Lecture 3. The Goods (and Services) Market

Reading: Blanchard, Chapter 3.

In the previous lecture…

- Major macroeconomic variables
  1) GDP
     - from the production / income / expenditure side
     - Nominal / Real

  2) The unemployment rate

  3) The inflation rate
     - GDP deflator / CPI

Outline

- The Composition of GDP
  - $Y = C + I + G + NX$
- The Consumption Function and the Keynesian Cross
- Investment – Saving interpretation
- Government, Fiscal Policy, and Multipliers
- Automatic Stabilizers and Some Remarks on the Fiscal Policy

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The demand / expenditure side of GDP

The final goods and services are purchased by a consumer, a firm, the government, and a foreign agent.

-
-
-
-
  (1)
  (2)
-

Y = C + I + G + NX (+ Inventory Inv.)

- Consumption
- by (domestic) consumers
- Food, haircut, (new) cars, etc.

Y = C + I + G + NX (+ Inventory Inv.)

- (Fixed) Investment to distinguish from inventory investment
- Fixed Inv. = Inv.
  (by firms, new plants, machines, …)
  + Inv.
  (new houses or apartments)

- Remark) Investment in macroeconomics
  ≠ Financial investment (bond, stocks, forward, etc.)

Y = C + I + G + NX (+ Inventory Inv.)

- Government spending
- Military spending, office equipment, and
- Services provided by government employees
  - ex) police officer, fire fighter, teachers, etc.
  - Government employees produce services. The government purchases the services and pays salaries to the employee.

- Government transfers $\notin$ G

Y = C + I + G + NX (+ Inventory Inv.)

- Net exports = = -

- Trade : Exports > Imports ⇒ NX > 0
- Trade : Exports < Imports ⇒ NX < 0

Y = C + I + G + NX (+ Inventory Inv.)

- Inventory investment
- What is produced but not sold becomes inventory.
- What if a consumer buys a good produced in the last year?

The Composition of U.S. GDP, 2014

		Billions of Dollars	Percent of GDP
	GDP (*Y*)	17,348	100.0
1	Consumption (*C*)	11,865	68.3
2	Investment (*I*)	2,782	16.0
	Nonresidential	2,233	12.9
	Residential	549	3.1
3	Government spending (*G*)	3,152	18.1
4	Net exports	−530	−3.1
	Exports (*X*)	2,341	13.5
	Imports (*IM*)	−2,871	−16.6
5	Inventory investment	77	0.4

Source: Survey of Current Business, July 2015, Table 1-1-5

Implications

- Inventory investment is very very small.

  Therefore, from now on, we assume that $Y = C + I + G + NX$.
- NX is small in the U.S. (and in HK).

  We assume that $NX = 0$.
- G is chosen by the government. So we take it as given.
- We will investigate I more carefully after we study interest rates.

- So, for now, we focus on , the largest component in Y.

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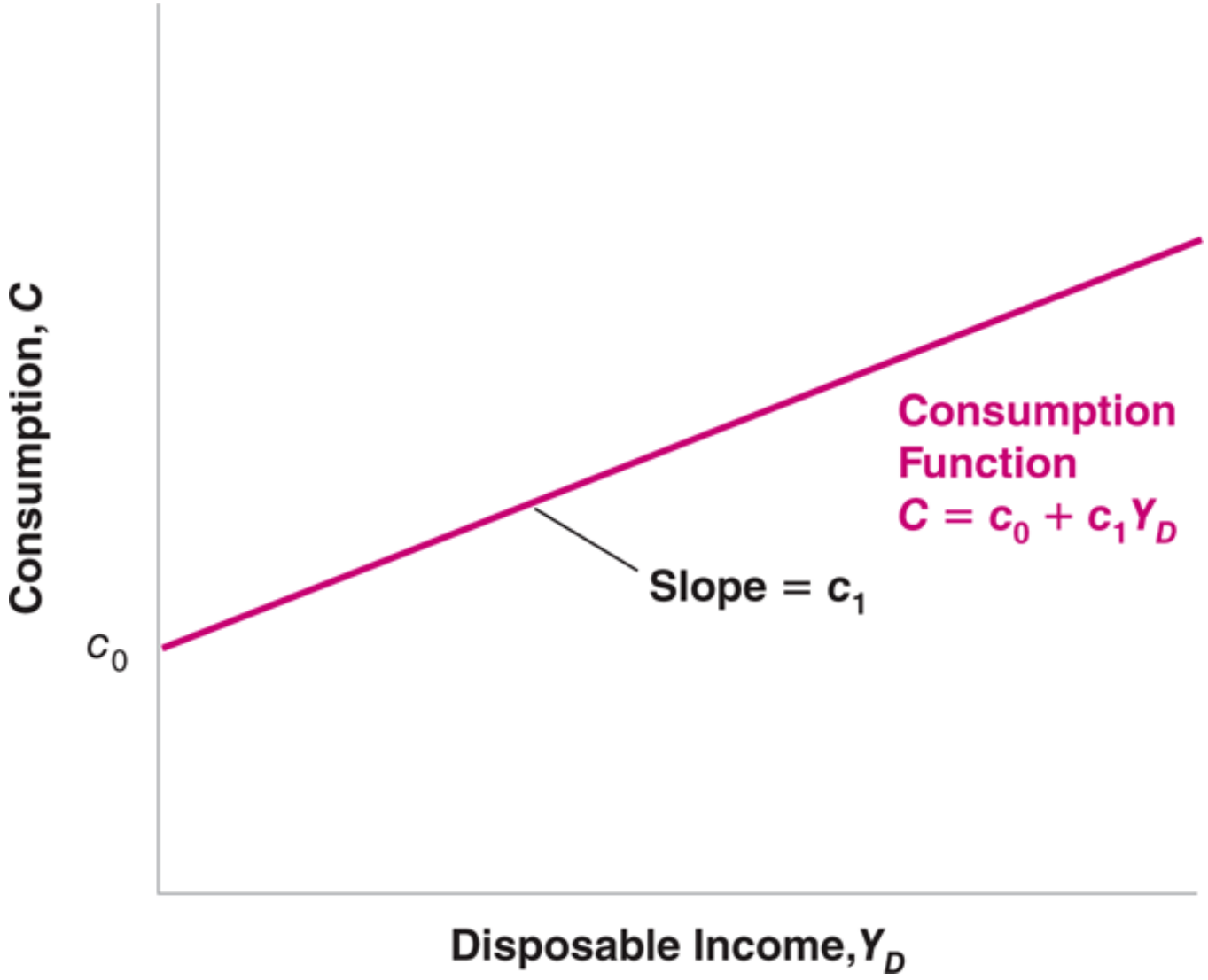
The consumption function

