Econ 352 - Credit Market Imperfections - Credit Frictions, Financial Crises, and Social Security

(See Williamson Ch. 10)

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Introduction

- Chapter 9 started thinking about credit markets–smoothing behavior
- And one big prediction from Chapter 9 was the Ricardian Equivalence theorem!
  - The timing of lump-sum taxes doesn't matter if it doesn't change NPV income
- But we make a big assumption: perfect credit markets
- In this chapter, we add frictions: asymmetric information, and limited committment
- They'll help us better understand some modern events (2008, 2022(?))
- And when Ricardian Equivalence may fail

Kinked Budget Constraints

- Before we assumed that the rate at which we lend and the rate we borrow at are the same
- However, it may be hard to rate people's credit risk (for instance) so r_{borrow} may be greater than r_{lend}.
- To keep with Williamson, we'll call $r_2 = r_{borrow}$, and $r_1 = r_{lend}$.
- We start again from the first-period budget constraint, which doesn't change:

$$c + s = y - t$$

- But now we'll have two budget constraints: one in which we borrow at r_2 ($s < 0$), and the other in which we lend at r_1 ($s \geq 0$)

Kinked Budget Constraints

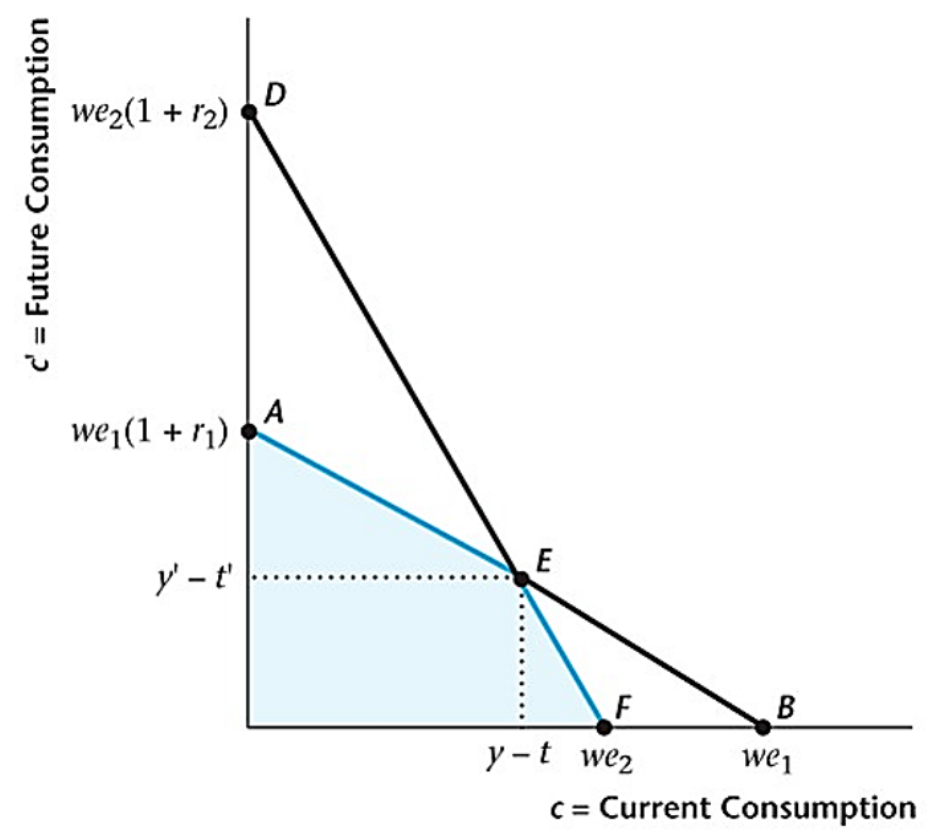
$$c + s = y - t$$

- But now we'll have two budget constraints: one in which we borrow at r_2 ($s < 0$), and the other in which we lend at r_1 ($s \geq 0$)
- As before, we can write out the lifetime budget constraint, but now there are two:

$$we = \begin{cases} c + \frac{c}{1+r_1} = y + \frac{y'}{1+r_1} - t - \frac{t'}{1+r_1} = we_1 & \text{if } s \geq 0 \ (c \leq y - t) \\ c + \frac{c}{1+r_2} = y + \frac{y'}{1+r_2} - t - \frac{t'}{1+r_2} = we_2 & \text{if } s < 0 \ (c > y - t) \end{cases}$$

- Each is a line, and we "kink" the slope of the line when we become a borrower vs. lender

