

I. Review of Course Materials

II. Introduction to Public Economics and Public Finance

A. Public Finance is a sub-area of Public Economics, which in turn is a subfield of Political Economy.

- i. Political economy or public choice focuses on the kinds of decisions that various forms of government are likely to make (using rational choice models).
- ii. Public economics analyzes the effects of those policies on economic activities and the political processes by which those policies come to be in place.
- iii. Public economics can be divided into several areas according to the policies one focuses on.
 - ◆ Economics of Regulation
 - ◆ Public Finance
 - ◆ Environmental Economics
 - ◆ Law and Economics
 - ◆ Macroeconomics

B. Most public economics courses, nonetheless, stress public finance topics, the subset of public policies that concern government revenues and expenditures.

- i. The traditional “home turf” of public finance includes theories of taxation and debt
- ii. The US government takes about one third of gross national product to finance its enforcement, purchasing, transfer, and production activities.
 - ◆ The central government's overall effect on the distribution of goods and services is larger than this, because its rules and regulations (and tax preferences) affect returns at the margin and thereby the allocation of a good deal more of the gross national product produced within its territories.
 - ◆ In other Western economies, government expenditures often exceed half of GDP.

- iii. The field of Public Finance originally emerged as an applied field in which experts would advise the “crown” about how to best raise revenues.

C. As field of academic study, public economics includes a far broader scope of policy and intellectual issues than modern day public finance, broad as the latter has become.

- i. Essentially anything that the government (legislature) may write new laws on is public economics insofar as those laws affect economic (rational) behavior.
- ii. With this broader perspective in mind, it seems clear that private economics is, itself, substantially a consequence of public economics, because the rules and regulations, property rights and property right enforcement, and taxes and expenditures, affect rates of return to investments in human and physical capital.
- iii. The study of economics without consideration of Public Economics is, thus, only a very partial theory of the allocation of resources, even within the West where the private sphere of markets is larger than in most other places.
- iv. This course will focus for the most part on the choice and effects of fiscal and regulatory packages within contemporary industrial democracies--the public economics of OECD nations.

Why Public Economics is Important

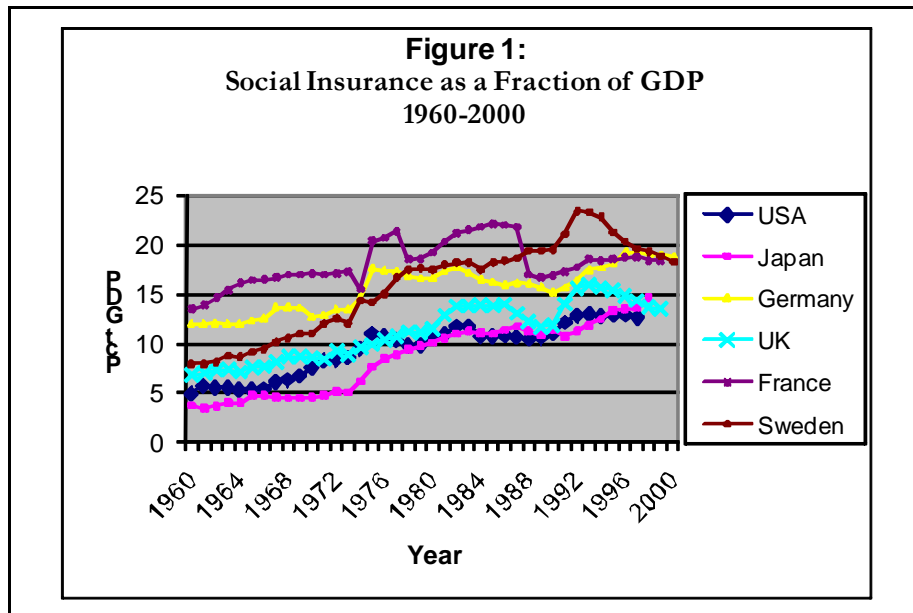
D. Public Economics within Market Economies

- i. Economics is often said to be the study of the allocation of scarce resources. And much of economics proceeds as if all resources were allocated by market forces.
 - a. A century ago, this might have been reasonable to ignore the resources directly and indirectly controlled by national governments.
 - b. A century ago, relatively little of a typical industrialized nation's national income was directly allocated by government decision making.
 - ◆ Only about 10% of GDP was collected as tax revenues.

