basic assumption - all politicians care about is maximizing the number of votes they get. If this is true and preferences are single-peaked, elected politicians choose the outcome preferred by the median voter. Illustrated by Downs (1957). Suppose all people care about is how much is spent on defense. Each voter has a preferred level of spending on defense, and will vote for the politician whose spending on defense is closest to their preferred level. Suppose voters are spaced evenly along the line from 0% spending on defense to 50% spending on defense, so the median voter would like for the government to spend 25% of the budget on defense.

Two candidates, John and George, are running for office and trying to maximize their votes. John places himself initially at $J_1$, to the left of the median, and George places himself at $G_1$ to the right of the median. Then John gets all the voters to his left, George gets all the voters to his right, and they split the voters in between them. But by moving slightly to the right, John still gets all the voters to his left and gets some voters away from George too. So John should move to the right. The same goes for George; he should move to the left. The process ends when they are both at 25%, the median voter’s preferred outcome. At that point, neither of them can get more votes by changing position.

Assumptions needed to use the median voter model
1. Single-dimensional voting. It assumes that votes are based on a single issue. It’s possible that someone who is the median voter on a lot of issues lies at one end of the spectrum on another issue. Then politicians might position themselves at that end of the spectrum to attract the median voter on other issues.

If voter preferences on issues are highly correlated, then voting will be as if it was single-dimensional. If people who favor low defense spending also favor more spending on education, more spending on health care and on benefits for the unemployed, and vice versa, then you can just have a vote on defense spending and each person’s vote will reflect how they feel about the other issues.

2. Only two candidates. If there are more, the predictions of median voter model break down. If there are three candidates and all three are at the median, then votes are equally divided among the three of them. By moving slightly to the left or to the right, a candidate can get all the votes to her left or all the votes to her right, thus gaining more votes. So being at the median is not an equilibrium when there are more than two candidates. In fact there is no stable equilibrium when there are more than two candidates.

3. No ideology or influence. Politicians care only about their number of votes and they do not have their own ideology. Also, politicians cannot influence voters by their positions.

4. No selective voting. The median voter theory assumes that everyone votes. In the United States only about 1/2 those eligible actually vote for the presidential election and for other elections the number is only about 1/3. Maybe the people with the stronger ideology are the ones who vote - then politicians could take a position to the left or right of center.

5. No money. Median voter theory assumes away fundraising. In reality, taking an extreme position may increase fundraising and serve the politician’s long-term goals.

6. Full information. Voters know exactly what positions the candidates represent, politicians know exactly what positions they represent, and politicians know the preferences of the voting population. In reality, voters don’t know everything about the issues based on which they elect politicians, politicians may not know everything about them either, and politicians don’t know the exact distribution of preferences of the population.

The effects of lobbying. Lobbying is the expending of resources by an individual or group to influence a politician. Lobbying can have two useful purposes: Providing information about issues to politicians and representing intensity of preferences.

Lobbying can lead to an inefficient outcome if the lobbyists represent a small group who benefits from a policy, whereas a much larger group would be hurt by the policy. Suppose there is a project where 100 citizens benefit by $1 million
each, but the remaining 259,999,900 lose by $100 each. It is inefficient to implement this project as the net social benefits are 100,000,000 - 25,999,990,000 \neq 0. But if the group that benefits from the project lobbies politicians by promising votes and campaign contributions, and if the remainder of the population isn’t well informed about the issue and doesn’t vote on it, then the project will be implemented.

Large groups with small individual interest in an issue suffer from a free-rider problem in trying to organize politically. The loss of $100 is probably not worth paying for lobbying of a politician. Small groups where each individual has a lot to gain from a policy tend to overcome the free-rider problem.

An example of this is farm subsidies. The percentage of American workers employed on farms was 2.5% in 2002. The sector receives $25.5 billion of support from the federal government each year. Of this, direct subsidy payments are $12.5 billion each year and price supports - minimum prices for crops - cost $13 billion each year. The subsidies cost an American household $390 per year on average and the average recipient of the direct subsidies receives $19,600 per year.

Justifications given by politicians - these subsidies are necessary to support the family farm. But in fact the amount of the subsidy increases with the amount of the crop produced, so larger farms get more benefits.

The reason these subsidies are in place is that the benefit to the small number of firms that gain is much larger than the loss to many taxpayers. These firms can organize and lobby politicians, while the taxpayers hurt by this policy do not find it worthwhile to lobby against it.

Other countries do the same: EU spends $100 billion per year supporting its farmers, Japan spends over $54 billion on farmers - rice tariffs.

Evidence on median voter model. The preferences of the median voter matter, but do not completely determine politician behavior. According to Stratmann (2000), when districts became more conservative through redistricting, their legislator started to vote more conservatively. Legislators also pay attention to their own ideology and to their core constituency. The median voter model would predict that two senators from the same state would vote similarly. But Levitt (1996) showed that when a state has one senator from each party, they vote very differently, and similar to senators in the same party from other states. Thus senators care roughly about the median voter, but also about their core constituencies and the party line (40% together). Remainder of behavior is explained by ideology.

Section 9.4 - Public Choice theory

Sources of government failure - the inability of government to act in the interests of its population.