

Introduction to Public Economics

Governments play a crucial role in much economic life.

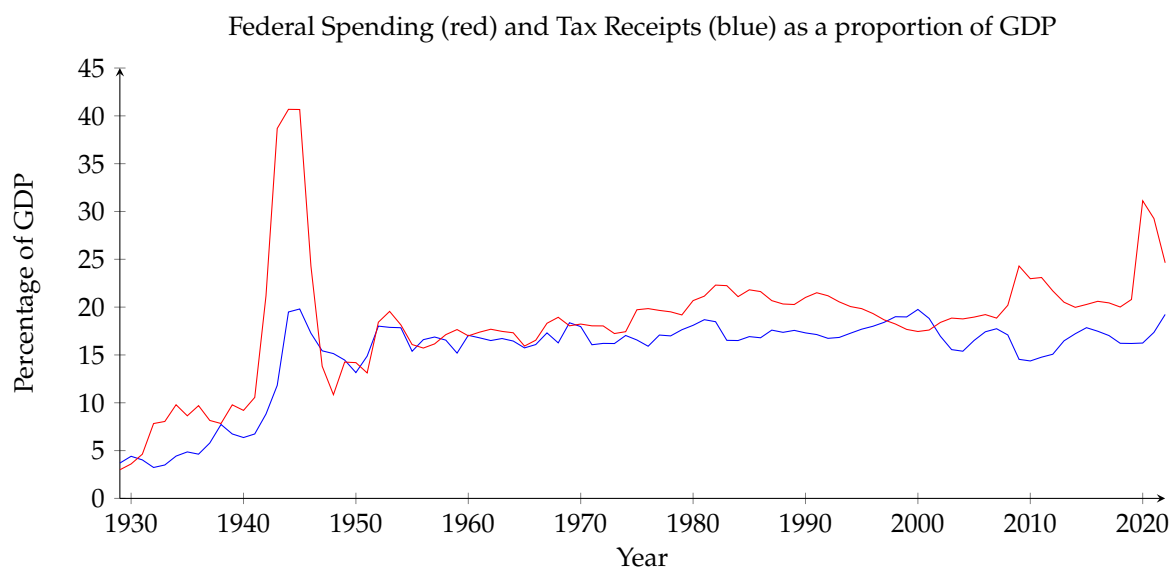
- Regulatory structure (financial markets, pharmaceuticals, labor markets, civil rights).
- Taxes.
- Public goods and social welfare spending.
- Macroeconomic stabilization.

Public finance is the study of the role of government in a market economy, primarily focusing on taxes and spending.

Reasons to study public economics:

- Governments have a lot of power in the realm of economic welfare.
- Nearly every economic transition is mediated by the government.
- It can inform debates about the appropriate role of government regarding taxes, healthcare, climate change, etc.
- The government is large.
 - It employs 1/6 of the US Workforce.
 - Tax revenue is approximately 27% of the United States's Gross Domestic Product.

The government (as measured by tax revenue/GDP) greatly increased in size between 1910 and 1940 (due to the establishment of the welfare state and various wars).



Two Motivations for Government Intervention

- Market Failure
- Redistribution

The First Welfare Theorem states that *in the absence of market failure*, markets will yield a result along the **utility possibilities frontier** (i.e., the set of all maximized utilities given the current market).

However, there are a lot of market failures:

- Externalities (pollution, network effects from vaccination)
- Public Goods (public safety)
- Asymmetric Information (market for lemons)
- Individual Mistakes (failure to save)
- Imperfect Competition (oligopoly, cartelization)

Policymakers also have to consider the *equity-efficiency tradeoff* in redistribution (i.e., some redistributive acts might reduce total utility)

Government as Social Cooperation

- Economists tend to have a narrow view of human behavior, but social cooperation undergirds much of the levels of societal coordination beyond individuals (i.e., families, communities, countries, global superstructures)
- Human societies of old depended on social cooperation for protection and taking care of the young, sick, and old.
- Modern states are the primary form of coordination today.
- Humans reveal their social nature (or social solidarity) via the size of the government (informal and formal).

Activity 1

Activity: Introduction to Public Economics

Econ 308

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Dani Rodrik and Stefanie Stantcheva (2021) begin their recent working paper as follows:

One of the biggest challenges that countries face today is the very unequal distributions of opportunities, resources, income and wealth across people. Inclusive prosperity — whereby many people from different backgrounds can benefit from economic growth, new technologies, and the fruits of globalization — remains elusive. To address these issues, societies face choices among many different policies and institutional arrangements to try to ensure a proper supply of productive jobs and activities, as well as access to education, financial means, and other endowments that prepare individuals for their participation in the economy. In this paper we offer a simple, organizing framework to think about policies for inclusive prosperity.

