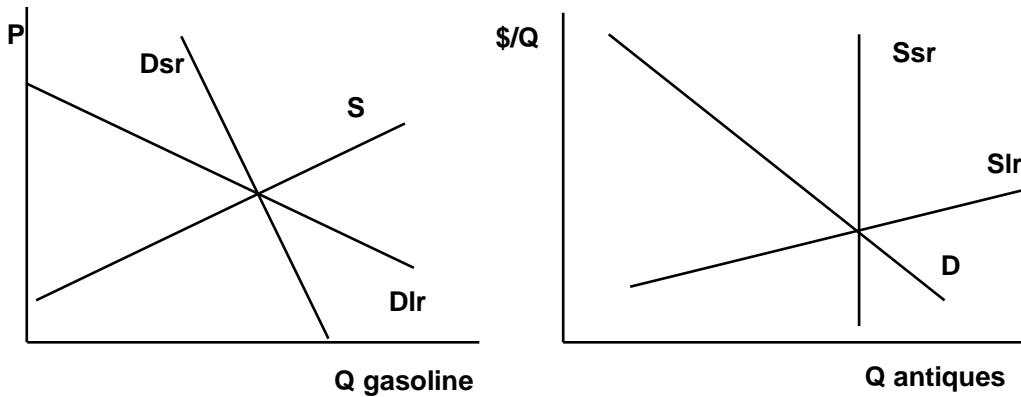


I. Basic Concepts and Tools from Public Finance and Political Economy

0. Identify and/or Define the following:

- a. pure public good
- b. club good
- c. externality
- d. median voter
- e. Anthony Downs
- f. Mancur Olson
- g. James Buchanan
- h. Leviathan model
- i. interest group
- j. Niskanen Model
- k. fiscal federalism
- m. Tiebout model
- n inter-governmental externality
- o. Pareto optimal
- p. Pigovian tax
- q. Lindahl tax
- r. Ramsay tax
- s. majority cycle
- t. flypaper effect
- u. matching grant
- v. block grant
- w. capture model of regulation
- x. rent seeking
- y. rent extraction
- z. contest success function
- aa. Constitutional political economy
- ab. King and council model
- ac. Rational Ignorance
- ad. Fiscal illusion
- ae. Condorcet Jury Theorem

1. Use indifference curves to illustrate the superiority of a lump sum tax over an excise tax that generates the same revenue from an individual tax payer.
 - a. Label all important details and discuss the implication of your diagram.
 - b. On a separate diagram show the effects of a general sales tax that raises the prices of all goods by 10%.
 - c. Use indifference curves and budget constraints to show that an income tax has many of the same properties as a general sales or VAT tax.
 - d. Are any of these taxes neutral? In what sense?
2. Using diagrams for (i) a market, (ii) a typical consumer in that market, and (iii) a typical firm in that market, to show the short run and long run effects of an excise tax. Clearly label all important details, and discuss the logic of your analysis.
3. Show the distribution of tax burden and deadweight losses that would result in the following markets in the short and long run as a consequence of a \$5.00/unit excise tax. (Discuss your reasoning and label all important details.)



4. Repeat problems 2-4, above, for a targeted subsidy.
 - a. Show, for example, that a conditional subsidy (matching grant) that affects relative prices always costs more than a lump sum subsidy when it attempts to achieve a particular increase in consumer welfare (given continuous and monotone increasing utility functions).
 - b. Discuss why many economists prefer a negative income tax to subsidies for housing and food.
5. Discuss why, in spite of your answers to #3 above, lump sum taxes are rarely used although other neutral taxes such as sales taxes and VATs are widely used.
 - a. Why might voters prefer a tax that one can potentially avoid to one that is unavoidable (100 words).
 - b. Are there other reasons favor an income rather than a lump sum tax? (100 words)
 - c. Are there any reasons for using a VAT rather than an income tax as the principle source of revenue? (100 words)
6. It is sometimes claimed that firms and their employees "share" the social security tax. That is to say, by law half of the money is deducted from employee salaries and the other half is paid by the firm.
 - a. Use the tools developed in class to analyze this assessment of the tax burden of the social security tax.
 - b. Is there any case in which the distribution of the tax burden of social security is shared equally?
 - c. How would the burden of the social security tax vary among labor markets?
7. Use a frequency distribution of voter ideal points to illustrate:
 - a. The identity of the median voter
 - b. An election between two candidates, both to the right of the median voter
 - c. A sequence of policy adjustments undertaken by two candidates to attract more voters
 - d. The Nash equilibrium of this process of competition for votes. Explain briefly why your equilibrium is a Nash equilibrium.
8. Discuss briefly the logic and implications of the Downsian model of competition between two major party candidates or two major parties developed in problem 8.
 - a. In a contest between an idealist who will never adjust his or her policy positions and a believable pragmatist who will do so, the pragmatist will always win.
 - b. At the Nash equilibrium of such contests, elections will always be close.
 - c. At the Nash equilibrium of such contests, many—perhaps most—voters are dissatisfied with the outcome (e.g. “direction” of the country).