- Which factors affect how much a person consume?
- C = a function of
- We ASSUME that



- When disposable income changes, we move along the curve.
- When something else changes, c_0 and/or c_1 vary and the curve shifts.

$$C = c_0 + c_1(Y - T)$$

- a behavioral equation

- c_0: autonomous consumption includes
  - subsistence level of consumption
  - effects of all the factors other than the disposable income (Y_D)

- c_1:
  - The effect an additional dollar of disposable income has on consumption.

What is the value of c_1?

TABLE 1. Empirical estimates of the marginal propensity to consume out of transitory income.

	Consumption Measure				
Authors	Nondurables	Durables	Total PCE	Horizon*	Event/Sample
Agarwal and Qian (2014)			0.90	10 months	Growth dividend program Singapore 2011
Blundell, Pistaferri, and Preston (2008)‡	0.05				Estimation sample: 1980–1992
Browning and Collado (2001)			~0		Spanish ECPF data, 1985–1995
Coronado, Lupton and Sheiner (2005)			0.36	1 year	2003 tax cut
Hausman (2016)			0.6–0.75	1 year	1936 veterans' bonus
Hsieh (2003)‡	~0		0.6–0.75		CEX, 1980–2001
Jappelli and Pistaferri (2014)	0.48				Italy, 2010
Johnson, Parker, and Souleles (2009)	~0.25			3 months	2003 child tax credit
Lusardi (1996)‡	0.2–0.5				Estimation ample: 1980–1987
Parker (1999)	0.2			3 months	Estimation sample: 1980–1993
Parker, Souleles, Johnson, and McClelland (2013)	0.12–0.30		0.50–0.90	3 months	2008 economic stimulus
Sahm, Shapiro, and Slemrod (2010)			~1/3	1 year	2008 economic stimulus
Shapiro and Slemrod (2009)			~1/3	1 year	2008 economic stimulus
Souleles (1999)	0.045–0.09	0.29–0.54	0.34–0.64	3 months	Estimation sample: 1980–1991
Souleles (2002)	0.6–0.9			1 year	The Reagan tax cuts of the early 1980s

- Source: Carroll et al. (2017), The distribution of wealth and the marginal propensity to consume.