- ◆ Regulations were at a relatively “low tide,” with most regulations developed by local governments, rather than national governments
- ◆ Civil law was largely “off the table” as an area of national or local legislation, although it had been significantly revised in the previous century.

E. However, this is clearly no longer the case.

- i. The typical national government of an industrialized democracy now directly controls between 30 and 60 percent of national income.
 - a. Taxes are much higher today than they were in 1950 or 1850 in all industrial countries as a percentage of income and in absolute levels.
 - b. National governments also engage in a good deal more regulation than they did a century ago, without significantly reductions in state and local regulations.
 - c. One of the main events of the twentieth century was the emergence of the “welfare state” in most of the West.
 - d. Explaining why such changes occurred is one of the aims of this course.



- ii. Conservative and libertarian economists often argue that the West would be richer if we had much lower taxes and regulation.
 - a. However, the industrialized democracies are the wealthiest on earth by essentially all physical measures of welfare: real income per capita, housing size, longevity.
 - b. Thus, one can not simply point to the deadweight loss of taxes or regulation and conclude that modern policies reduce national income and welfare.
 - ◆ A lot depends on how taxes are collected and spent, and also on the kinds of regulations adopted!
 - ◆ Some expenditures have returns that are greater than their costs, as might be argued of expenditures on an honest reasonably accurate judicial system, infrastructure, national defense, and public education.
 - ◆ Others, of course, may have returns below their costs for individual and/or in the aggregate.
 - ◆ (This may also be true at the margin for expenditures that can be justified on economic, Paretian, or utilitarian grounds.)
- iii. Identifying the effects of fiscal policies is thus an important issue if one wants to understand differences in the average incomes and growth rates of countries around the world.

F. One does not have to believe that government expenditures should be larger or smaller to study public economics.

- i. One simply has to appreciate that government expenditures **are**, in fact, large and important in modern industrialized nations.

(Your opinion of whether government services are too large or too small is in large part, as we will see, a matter of your tastes, fiscal circumstances, normative theory, and ideology!)
- ii. Many of your own decisions today were affected by government fiscal policies.
 - a. For example: WVU is (still) a publicly financed university.

- b. (About a third of WVU's operating expenses are paid by West Virginia tax payers, and much of the research conducted at WVU is also supported by tax dollars or tax deductions.)
 - c. You are here, in part, because the cost of a college education at WVU is relatively less expensive than an equivalent private education.
 - d. If you received fellowship money from a private donor, his or her decision was probably influenced by the tax deductibility of charitable contributions.
 - e. You probably used highways and/or public transit to make your way to class.
 - f. You probably paid sales tax on your lunch, and also paid a variety of state and federal excise taxes on the gasoline that you used to drive here.
 - g. If you worked during the summer, you paid a variety of federal, state, and local income taxes, and your employer was subject to a variety of labor regulations.
 - h. If you plan to marry one day, your decision may be based partly on the bundle of rights and obligations associated with the “marriage contract,” which are largely determined by state laws and regulations.
 - i. If you think about retiring some day, your decision is influenced in part by the magnitude of Federal Social Security and Medicare benefits--and risks associated with their provision by the federal government (and, of course, future tax payers!).
- iii. Overall, whether one likes it or not, public economics affects all manner of decisions at the margin, and by doing so has important consequences for private market activity and public sector politics.

G. The main aim of this course is to show how micro economic tools and concepts can help explain the impacts of its taxes, subsidies, and borrowing policies—and to explain how the policies that we observe come to be in place.

- i. The literature is huge and, so, we will sample only a small fraction of the papers and books that potentially could have been read.
 - a. The course begins with an overview of traditional positive and normative public finance.