1. This framework is illustrated with the 3x3 matrix below. Where might the following public policies fit in this matrix?
 - (a) cash transfers to low income people
 - (b) estate/inheritance taxation (based on estate of deceased)
 - (c) healthcare; primary education
 - (d) minimum wage; apprenticeships
 - (e) on-the-job training; labor laws; protectionist trade policy
 - (f) progressive income taxation; wealth taxes; corporate taxes
 - (g) public higher education
 - (h) R&D tax credits; antitrust policy
 - (i) social insurance (e.g., unemployment insurance, disability insurance, Social Security)
 - (j) universal basic income

		At what stage of the economy does policy intervene?		
Which income group is the target of the policy?		Pre-Production Stage: shape the endowments with which people enter the workforce	Production Stage: shape the employment, investment, and innovation decisions of firms	Post-Production Stage: redistribute income and wealth after they have been realized
	Bottom	(c)	(d)	(a, f, i, j)
	Middle	(c, e)	(d, e)	(f, i, j)
	Top	(c)	(h)	(b, f, i, j)

2. At which stage do you think it is most important for policy to intervene? Why?

Pre-production: helps to equalize endowments to equalize opportunity

Microeconomic Foundations: Consumer Theory

Utility function $u(X, Y)$ translates consumption quantities into utility.

Indifference curve A graphical representation of all bundles of goods that make an individual equally well off. Mathematically, an indifference curve is the set of all bundles (X, Y) such that $u(X, Y) = U$ for some utility level U .

Marginal Rate of Substitution MRS_{XY} is the negative slope of the indifference curve — it's the rate at which the consumer will trade Y for X .

$$MRS_{XY} = \frac{\partial u / \partial X}{\partial u / \partial Y}$$

Budget Constraint the set of all bundles for which the total amount spent equals income

- Let I indicate income and P_X and P_Y represent the prices of goods X and Y respectively.
- The budget constraint is the line segment $P_X X + P_Y Y = I$.
- The slope of the budget constraint is $-\frac{P_X}{P_Y}$.

Utility Maximization A rational consumer maximizes utility subject to the budget constraint via the parallel conditions of tangency ($MRS_{XY} = \frac{P_X}{P_Y}$) and the budget constraint ($P_X X + P_Y Y = I$).

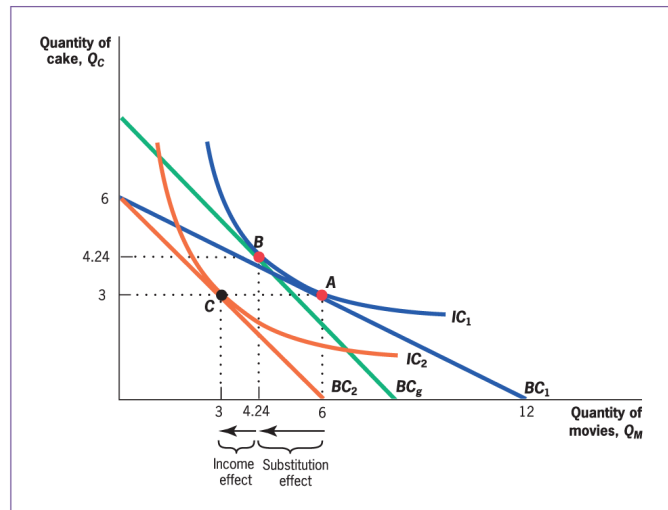
Demand Functions Utility maximization generates demand functions (quantity in terms of price) $X(P_X, P_Y, I)$ and $Y(P_X, P_Y, I)$. There are two primary canonical utility functions.

- Cobb-Douglas: $u(X, Y) = A \ln(X) + B \ln(Y)$, or $u(X, Y) = X^A \cdot Y^B$. The demand function for this utility function yields that P_X has no effect on Y and P_Y has no effect on X .
- Quasilinear: $u(X, Y) = v(X) + BY$ where $v'(X) > 0 > v''(X)$ (i.e., concave down, sloping up). The demand function for this utility function yields that I has no effect on X assuming an interior solution.

Price Effects The impact of a change in P_X on demand for X is composed into two effects:

- Substitution Effect: change in consumption due to the change in relative prices, with utility held equal. When the price of a good increases, the substitution effect is always negative, and vice versa.
- Income Effect: change in consumption due to a change in purchasing power as a result of the price change, where relative prices are held constant at the final price ratio. Income effects can be positive or negative depending on the type of good.
- The total effect is equal to the income effect and the substitution effect.

Income and Substitution Effects



Gruber, *Public Finance and Public Policy*, 6e, © 2019 Worth Publishers

Price Elasticity The price elasticity of demand is the % change in demand caused by a 1% change in price of a good.

$$E^D = \frac{dD}{dP} \frac{P}{D}$$

Elasticities are *unit-free*, typically negative, and tend not to be constant along a demand curve.

Game Theory

Some decision problems involve strategic interactions between individuals.