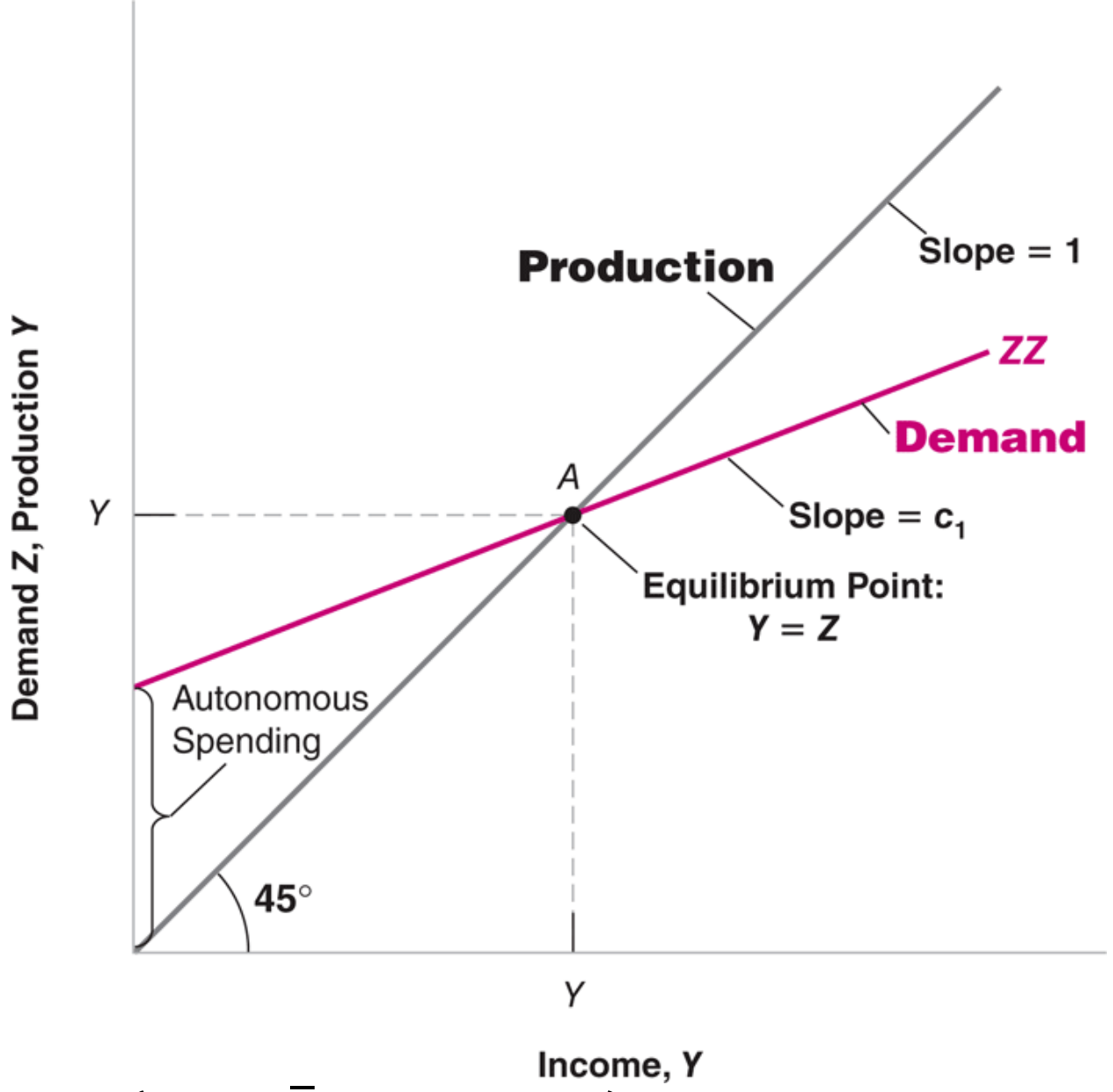
What is the value of c_1?

- There is no consensus among economists…
- A substantial heterogeneity across consumers exists.
  - ex) The poor usually have higher MPCs than the rich.
- Any value which is not extremely low or high would be okay for the purpose of this course.

The Keynesian Cross

- Demand: $Z = C + I + G + NX$
  - People want to purchase Z amount of goods and services given income Y.
- Supply: production Y
- Equilibrium condition for the goods and services market

  supply (production) = demand (expenditure) $\Rightarrow$



- Demand : $Z = (c_0 + \bar{I} + G - c_1 T) + c_1 Y$
- Supply : Y (production) $= Y$ (income)

What happens if $c_0 \uparrow$?

- When does the autonomous consumption increase?

The total effect on equilibrium output

- $1 + c_1 + c_1^2 + c_1^3 + \cdots =$: “ ”

- Ex) Suppose that $c_1 = 0.5$. When c_0 increases by \$1, the equilibrium output Y increases by $\$2 = \frac{1}{1-0.5}$.

- The higher the MPC (c_1), the higher the multiplier effect.

Graphical illustration

Algebra

- Demand: $Z = (c_0 + \bar{I} + G - c_1 T) + c_1 Y$
- Equilibrium condition: $Y = Z$
- Derive the equilibrium output:

$$Y = \frac{1}{1 - c_1}(c_0 + \bar{I} + G - c_1 T)$$

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$Z = Y \quad \Leftrightarrow \quad I = Total\ saving$

- Private saving (S) : $S = Y_D - C = Y - T - C$
- Public saving : $T - G$

- Show that $Z = Y \quad \Leftrightarrow \quad I = Total\ saving.$
- $C + I + G = Y \quad \Leftrightarrow$

- IS relation: What firms want to invest must equal what people and the government want to save.