- b. This is followed by a brief overview of public choice models that can be to analyze the origin of the “public sector,” and political pressures that generates fiscal and tax-based regulatory policies.
 - c. It turns out that political institutions have significant effects on a government’s fiscal policies, because these determine the political equilibria.
- ii. The last part of the course examines a few policy areas in which the tools of public finance can shed a good deal of light.
- a. Examples include social insurance, tax reform, and solutions to international public goods and externality problems.
 - b. Although the focus is for the most part on public finance issues in the United States problems, we will not entirely neglect the rest of the World.

III. Historical Public Finance Data

A. One striking feature of the past century of government finance is the extent to which more and more national resources are directly allocated by government decisions.

- i. This increase took place for the most part in the 20th century particularly in the period between W.W.I and W.W.II and during the period between 1960 and 1985.

Figure A2 (from Congleton 2003)

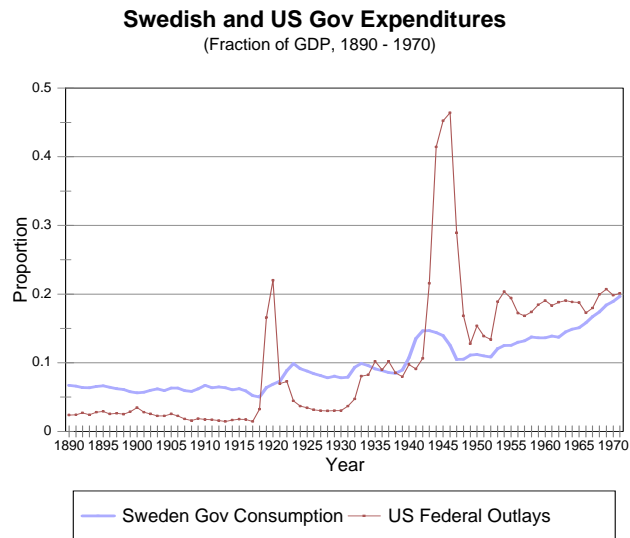


Table A3 (from Congleton, 2003)
Central Government
Consumption, Tax Receipts and Expenditures
As Percent of GDP (1960 -1996)

Year	Sweden (Central Government)			United States (Central Government)			Denmark		U. K.	
	Swd Gov Con	C. G. Tax Rev.	Cent. Gov Exp.	US Gov Con	C. G. Tax Rev.	Cent. Gov Exp.	D Gov Con	Cent Gov Exp.	C. Gov Con..	Cent. Gov Exp.
1960	16	..	..	17	..	..	13		16	
1961	16	..	..	17	..	..	14		17	
1962	17	..	..	18	..	..	15		17	
1963	17	..	..	17	..	..	15		17	
1964	17	..	..	17	..	..	16		17	
1965	18	..	..	16	..	..	17		17	
1966	19	..	..	17	..	..	17		17	
1967	20	..	..	19	..	..	18		18	
1968	21	..	..	19	..	..	19		18	
1969	21	..	..	18	..	..	19		17	
1970	22	26	25	18	..	..	20	32	18	32
1971	23	28	26	18	..	..	22	32	18	32
1972	23	28	28	18	17	19	22	32	19	32
1973	23	27	28	17	17	19	22	29	19	32
1974	24	27	29	18	18	19	24	33	20	36
1975	24	27	29	18	17	21	25	34	22	39
1976	25	31	32	18	16	21	25	33	22	39
1977	28	33	35	17	17	21	24	33	21	37
1978	28	32	37	17	17	21	25	34	20	37
1979	29	31	39	16	18	20	26	35	20	36
1980	29	30	39	17	18	22	27	39	22	38
1981	30	32	42	17	19	23	28	41	22	41
1982	30	32	43	18	19	24	29	43	22	41
1983	29	32	45	18	17	25	28	43	22	40
1984	28	33	44	17	17	23	26	42	22	40
1985	28	34	45	18	18	24	26	40	21	40
1986	27	34	43	18	17	24	24	37	21	38