- d. That nonetheless, voters may broadly prefer majoritarian outcome to any alternative form of government that they are familiar with.
 - e. Than increases in the extremism of one or the other side of the political spectrum will not change policies unless the median voter also changes his or her ideal point.
 - f. That an increase in median income tends to increase government services.
9. Write down a median voter model of environmental regulation and characterize that voter's ideal level of regulatory stringency.
- a. Explain briefly the assumptions used in your model about the median voter's costs and benefits of that regulation.
 - b. Explain briefly the first order conditions in terms of marginal costs and marginal benefits—how are these characterized by your model?
 - c. How would change in technology the reduced undesirable emissions affect the median voter's preferences for regulation other things being equal. (If you cannot do this mathematically, use diagrams to illustrate the effects on the median voter's ideal regulatory stringency implied by your model.)
 - d. (Hint: you may use general functional forms or Cobb-Douglas forms in your model.)
10. Repeat #9, but assume that the level of environmental stringency is set by a revenue maximizing ruler. Answer a-d for that analysis and then compare the ideal policies of median voters and authoritarians. Explain why they tend to differ.

II. Somewhat More Question on the Political Economy of Public Policy

11. Use a two by two game matrix to illustrate the logic of the free rider problem associated with the provision of pure public goods. Suppose that the public good of interest provides benefits of \$5.00 to each "player" and costs a total of \$6.00 to produce. The cost is shared if both contribute but must be paid entirely by one person if that person provides the service while the other free rides.
- a. Label all payoffs, and explain the logic of the game.
 - b. Now suppose that provision of the good is subsidized. How much would the cost of the public good have to fall to eliminate the free rider problem?
 - c. Now suppose that the provision of the good is mandated and failure to comply is punished with a fine. How large would a "shirking fine" have to be to solve the problem?
 - d. Mancur Olson noted that interest group politics have incentives that are fundamentally similar to this game. Explain why that tends to be the case.
 - e. In an interest group contest, explain why free riding may make most persons outside the groups who are free riding better off—in cases in which all groups have the same free riding propensities.
 - f. In the Olsonian context, explain why free-riding tends to reduce the effectiveness of large groups with relatively small benefits relative to small groups with large benefits from engaging in collective action (lobbying).
 - g. Explain why in the latter case, free riding may hurt the majority of the individual in a society.
12. Write down a rent seeking model between 3 persons or groups that compete for a prize in a contest with a Tullock contest success function (e.g. a lottery based game).
- a. Characterize the ideal investment in this game by a typical group or individual in the game