More on saving

- $S = Y_D - C = Y_D - (c_0 + c_1 Y_D) = -c_0 + (1 - c_1) Y_D$
  - Marginal Propensity to Save $(MPS) = 1 - c_1$

- The paradox of saving (or the paradox of thrift)
  - Suppose that consumers decide to save more by reducing c_0 by 1 unit.
  - Will Y_D be the same? If not, how much will it change?

  - What is the ultimate effect on the private saving S?
  - Exercise) What if consumers lower the MPC?

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A crash course on the fiscal policy

- Most of the materials here are borrowed from Professor Saez' lecture slides for the undergraduate public economics course in UC Berkeley.

Taxes and Expenditures by governments

- **Taxes**: governments in advanced economies collect 35-50% of National Income in taxes.

- **Expenditures**: taxes fund
  - **public goods** (infrastructure, public order and safety, defence),
  - **welfare state** (education, retirement benefits, health care, income support), and
  - **fiscal stimulus** to stabilize business cycles.

Key facts on taxes and expenditures

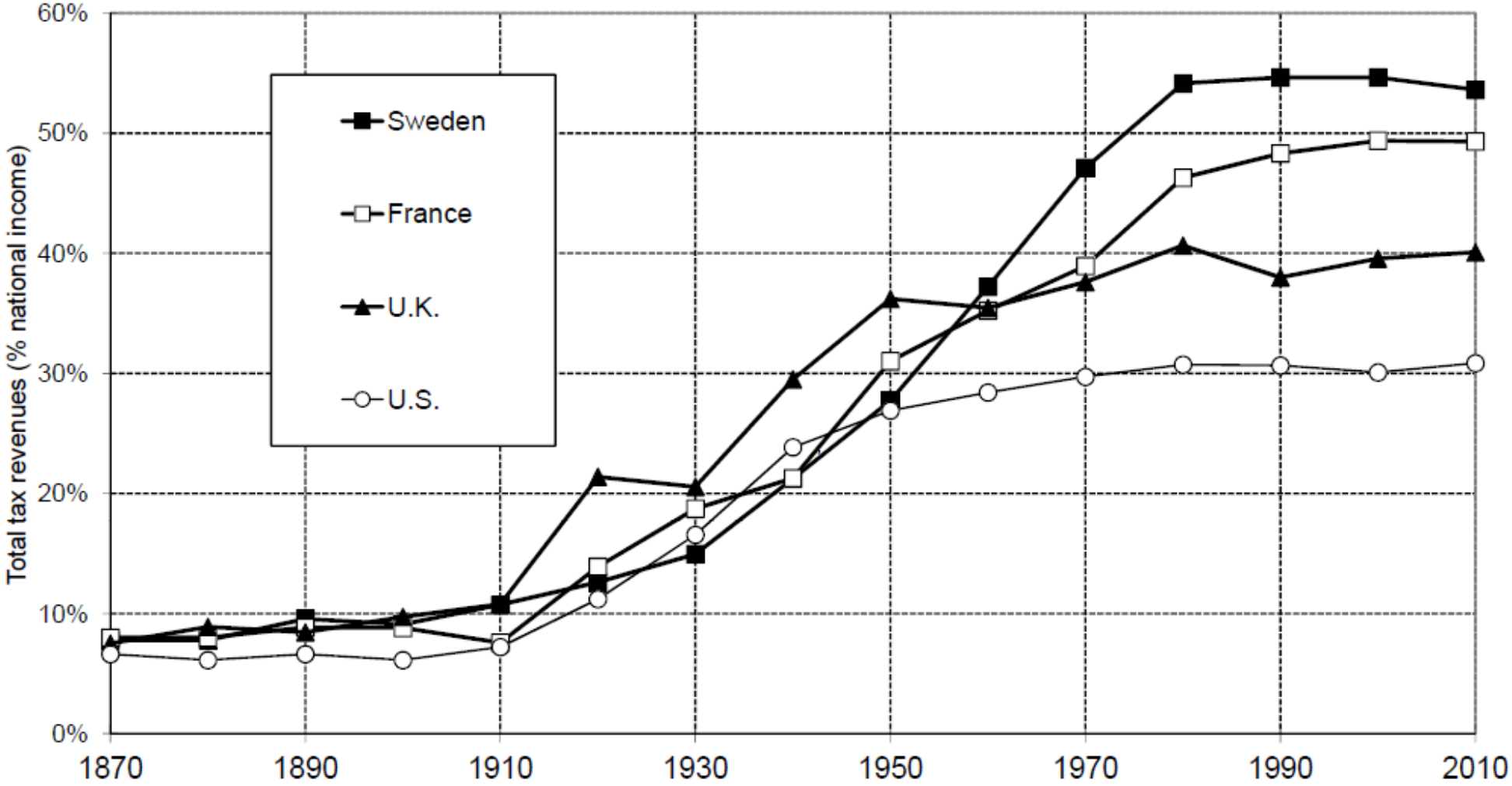
1) **Government Growth**: Size of government relative to National Income grows dramatically over the process of development from less than 10% in less developed economies to 30-50% in most advanced economies