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1987	27	37	41	18	18	23	26	37	21	37
1988	26	37	40	18	18	23	26	39	20	35
1989	26	37	39	17	18	23	26	39	20	34
1990	27	38	41	18	18	23	26	39	21	38
1991	27	36	43	18	18	25	26	39	22	40
1992	28	35	46	17	18	24	26	41	22	43
1993	28	31	52	17	18	24	27	42	22	42
1994	27	29	49	16	18	23	26	43	22	42
1995	26	34	49	16	19	23	26	41	21	42
1996	26	37	46	16	19	22	26		21	

Source: World Development Indicators, 1999, (CD) World Bank, ISBN 0-8213-4375-0.

(Shaded cells indicate years where nonsocialists formed the Swedish government.)

(Notice the difference between tax receipts and government consumption. The difference largely "transfer payments" such as welfare and social security, which GNP accounts do not include as government consumption. In fact, central government expenditures including transfers is **generally a bit larger than tax revenues**, because most run significant deficits. Also remember that state and local taxes are ignored by these numbers.)

B. Government Growth and Some Indicators of Individual Welfare

Table A9 (From Congleton (2003))
Government Growth and National Performance

1960 and 1995 (Sorted by 1995 Central Gov Con)

	Government Consumption as % RGDP		Life Expectancy		Income Share Bottom 40%		Unemployment Rate	
	1960	1995	1960	1995	1960s	1980s	1960	1996
Sweden	16	25.8	74	79	15.1	21.2	1.4	8
UK	16.4	21.4	71	77	19.2	17.3	1.7	7.4
Norway	12.9	20.7	73	78	17.1	19	2.5	4.9
Canada	13.4	19.6	71	79	19.7	17.5	7	9.7
Germany	13.4	19.5	70	76	14.8	19.5	1.3	10.3
France	14.2	19.3	71	78	10	18.4	6.2*	12.4
Australia	13	18.8	69	77	19.7		3.5	6.2
Austria	11.2	17.5	71	77	20.1	15.5	2.4	8.5
Spain	8.3	16.6	70	77	16.5	19.4	11.5*	22.7
Italy	12	16.3	70	78	15.6	18.8	4.2	12.1
USA	19.4	16.2	70	77	15.9	15.7	5.5	5.4
Belgium	12.4	14.8	71	77		21.6	5.4	12.9
Ireland	12.5	14.7	70	77			6.7	11.3
New Zealand	10.5	14.3	71	76	20.9	15.9	2.5*	6.1
Netherlands	12.3	14.3	73	78	14.5	20.1	1.2	6.7
Switzerland	8.8	14	72	78		16.9	0.2*	4.7
Japan	8	9.7	69	80	15.3	21.9	1.1	3.3
Average	12.629	17.265	70.941	77.588	16.743	18.58	4.8	10.173

Source Table II.1 Table IV.8 Table IV.10 (*1980) Table IV.3
 Assembled from Tanzi and Schuknecht (2000) various tables.
 (Most of their data is from various OECD reports.)

IV. Some Notes on Methodology: Positive and Normative Issues in Public Economics

A. For many academic purposes, it is useful to distinguish between positive and normative policy analysis .

◆ DEF: A **positive statement** is a statement about what "is" "will be" or "has been." It is an attempt to describe the world.)

- i. **Positive** public finance attempts to characterize the causes and effects of public policies. It addresses such issues as:
 - a. the burden of alternative fiscal instruments,
 - b. the effects of alternative methods of public production and subsidies
 - c. the ultimate cause for government policies: individual interests, externalities, and public goods, politics
 - d. the effects of political institutions on fiscal policies.
- ii. **Normative public finance** attempts to address the relative merits of public policies.