- b. Characterize the Nash equilibrium total investment in this contest by all three players.
 - c. Determine the extent to which potential rents are dissipated by competition for this prize.
 - d. Explain why such contests can be regarded to be socially undesirable in cases in which the prize at stake is an entry barrier of some kind that reduces competition in a market and increases industry profits.
 - e. Explain why rent-seeking contests are nonetheless commonplace in most governmental systems.
 - f. Given e, explain why there are anti-bribery laws in most of these same countries?
13. Develop a calculus-based characterization of the median voter's demand for a public service that is a pure public good and will be funded through a proportional tax on income. Let $U=u(X, G)$ where X is private consumption which equals after tax income, and G is the service level of a pure public good, and $C=c(G)$ is the production cost of the public service.
- a. Characterize the ideal level of services and taxes for the median voter when there are N voter-taxpayers and the median voter's income is approximately average income.
 - b. What happens to the demand for this service if population (N) increases?
 - c. What happens to the demand for this service if the median voter's income (Y^v) increases?
 - d. Explain your reasoning and demonstrate mathematically if possible. (Hint: apply the implicit function differentiation rule.)
14. Develop a calculus-based characterization of the median voter's demand for a public service that is a pure private good that will be funded through a proportional tax on income and provided uniformly to all voter-taxpayers. Let $U=u(X, G)$ where X is private consumption which equals after tax income, G is the service level of the private service and $C=Nc(G)$ is the production cost of the service.
- a. Characterize the ideal level of services and taxes for the median voter when there are N voter-taxpayers and the median voter's income is approximately average income.
 - b. What happens to the demand for this service if population (N) increases?
 - c. What happens to the demand for this service if the median voter's income (Y^v) increases?
 - d. Explain your reasoning and demonstrate mathematically if possible. (Hint: apply the implicit function differentiation rule.)
15. We reviewed two theories of the origin of government in class, Olson's extractive state model, and Buchanan's social contract-based model of a productive state.
- a. Discuss differences in the sorts of public policies that one would expect from these two types of governments. (For convenience assume that there is a single ruler in the Olson state and democratic government in the Buchanan state.)
 - b. Discuss reasons why the policies of an Olsonian state might be worse than his model suggests.
 - c. Discuss reasons why the policies of a Buchanan state might be worse than the median voter model implies.
 - d. Develop a simple model of each type of rule-maker and demonstrate that in each case, taxes and government services are simultaneously determined.
 - e. Explain why persons that create a productive state via social contract may agree to use majority rule for ordinary decisions, but insist on super majority or consensus rules for major decisions such as revisions to the social contract (constitution).

16. Suppose there are 21 voters, including yourself. You are narrowly self-interested, risk-neutral, and it costs you \$30 worth of time to vote. Candidate A is \$1200 better for you than Candidate B, and all voters other than yourself vote for A with probability $p=0.5$.

- a. Using the standard probability of decisiveness formula, calculate your expected *net benefit of voting*.
- b. Now use a similar calculation to determine the net benefits of being informed about candidate policy positions.
- c. Are these direct (narrow) non-electoral benefits that only individuals participating in elections receive? Explain.
- d. Are there any non-election-based reasons to invest in acquiring information about the policy preferences of candidates for high office? Explain.

17. Use a median voter model of local government to demonstrate that a “matching grant” from the central government can affect a local government's provision of local services through effects on the median voter's tax price for local government services.

- a. Use the median voter's government budget set and indifference curves to show the effects of matching grant on the median voter's preferred local government's output of a service such as public education.
- b. Show that a block grant can often improve the median voter's welfare relative to an equally costly matching grant. (Hint, this looks like the difference between lump sum and marginal subsidies developed reviewed in lecture.)
- c. Does your analysis suggest a “fly paper effect?” (e.g. that grants “stick” to the services subsidized). Why or why not?
- d. In what case, if any, will a conditional lump sum grant (on targeted to a specific service) have a larger effect on local government expenditures than a block grant?
- e. Repeat using calculus and a utility function-based median voter model that determines policies under the assumption of a balanced budget.

18. Erik Lindahl argued that inefficiencies of taxation can be eliminated by taxing persons so that each person faces a marginal tax rate equal to their marginal benefit from the goods financed through taxation (at the quantity provided).

- a. In what sense is efficiency increased through the use of a Lindahl tax system for funding public goods?
- b. Is Lindahl taxation consistent with any of the usual theories of optimal taxation?
- c. In what sense, could Lindahl's tax scheme be said to minimize the coercive element of taxation?
- d. Describe the preference revelation problem associated with Lindahl taxation and explain possible solutions.
- e. Are there any economic or normative arguments against using Lindahl taxes to finance all public services?
- f. Can a Lindahl tax be used to finance redistribution? Social Insurance? Explain.