2) **Government Size Stable** in richest countries after 1980

3) **Government Growth** is due to the expansion of the welfare state: (a) public education, (b) public retirement benefits, (c) public health insurance, (d) income support programs

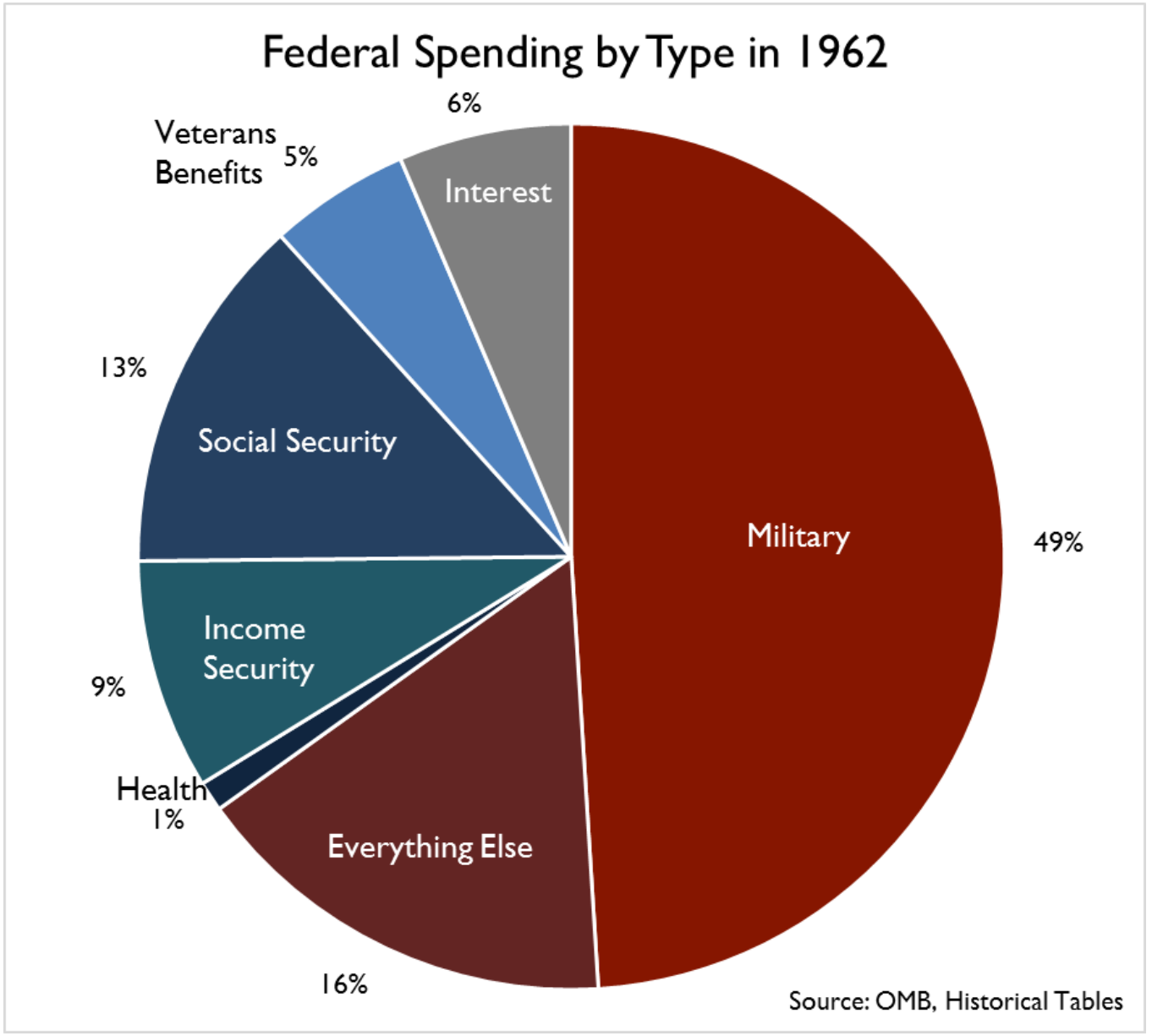
4) **Govt expenditures > Taxes**: Most rich countries run deficits and have significant public debt (relative to GDP), particularly during Great Recession of 2008-10