◆ (DEF: A **normative statement** attempts to evaluate alternative policies or alternative states of the world. Is one policy "better" than another? Is one state of the world "better" than some other. Most normative statements are based upon normative theories of some kind that attempt to determine what are "good" or "bad," "just" or "unjust," "fair" or "unfair" public policies.)
- iii. Normative economics (welfare economics) addresses such issues as:
 - a. What is the best way to raise money to finance government services? (optimal tax theory)
 - b. What level of services should be provided by government? (the Pareto efficient supply of pure public goods, the social-welfare maximizing level of social insurance ...)
 - c. What is the best division of fiscal responsibilities among various levels of government? (optimal decentralization)
 - d. How do institutions affect the potential for government "failure," especially with respect to fiscal policies? (Balance budget rules, executive veto, etc.)
 - e. What is the ideal level of social insurance?

f. What is the "ideal" distribution of income or wealth? (Note that this differs from the optimal social insurance systems--*why?*)

- iv. Modern welfare economics emerged from normative public finance, and has become increasingly abstract and philosophical.
 - a. Its philosophical roots go back at least to the Ancient Greeks and their efforts to characterize ideal governments and societies [as in Plato's *Republic* and Aristotiles *Politics* (bks. 6-8).
 - b. Aristotle (book 6, part ii) notes, for example, that "it is evident that the form of government is best in which every man, whoever he is, can act best and live happily."

B. When working in any area of public economics it is often useful to be able to distinguish between positive and normative statements, both to avoid confusion and to improve the quality of discussions.

- i. This is partly because it is often easier to agree on positive issues than normative ones.
 - a. Most social scientists use similar tests to evaluate the accuracy of positive statements about the world.
 - b. (A statement that is testable is said to be "operational.")
- ii. Normative statements are less subject to tests than positive claims, so discussions often turn on whether a particular normative theory is more or less "appealing" than others.
 - a. For example, one's assessments of normative statements will vary according to whether one uses (i) Paretian, (ii) Utilitarian, (iii) Contractarian, (iv) Rawlsian (maximin), or (v) natural rights theories.
- iii. Many, perhaps most, sophisticated normative theories are "consequentialist." That is to say whether a policy is good or bad, desirable or not, depends in large part on the consequences of those policies.
 - a. Normative claims based on such theories will often include positive statement. Policy X is better than policy Y because it generates a lower unemployment rate.
 - b. Note that the positive parts of such claims, can often be tested.
 - c. However the norm, here "unemployment is bad," cannot be tested in the same way.

d. Given such operational norms, one can actually use normal scientific tests to determine whether one policy is better than another--but the conclusions about which policy is better requires accepting the norm.

- ◆ Net benefit maximization, unemployment, green house gas density, etc are all examples of “normative yardsticks” that refer to objective measures and so can be used to rank policies, given those norms.
- ◆ Other normative theories are mainly subjective. Law X is better than law Y because “I” believe it to be so.
- ◆ For the most part, welfare economics uses consequentialist norms, many of which, but not all, have objective yardsticks.

C. The *positive* strand of public economics is important, because understanding the effects of policy is of scientific interest in its own right, and also because it is the first step in any systematic normative analysis.

- ◆ Nearly all economic activities are affected by taxation or regulations.
- ◆ Nearly all non-economic activities are affected by public policies and/or economic considerations.

D. The *normative* strand of Public Finance is also important because at some point, decisions have to be reached. This requires ranking alternative policies--not simply understanding their consequences.

- i. All public policies are chosen one way or another and the choices tend to reflect both the positive and normative characteristics of the policy alternatives considered.
- ii. For most of us, the use of simple (narrow) self-interest will fail to explain our patterns of voting or our preferences over public policies.
 - ◆ That is to say, most of us use normative theories to evaluate public policies, often ones based on more or less global ideological theories.
 - ◆ (Here we may note that some professors at public universities vote for republican and libertarian candidates, who promise to reduce university budgets, in spite of their economic interests in larger budgets.)

E. Broader philosophical questions are also of interest. Analysis of alternative policies and constitutional reforms benefit from generalized method of identifying the “best” policy.”