19. Voters have fairly weak incentives to be well informed about candidates or public policy issues.

- a. Illustrate what happens to the service level of a government services if voters systematically underestimate their tax costs.
- b. Illustrate what happens to the service level of a government services if voters systematically underestimate their service benefits.
- c. Discuss the sense in which fiscal illusion can be said “to cause” voters to make mistakes in such cases. In what sense(s) can fiscal illusion be said to be rational?

- d. Explain why rational ignorance, especially the pure ignorance variety, creates a domain in which interest group campaigns and lobbying can affect public policies.
- e. Explain cases in which public education and lack of censorship can be expected to (a) reduce rational ignorance and fiscal illusion and (b) increases it.
20. It can be argued that constitutional designs have significant effects on the policies adopted by a government. They are not primary drivers, but have secondary effects that may significantly alter the typical policies in place in a given country operating under a different constitutional regime.
- Consider first differences between proportional representation (at large) and first past the post (single member districts) electoral systems. Assume that there are no other differences among voters. Predict differences that will tend to be exhibited among these systems based on these voting rules (relative importance of parties versus candidates, regionally targeted versus nationally targeted programs, prospects for capture by ideologically groups, and so forth).
 - Consider how differences in the degree of centralization tend to affect outcomes—given a specific national election system (that is holding other things constant). First, assume that Tiebout's model captures a general tendency about intergovernmental competition. Second, assume that inter-governmental externalities are commonplace. To what extent can the second level of problems be solved through conditional governmental grants from the central government?
 - Consider fundamental differences in governmental organization—as with differences between democracies and dictatorships. What factors determines differences in planning horizon by pivotal decision makers in those systems? To what extent are policies different because of (i) differences in the interests of pivotal decision makers, (ii) in the planning horizons of pivotal decision makers, (iii) in the certainty with which the system will remain in effect.
 - Speculate about why Western democracies tend to outperform most authoritarian regimes in both the short and long run given your analysis under “c”.
21. Suppose that there are two regional governments in a given country. Both regional governments can invest in a local public good that improves the welfare of their residents. However, there are spillovers from their investment decisions. If region 1 provides the public good region 2 obtains some spillover benefits, and vice-versa. More precisely, let be the local public good levels in region 1 be G_1 and that in region 2 be G_2 . Their respective welfare levels are assumed to be:
- $$W_1 = 2(a G_1^{0.5} - b G_1^{1.0} G_2^{1.0}) - c$$
- $$W_2 = 2(a G_2^{0.5} - b G_1^{0.5} G_2^{0.5}) - c \quad \text{where } a > 0 \text{ and } 0 < b < c.$$
- Find the Nash equilibrium levels of G_1 and G_2 when public investment decisions are taken simultaneously.
 - What is the equilibrium welfare level in each region?
 - Suppose that public investment decisions are centralized. What levels of G_1 and G_2 maximize total welfare? Compare with parts (a) and (b), and explain.
 - Assume that the central government can impose a interregional Pigovian transfer scheme based on the public investment of each region. Find the optimal scheme. Compare with b and a.
 - Now find the solution for the case in which $b < 0$. Explain why the results in this case are so strange!

III. Other Puzzles and Problems regarding the Political Economy of Public Policy

22. Suppose that an environmental externality is known to impose external costs of 20 billion dollars per year. A variety of clean up and/or regulatory methods are possible. Determine the present value of the cost and benefits of each of the following programs. Assume that the interest rate is 5% and that each program continues forever.

- a. Program one imposes fixed regulatory standard (as in auto emissions) which is expected to increase industry operating costs by 18 billion per year and cost 1.5 billion to administer.
- b. Program two uses a Pigovian tax on pollution to induce companies to use cleaner technologies. It is expected to increase operating costs by only 15 billion dollars per year, but have administrative costs of 6 billion dollars per year. There will also be an initial 10 billion dollar cost to set up the program. The Pigovian tax will generate tax revenues of 5 billion dollars per year.
- c. Program three establishes a general target for this particular form of pollution and creates a tradable "effluent licenses" which entitle the owner to release effluents at some fixed rate (say K pounds per year). One expects low cost polluters to sell their licenses to high cost polluters. This program will increase operating costs by 14 billion dollars per year, and have administrative costs of 7 billion dollars per year. There will also be an initial 12 billion dollar cost to set up the program. (Initially, pollution licenses are given away and so the program generates no revenues.)
- d. Which program would a median voter prefer? Explain your reasoning.