Figure 13.1. Tax revenues in rich countries, 1870-2010

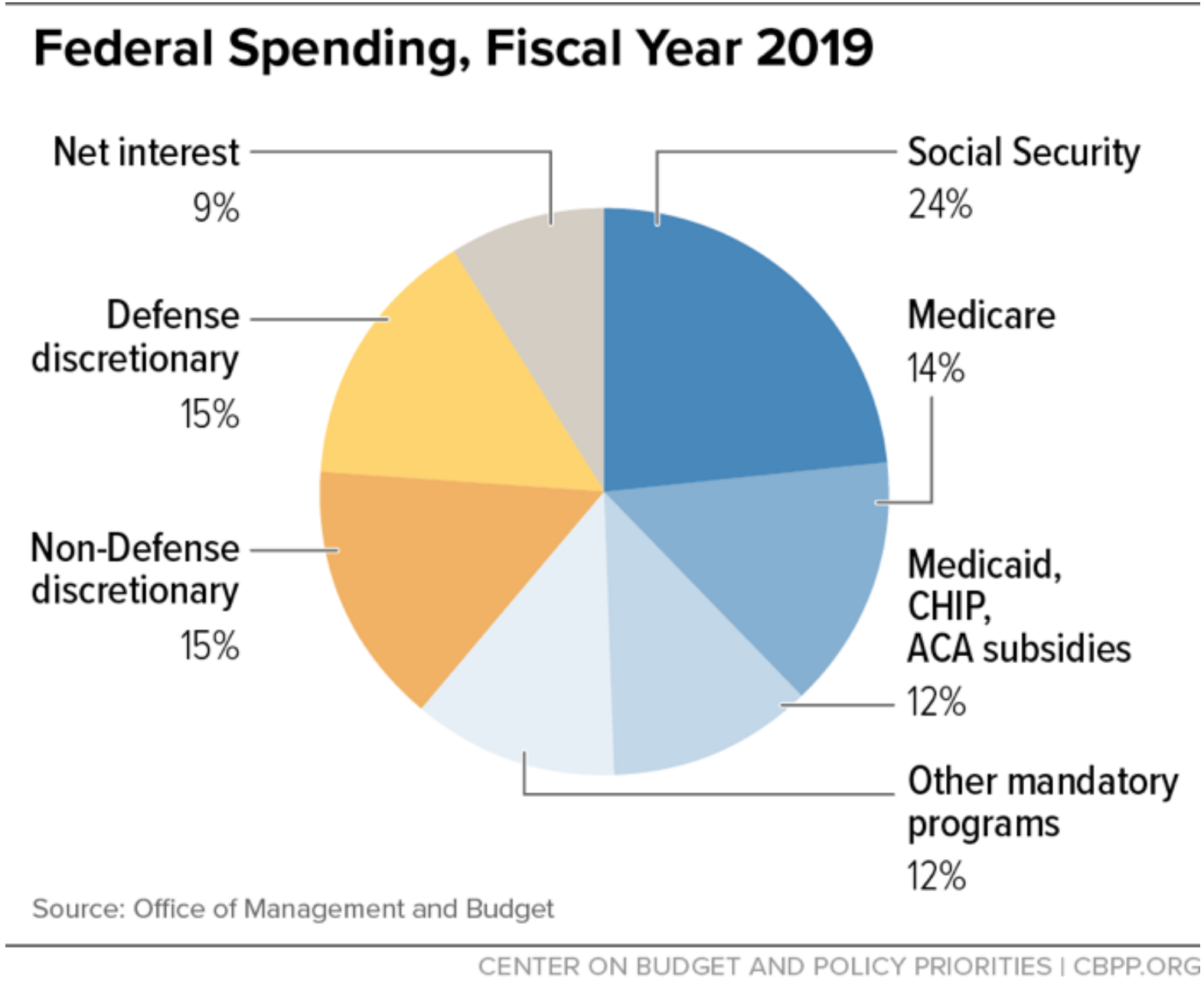


Total tax revenues were less than 10% of national income in rich countries until 1900-1910; they represent between 30% and 55% of national income in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Source: Piketty (2014)