- i. In order to assess whether "society" or constitution is doing as well as it can requires some method of ranking social states--at least if it is to be a subject of analysis and argument.
- ii. Consequently, at the heart of every normative analysis of market outcomes, policy choices, and constitutional reform is a *normative* theory of some kind.
- iii. The normative theories used most widely by economists include
 - a. the Pareto norms,
 - b. various forms of Utilitarianism
 - c. various forms of Contractarianism.
 - d. other less widely use normative theories include natural rights theories and environmental (green) theories

V. An Overview of Mainstream Welfare Economics.

A. The Pareto Criteria:

- i. Social state A is *Pareto Superior* to social state B, if and only if at least one person strictly prefers A to B, and no one strictly prefers B to A.
 - a. A Pareto superior move makes at least one person better off and no one worse off. (V. Pareto argued that in this case social welfare can be said to have unambiguously been improved.)
 - b. Social state C is *Pareto Optimal* (also called Pareto Efficient) if and only if no *feasible* social states are Pareto Superior to C.
 - ◆ A social state is Pareto efficient if there is no way to change things in a manner that will make at least one person better off without making someone else worse off.
 - ◆ Note the "making at least one person better off" is not just a matter of personal income or wealth. It is a matter of whether "utility" increases.
 - ◆ [Puzzle, should assessment of individual welfare should include consideration of all the "goods" that an individual believes influence his

well-being?. (This might include consideration of the individual's own social philosophy and matters of personal altruism or malice.)]

- ii. Unfortunately, often there are many social states that are Pareto efficient in a given problem.
- iii. Draw a two person Utility Possibility Set to illustrate these points.
 - ◆ [The Utilitarian and Contractarian theories discussed below (generally) identify states that are Pareto optimal (efficient).]

B. Utilitarian Norms and Social Welfare Functions

- i. Utilitarian theory has a long history, but it is usually associated with Jeremy Bentham, who was writing to critique the contractarian theories of his day (“nonsense on stilts”) and to propose an alternative, which in his mind made more sense.
 - a. He can be said to have founded the utility-based models that dominate contemporary neoclassical economics.

“Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all we think” *Principles of Morals and Legislation*
 - b. With respect to normative theory, he argued that:

It is the greatest good to the greatest number of people which is the measure of right and wrong.

and that

It is vain to talk of the interest of the community, without understanding what is the interest of the individual.
 - c. Utilitarianism rapidly displaced contractarian theories in the nineteenth century as the mainstream normative theory of liberals.

- ii. During the 1950s, economists took up utilitarianism using the mathematical representations of utility functions developed by neoclassical economists in the previous half century.
 - a. A (Bergson, 1938) **social welfare function** characterizes social welfare, W , as a function of individual utility levels:
 - b. $W = w(U_1, U_2, U_3, \dots, U_N)$
 - c. with *positive partial derivatives for each person* in the community or society of interest.
 - ◆ Two widely used *special cases* of social welfare functions are the
 - ◆ Benthamite or Utilitarian Welfare Function: $W = \sum U_i$ and the
 - ◆ Nash social welfare function $W = \prod U_i$.
- iii. A Pareto efficient state can be characterized with a social welfare function by maximizing W subject to some a production possibility frontier (global resource/production constraints).
 - a. However, it bears noting that *different social welfare functions* (ones that weight individual welfare differently) will select *different* Pareto efficient policies and different “ideal” allocations of wealth and income.
 - b. Most social welfare functions are assumed to exhibit diminishing marginal returns in the wealth of each individual.
 - ◆ This causes them to recommend egalitarian distributions of wealth, other things being equal
 - ◆ Inequality in such models is “ideal” only insofar as it increases total wealth.
- iv. A variety of other propositions about market outcomes and public policies can be derived from social welfare functions and also from their somewhat coarser cousin: social net benefit maximization.