23. Within democracies, the median voter model can be used as a first approximation of government expenditures and taxation.

- a. Explain the growth of government from the perspective of that model. Are there any conditions under which the government sector would stop growing or even decrease in size?
- b. In what sense can majority rule decision making be regarded as a technique for aggregating information?
- c. What kinds of political failures on average grow less severe as the number of voters increases? More severe? Carefully explain your reasoning.
- d. Given the incentives of the simple representative election model (and the more complex stochastic voting model), why don't the presidential platforms of the Democrats and Republicans fully converge?

24. The Laffer Curve expresses the idea that there are low and high tax rates that will raise the same revenue, along with one rate that will yield the maximum revenue. Some economists claim that at least some tax rates are above their revenue maximization rates.

- a. Is this claim analytically coherent? In what sense?
- b. Under what circumstances would a median voter favor tax rates that are higher than the one that maximizes short (or long) run government revenues?
- c. Explain why tax complexity could generate this result if it induces fiscal illusion.

25. For many years, social security has collected more in tax revenue than it has paid out in benefits. This surplus has been "borrowed" by the treasury for use in rest of the Federal budget. In exchange, the treasury issued IOUs to the trust fund (e.g. sells bonds to the Social Security Administration).

- a. Explain why the government will have to raise taxes, borrow, or print money in order meet its future obligations to retired persons as these IOUs are redeemed to fund social security benefits.
- b. Explain why "a" is true regardless of whether the trust fund is accumulated as government bonds or treasury IOUs—and moreover would have been true even if no trust fund had been accumulated!

- c. Explain why the Social Security Program will have a cash flow problem from now on if taxes and benefits follow their present course (as set in current laws describing future benefits Applied Examples and Puzzles)
26. In the nineteenth century, it was often argued that “voters are always poorly informed about public policies, consequently public policies in a democracy always tend to be inferior to those adopted by a king or queen.” Evaluate the strengths and weaknesses of this position.
27. The president’s tax commission recommends that the deductibility of home mortgages be capped at about 80% the value of the median house in the region where a taxpayer’s home is located. It also suggests that the interest tax “deduction” be replaced with a tax “credit.” The plan (as a whole) is “revenue neutral” and is said to reduce the deadweight loss of the income tax.
- In what sense can the tax deductibility of mortgages be said to be inefficient? (Use a diagram and/or simple mathematics to illustrate you point.)
 - Explain how this plan redistributes the burden of income taxation among taxpayers with mortgages. Who wins and who loses under this proposed reform?
 - Given your answer to parts “a” and “b,” should firms be able to deduct the interest cost of loans used to make capital investments? Explain your reasoning.
28. Use the present value formula to calculate the net benefit that Al receives from the social security program.
- Assume first that Al will retire in 30 years and live 25 years after retiring. Suppose that Al's tax is 10,000 per year and that his benefits are 15,000/year in real terms. Assume that the real interest rate is 3%/year.
 - Calculate the present value of Al's tax payments.
 - Calculate the present value of Al's benefits. (Hint: don't forget that the benefits are not received until 30 years in the future.)
 - Is Al better or worse off under social security if his "opportunity cost rate of return" is 3%/year.
 - Now repeat a-d but assume that the real interest rate is 2%/year, 1%/year.
 - Suppose that Al were planning to retire in only 10 years. How would this affect the present value of his/her participation in the social security program? (Use some numbers to support your conclusion.)
 - Use a spreadsheet program or other computer program to find Al's rate of return in both a and c.
29. Nominal social security benefits averaged \$43.45 per month in 1946, \$118 per month in 1970, \$567 per month in 1989, and approximately \$1150/month in 2007.
- What is the average annual percentage rate of growth of nominal social security benefits in each sub-period and overall?
 - The CPI was 18.2 in 1946, 37.8 in 1970, 121.1 in 1989, and 202 in 2007; what was the real benefit at each date.
 - What was the rate of growth in (real-inflation adjusted) average social security benefits overall and in each sub period?
 - If the real growth rate continued until 2050, what would real monthly social security benefits be?
 - If the nominal rate of growth found above continued until 2050, what would nominal monthly benefits be?
30. Analyze the partial or total privatization of Social Security—that is, the replacement of the current pay-go system with a system of forced saving.
- First, contrast the behavior of pre-retired persons under a system in which a person is required to purchases private annuities (as in Chile) with the current pay-go system in the US.