- Source: https://taxfoundation.org/where-do-your-tax-dollars-go/

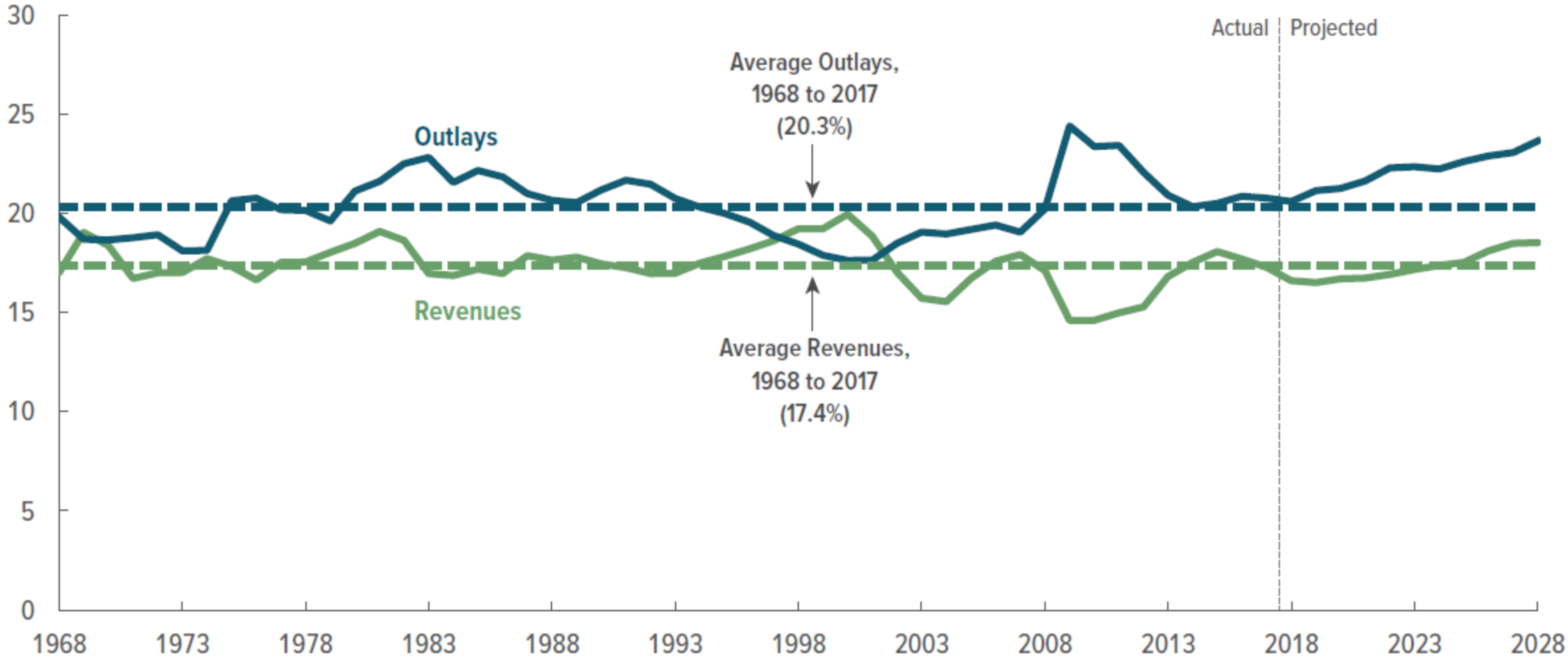


- Source: https://www.cbpp.org/federal-spending-fiscal-year-2017

Figure 4-2.

Total Revenues and Outlays

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

Two forms of expenditures

- **Entitlement (Mandatory) spending**: Mandatory funds for programs for which funding levels are automatically set by the number of eligible recipients (ex: Medicare, social security)
- **Discretionary spending**: Optional spending set by appropriation levels each year, at Congress's discretion (ex: defense)

- Q) To fight against recessions, which type of expenditure can be expanded?

Government Budgeting (Ch. 22.2)

- **Debt (B)**: The amount borrowed by government through bonds to individuals, firms, or foreign governments. Debt is a **stock**.
- **Deficit**: government's spending + interest payments on debt minus government revenues in a given year. A negative deficit is called a surplus. Deficit is a **flow**.

- $B_{t+1} = B_t + Deficit_t = (1 + r_t)B_t + G_t - T_t$

  with r_t interest paid on government debt
- Primary Deficit = $G - T$
- Two methods to finance G: (1) , and (2) .

Fiscal stimulus: three different scenarios

1) $G: 1 \uparrow$

2) $T: 1 \downarrow$

3) $G: 1 \uparrow$ and $T: 1 \uparrow$

- Recall that the equilibrium output is given by

$$Y = \frac{1}{1 - c_1}(c_0 + \bar{I} + G - c_1 T).$$

- Compare 1) and 3): Financing method for an increase in G matters! Deficit-financing vs. Tax-financing

1) Spending multiplier

- Remember that

$$Z = C + I + G = c_0 + c_1(Y - T) + \bar{I} + G$$

- What will happen to Y if we increase G while not changing T?

- Multiplier $\left(\frac{\Delta Y}{\Delta G}\right)$?

2) Tax multiplier

- Remember that

$$Z = C + I + G = c_0 + c_1(Y - T) + \bar{I} + G$$

- What will happen to Y if we decrease T while not changing G?

- Multiplier $\left(\frac{\Delta Y}{\Delta T}\right)$?

3) Balanced budget multiplier

- Remember that

$$Z = C + I + G = c_0 + c_1(Y - T) + \bar{I} + G$$

- What will happen to Y if we increase G and T by one unit?

- Multiplier $\left(\frac{\Delta Y}{\Delta G}\middle|_{\Delta G=\Delta T}\right)$?

(Spending) Multipliers in the real-world

- Data:
- “In that paper, which focused only on temporary, **deficit-financed** increases in government purchases, I concluded based on the evidence available from US data at that time that the multiplier was probably between **0.8 to 1.5**, but that the data did not reject a range from 0.5 to 2.”
- Ramey, Valerie A. (2019), “Ten Years After the Financial Crisis: What Have We Learned from the Renaissance in Fiscal Research?,” *Journal of Economic Perspectives* 33(2), 89-114.