C. The Contractarian approach

- i. Both the contractarian precursors to utilitarianism (Hobbes, Locke, Rousseau) and the modern versions (Rawls, Buchanan) that have tried to displace utilitarianism with new social contract based analysis, **use agreement as its sole index of social welfare.**

- ◆ State A is better than state B, if everyone agrees to move from B to A.
 - ◆ An advantage of this approach is that it does not, in principle, require everyone to be a contractarian or even to agree about the exact consequences of being in state A or B.
 - ◆ Contractarian ideas rest upon the normative appeal of voluntary action and agreements.
- ii. Although the contractarian approach differs from both the Pareto approach and the utilitarian approach, its conclusions are often the same as those that emerge from applying the other criteria.
- ◆ If *all* affected parties must agree to any change in a social state, or its institutions, only Pareto Superior moves can be made. (Why?)
- iii. The status quo ante is an important consideration in most contractarian theories, because what changes in institutions one will agree to depends in part on those initially in place.
- iv. Contemporary contractarians use a hypothetical agreement to analyze and rank states of the world. To make agreements more likely to emerge, they often introduce uncertainty or ignorance in one way or another.
- ◆ That is to say, rather than deal with explicit agreements between "real" people, the contractarian methodology often appeals to a hypothetical agreement from behind a "veil of ignorance" or a "veil of uncertainty."
- a. The Rawlsian **veil of ignorance** assumes a situation in which individuals perceive themselves to be equally likely to be anyone in the society that follows from their agreement.
- ◆ Rawls and many others argue that agreements are more likely to be obtained in such circumstances. (Why?)
 - ◆ Rawls argues that agreement from behind the veil tends toward rules that maximize the advantage of the least able person in society--although this conclusion requires an assumption that persons are all very risk averse. (Why?)
- b. Buchanan and Tullock in their calculus of consent (and Buchanan elsewhere) suggest that constitutional agreements are made more likely by uncertainty about the specific effects of new rules on particular individuals.

- ◆ Buchanan often argues that agreement will tend to be about the rules of the game rather than about particular outcomes, because agreements about generalized rules is easier to obtain. (Why?)

- v. A few contractarians use extent of agreement as an index of social welfare.
- vi. In principle, the contractarian approach implies the proper "social ranking" emerges from the individual decisions/evaluations of those affected by the policy, rather than from those of philosophers or the norms of the theorist--as would be the case when a theorist chooses a particular social welfare function.

D. There Is Significant Convergence Among Widely Used Normative Theories.

- i. The logic of Paretian, Utilitarian, and Contractarian analyses are similar partly because they use similar models of "man" and partly because they are inclusive social norms in which everyone counts.
- ◆ All start with the individual, all use rational characterizations of individual interests (as static and consistent) and possibilities (opportunity sets).
 - ◆ Every individual in society matters not simply an elite or privileged group.
- ii. The conclusions often tend to be similar, because the Rawlsian veil is often assumed to make everyone behave as if they were Benthamite utilitarians.
- ◆ That is to say, it is often (but not always) assumed that each individual maximizes *expected utility* in a setting where one's own identity is not known. (Note that $U^c = \sum_i U_i P_i$ has effectively the same maximand as the Bentham social welfare function if $P_i = P_j$ for all i and j .)
- iii. How risk averse people are has effects under both utilitarian and contractarian analysis.
- ◆ For example, Rawls argues that persons behind the veil may be very risk averse and choose to maximize the welfare of the worst of individual.
 - ◆ (What is the relevance of risk aversion in utilitarian theories?)
- iv. All three mainstream normative theoretical systems yield systematic rankings of "social states" that are in many ways similar.

- ◆ Nonetheless, differences in the weights used in social welfare functions can produce rankings that are quite different among utilitarians.
- ◆ Similarly, contractarian conclusions vary with assumptions about the status quo and the degree of individual risk aversion assumed for the individuals engaged in the negotiation.
- ◆

VI. Some Geometric Applications of “Crude” Utilitarianism: The Net Social Benefit Approach to Short and Long Run Competitive Equilibrium

A. If we assume that individuals maximize their own expected net benefits, it turns out that one can use some simple geometry to demonstrate that competitive market equilibria tend to be Pareto Efficient and to maximize social net benefits (social utility?)