- For example, Antonia and Bruno might care about giving to a local charity, and give G_A and G_B respectively.
- Their utility functions depend on each other $u_A(G_A, G_B)$, $u_B(G_A, G_B)$.
- The **Nash Equilibrium** yields each individual choosing an action that maximizes their utility *given the other person's behavior*.

Social Welfare

Economists incorporate distributional concerns by use of social welfare functions.

$$SWF = f(u_1, u_2, \dots, u_n)$$

We have two canonical social welfare functions:

- Utilitarian SWF: $SWF = U_1 + U_2 + \dots + U_n$.
 - Marginal utility decreasing in income \rightarrow redistribution from the rich to the poor.
 - Taking \$1 from a rich person decreases their utility by a small amount, but transferring to a poor person increases their utility by a large amount.
- Rawlsian SWF: $SWF = \min\{U_1, U_2, \dots, U_N\}$
 - Social welfare is maximized by maximizing the well-being of the worst-off person.
 - Rawlsian social welfare is more redistributive than utilitarian social welfare.

There are a few other philosophies regarding the fairness of economic distribution in society.

Just deserts Individuals should be compensated in line with their contributions.

Commodity egalitarianism Society should ensure that individuals meet a set of basic needs, but beyond that point income distribution is irrelevant.

Equality of opportunity Society should ensure that all individuals have equal opportunities for success.

Present Discounted Value

The present discounted value of a future value of money F that is received and spent in n periods is:

$$PDV = \frac{F}{(1 + r)^n}$$

For the **discount rate** r , typically the interest rate.

For a stream of future expenses F_i , we use the following formula:

$$PDV = \sum_{i=1}^n \frac{F_i}{(1 + r)^i}$$

If the values of F_i are equal, then $PDV = \frac{F}{r}$, via the geometric series formula.

Activity 2

Activity: Theoretical Tools of Public Economics

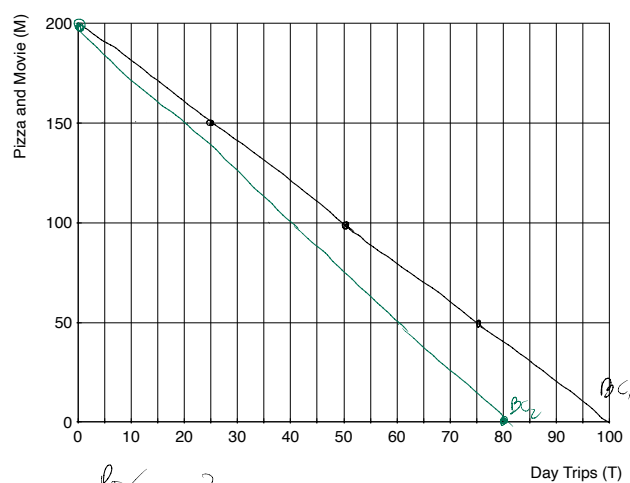
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1 Gruber 2.14: Consumer Choice

You have \$4,000 to spend on entertainment this year (lucky you!). The price of a day trip (T) is \$40 and the price of a pizza and a movie (M) is \$20. Suppose that your utility function is $u(T, M) = T^{3/4} \times M^{1/4}$.

a. Draw the budget constraint below. What combination of T and M will you choose?



$$P_T / P_M = 2$$

$$\frac{\partial u}{\partial M} = \frac{1}{4} \left(\frac{T}{M} \right)^{3/4}$$

$$\frac{\partial u}{\partial T} = \frac{3}{4} \left(\frac{M}{T} \right)^{1/4}$$

$$\frac{\frac{\partial u}{\partial T}}{\frac{\partial u}{\partial M}} \rightarrow \approx 3 \frac{M}{T}$$

$$2 = \frac{3M}{T}$$

$$40T + 20M = 4000$$

$$60M + 20M = 4000$$

$$80M = 4000$$

$$M = 50$$

$$T = 75$$

$$3M = 2T$$

- b. Suppose that the price of day trips rises to \$50. Draw the new budget constraint in the same plot in part (a). What combination of T and M will you now choose?

$$\begin{aligned}
 P_T/P_M &= 3/2 \\
 M/P_M &= 3M/T \\
 8T &= 6M \\
 50T + 20M &= 4800 \\
 60M + 20M &= 4800 \\
 M &= 50 \\
 T &= 60
 \end{aligned}$$

2 Bonus: Social Welfare Functions

The utility possibilities frontier (UPF) drawn below corresponds to an economy with only two individuals, Abbi and Ilana. There is a high level of inequality at the market equilibrium outcome, i.e., Abbi is rich, while Ilana is poor. Which of the four labeled points (W , X , Y , Z) is most preferred by a social planner with:

- a. a utilitarian social welfare function? (Y)
 b. a Rawlsian social welfare function? (X)