- b. Second, analyze whether requiring purchases of private annuities tends to generate greater economic growth than a paygo system.
 - c. Third, discuss how a transition to a forced savings program can be managed without significantly reducing benefits for those close to retirement.
 - d. Discuss why this tends to be a normative and political problem for many privatization proposals.
31. One common property of the public pension and health policies of Western democracies is that they all promise larger benefits to future generations than can be paid for under current tax laws.
- a. Many public pension programs are financed with an earmarked flat tax on labor income. Is this efficient from an economic perspective? Why or why not?
 - b. To what extent should the promised payments to future retirees be regarded as part of the national debt?
 - c. Is the excess of future benefit levels relative to future taxes under existing laws consistent with either electoral or interest group models of fiscal policies? (Explain using a three generation overlapping generations model.)
32. Suppose that two adjacent community provide a similar public service to their own residents, and finance that service from local tax receipts generated by taxing “their base,” B_i . The tax base of Community 1 is $B_1 = (G_1 - G^*) - 100(t_1 - t_2)$ and the tax base of Community 2 is $B_2 = (G_2 - G^*) - 100(t_2 - t_1)$. Neither community can borrow, so $t_1 B_1 \leq c G_1$ and $t_2 B_2 \leq c G_2$. The residents of each community each want the same ideal service level, G^* , but do not like paying for them. Assume that both community’s have town managers that attempt to maximize their tax base.
- a. Characterize the best reply function for each government’s tax and service levels.
 - b. Characterize the equilibrium tax and expenditure levels in the two communities, both mathematically and graphically. Explain your result. (If you find the math difficult try setting up a PD game between the two town managers.)
 - c. How would the result have differed if there were two types of residents with different ideal service levels?
 - d. How would this equilibrium have been different if both governments had been net revenue maximizers rather than tax base maximizers?
33. Some economists (and politicians) have suggested switching from income taxation to a national sales tax or consumption tax.
- a. Analyze the merits of this proposal with reference to economic theory.
 - b. Now consider the political economy of such tax choices. Are there circumstances under which there would be unanimous agreement for such a change occur? Majority agreement? Explain.
34. Consider one regression among many that have been run of the following general form: The dependent variable is some such variable as the per capita cost of providing some particular service or per capita property value; the independent variables include the usual assortment of candidates, plus some kind of organizational variable that is the item of interest. This variable could denote whether the service is provided by a public bureau or a profit-seeking firm, it could denote alternative electoral systems, or any of a number of other possibilities. The central claim is that organizational form matters significantly in the provision of services.
- a. Is such a finding plausible?
 - b. If you think it is, explain how you can account for the existence of a variety of organizational forms.

- c. Summarize some of the existing empirical public finance literature on this point.
35. Construct a two-person three-strategy game that illustrates the fiscal commons problem (pork barrel dilemma) experienced in federal systems of taxation. Briefly explain all relevant details.
- d. Explain why taxation in a federal system can be excessive even if each level of government adopts the Pareto efficient level of public services for its residents.
 - e. Explain why such problems might be tolerated as a necessary cost of competitive governance in a federal system of governance.
 - f. Discuss how a revenue sharing program of block grants can reduce this problem, while preserving fiscal competition. Are there political risks associated with such programs?
36. **True or False.** “The existence of multiple taxing units always tends to reduce total government revenue.” Explain or critique the above using one or more clearly specified theoretical frameworks.
37. If you compare tax rates on gasoline in such states as California, Connecticut and New York, you will see that they are about twice as high as tax rates in such states as Alaska, Wyoming, and New Jersey. What is the most likely explanation for the variation in gasoline tax rates?