- Our model: $\frac{1}{1-c_1} \geq 1$. For example, if $c_1 = 0.5$, $\frac{1}{1-c_1} = 2$.

What are missing in our current model?

- As more variables are incorporated in the model, you will see how the fiscal multiplier changes.

- Ch 4 and 5:
- Ch 5:

- Ch 7 and 7 in the 6th edition:

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Automatic stabilizers

- We have studied the effects of ‘discretionary’ fiscal policies.
- However, the built-in responses of the tax-and-transfer system can be useful for stabilizing economic fluctuations (i.e., business cycles).

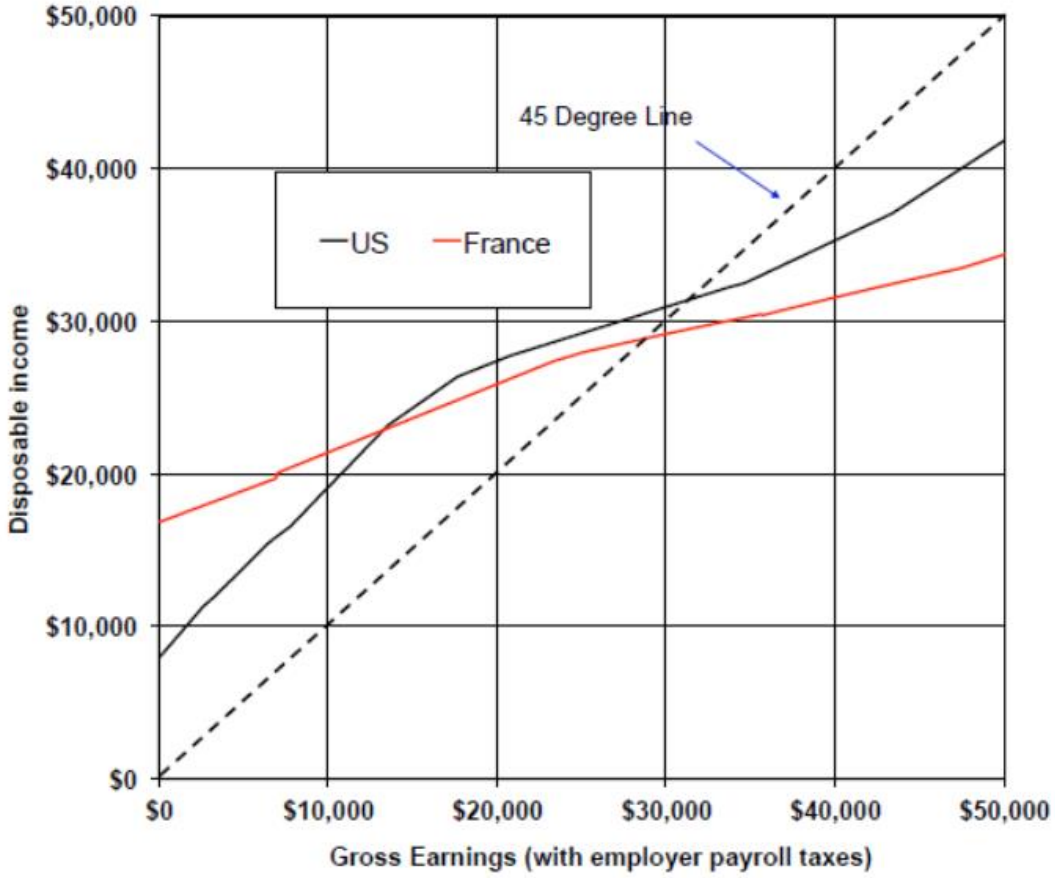
- These policies governed by (automatic) rules are called “automatic stabilizers.”

EX1) Unemployment insurance (UI)

- In recessions, $Y \downarrow$, more people become unemployed (Lecture 2).
- The government pays parts of workers' original earnings for a specified amount of time.
- This would help the unemployed workers and reduce the negative effects of recession on consumption.

EX2) Progressive income tax system

- Most countries have progressive income tax system. That is, as you earn more, the tax rate gets higher.
- During expansions, $Y \uparrow$, income increases, and people pay more taxes.
- This makes the reaction of C less sensitive to the change in Y, i.e., automatically stabilize the economy.
- Exercise #5, p. 85.



Source: Piketty, Thomas, and Emmanuel Saez (2012)

- US and France in 2010.
- The poor receive positive transfers.
- The rich pay more tax.

Some remarks on the fiscal policy

- Changing government spending or taxes is not easy. It always takes time for the Congress to pass the bill.
- For example, it took 99 days for National Assembly in Korea (≈ Congress) to pass the recent stimulus plan.

- MP has shorter “ ” than FP.
- But when interest rates are close to zero and there are not many remaining policy options for the central bank, FP can be very important.

In the next class…

- We will look at the financial markets and the determination of the interest rate. We focus on how monetary policy can (and cannot) affect the interest rate.

- Blanchard, Chapter 4.