B. If one uses this approach, rather than the utility maximizing approach, one can show that:

- i. Market **demand** curve can be used as social marginal benefit curve for all consumers of the good being traded when the individual demand curves are derived from personal Marginal Benefit (evaluation) curves, represent Hicksian income compensated demand curves, or equivalently are cases where income effects are unimportant.
 - a. The logic of using the demand curve as a social marginal benefit curve can be understood as follows:
 - b. Assume that individuals maximize net benefits and that in given circumstances each person has a marginal benefit curve for the good or service of interest.
 - c. A marginal benefit curve depicts the highest price that a person is willing to pay for “one more” unit of the good of interest.

It is normally a monotone, decreasing, function. (why?)

(There are exceptions however, as with the MB of individual shoes.)

- d. One can derive an individual demand curve by (1) choosing a price and finding the consumer surplus maximizing quantity, (2) plotting price and quantity, and (3) repeating to trace out a demand curve.

- e. Note that the points on the demand curve are all points on the individual’s MB curve.
 - f. To find a market demand one adds up the individual demand curves (a HORIZONTAL sum).
 - g. The market demand curve is, thus, a sum of individual MB curves, e.g. a “social” (consumer) marginal benefit curve.
- ii. Market supply curves in the short run and medium run (and in the long run for **Ricardian** supply curves) can be shown to be industry marginal cost curves.
 - a. In this case one assumes that the producers (firms) have a marginal cost curve (short run and/or long run, according to one’s interest).
 - b. One can derive a firm’s supply curve by (1) picking a price, (2) finding the associated marginal revenue curve for a price taking firm, (3) finding the firm’s profit maximizing output, (4) plotting price and the profit maximizing quantity, and (5) repeating to trace out the firm’s supply curve.
 - c. Every point on the individual firm’s supply curve is also a point on its MC curve.
 - d. A market (industry) supply curve is simply the (HORIZONTAL) sum of individual firm supply curves (in both the short and medium run--although there are some disagreements about the long run--more on this below).
 - e. The industry supply curve is a sum of the individual firm marginal cost curves, and thus can be used to characterize the **industry’s marginal cost**.
 - iii. [The long run supply curve in a **Marshallian** analysis differs from Ricardian analysis, because in Marshall’s analysis long run supply is determined by each firm’s lowest long run average cost, because in the long run efficiently-sized firms enter and exit the market to set long-run supply equal to long-run demand. The minimum ATC occurs where MC crosses ATC, so this process also makes price equal to LR marginal cost. This is not as simple as in the Ricardian case, which can be analyzed as above.]
 - iv. The area under a "marginal X" curve is "total X," in all cases where total X has the value 0 at $Q = 0$. (Substitute for "X" such words as cost, benefit, utility, product, revenue, profit, etc...)

C. In cases where there are no benefits or costs involved in production and consumption other than those directly borne by firms and consumers, *the area between the Demand and Supply curves represents* net social benefits from production and exchange.

- i. That area is *the money value of all gains from trade in the market of interest.*
- ii. This area is maximized by the ordinary operation of competitive markets.
- iii. **Competitive markets thus both maximize social welfare (measured in dollars) and achieve a Pareto efficient outcome (for the market of interest).**
 - ◆ **LR competitive equilibrium in markets without externalities maximizes social net benefits**, and, thereby, the realization of potential gains to trade between consumers and firms, which implies that the result is Pareto efficient.
 - ◆ (Any other output level will reduce social net benefits and, so, have unrealized potential gains to trade!)

D. However, in cases where there are benefits or costs involved in production or consumption that fall on other firms or consumers (in the same or other markets) a new curve has to be introduced that reflects the marginal costs or benefits borne by these other persons.

- ◆ These are the external marginal damages or benefits generated by production or trade in the market of interest.
- ◆ In such cases, markets are unlikely to maximize social welfare in the above sense, or to achieve Pareto efficient outcomes.

E. These graphical tools also allow you to use comparative statics to determine who wins and loses as circumstances or policies change.

- ◆ In this respect the net-benefit maximizing model is similar to the utility maximizing ones, but a bit simpler and less powerful to use.