Kinked Budget Constraints



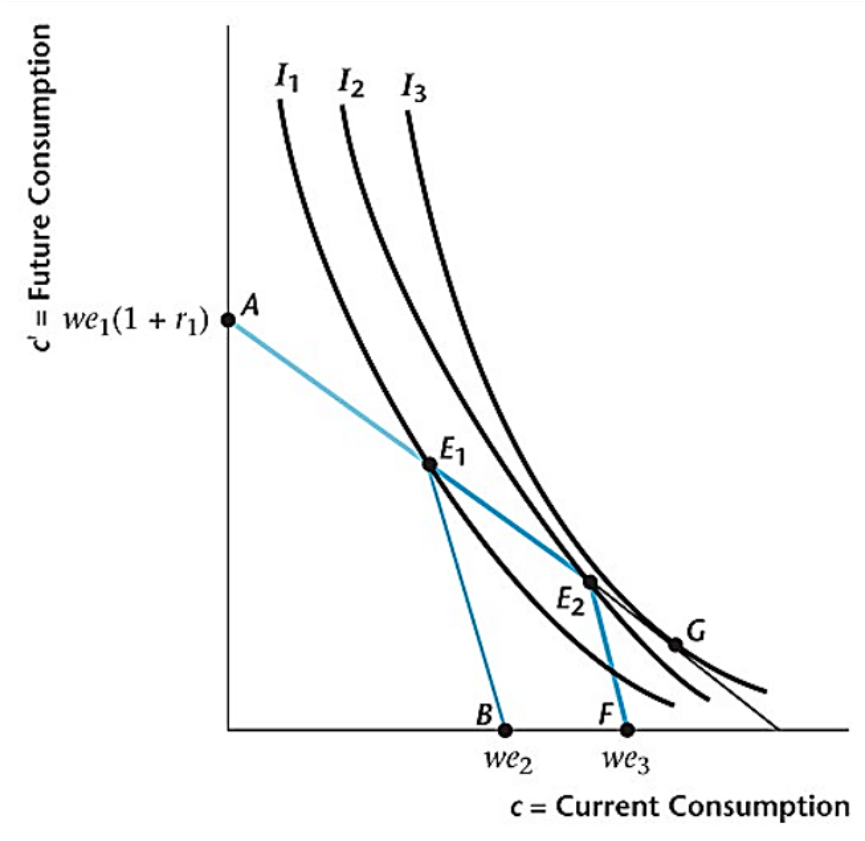
We borrow to the right of E, lend to the left. AEF is our budget constraint. (DE and EB are irrelevant)

Kinked Budget Constraints

$$c + s = y - t$$

- When you have heterogeneous indifference curves, they tend to stack at the kink (uniform preferences that would have been different all end up on that point, which "sticks out")
- Should get many people who are neither borrowers nor lenders

Effects of a Tax Cut to a Consumer with Different Borrowing and Lending Rates



No Ricardian Equivalence! Higher income today, lower income tomorrow but $c_1 \uparrow$, $c_2 \downarrow$ (consumption bundles are endowments E_1 and E_2, b/c consumer is at a corner solution/wishes he could consume even more today!)

Policy

- Credit market imperfections can help break Ricardian equivalence
- Perhaps a deficit-financed lump-sum tax cut can increase consumption today, decrease it tomorrow!
- In doing so, govt is essentially a bank giving loans
- Whether this increases efficiency/happiness depends on whether or not the kink was there for a reason (e.g. high costs of screening & evaluating loans)

Asymmetric Information

- What causes a kink?
- One answer is "asymmetric information:" one party has more information than another
- We want to create a model of asymmetric information between a consumer & a bank & a govt that works with Ch. 9

Model Description

- We have same consumers/households as in Ch. 9
- But now they deposit money (are lenders) to bank in the first period, get interest rate r_1.
- Bank takes deposits and makes loans.
- Problem! Some fraction $1 - a$ borrowers are "bad," get zero income and default on their loan
- Borrowers know they are bad, but bank does not
- Two types: good and bad borrowers
- Borrowers choose loan quantity L, bad borrowers imitate good so they also choose L.
- If pay back, pay back at $r_2 > r_1$

Model Description-II

- For each L deposits, bank has a good borrowers and $1-a$ bad borrowers
- Pays out $L(1+r_1)$ (pays depositors for all loans, good and bad)
- But only recieves $aL(1+r_2)$
- Bank profits are:

$$\begin{aligned}\pi &= aL(1+r_2) - L(1+r_1) \\ &= L(a(1+r_2) - (1+r_1))\end{aligned}$$

- In equilibrium, $\pi = 0$ (competition between banks) so:

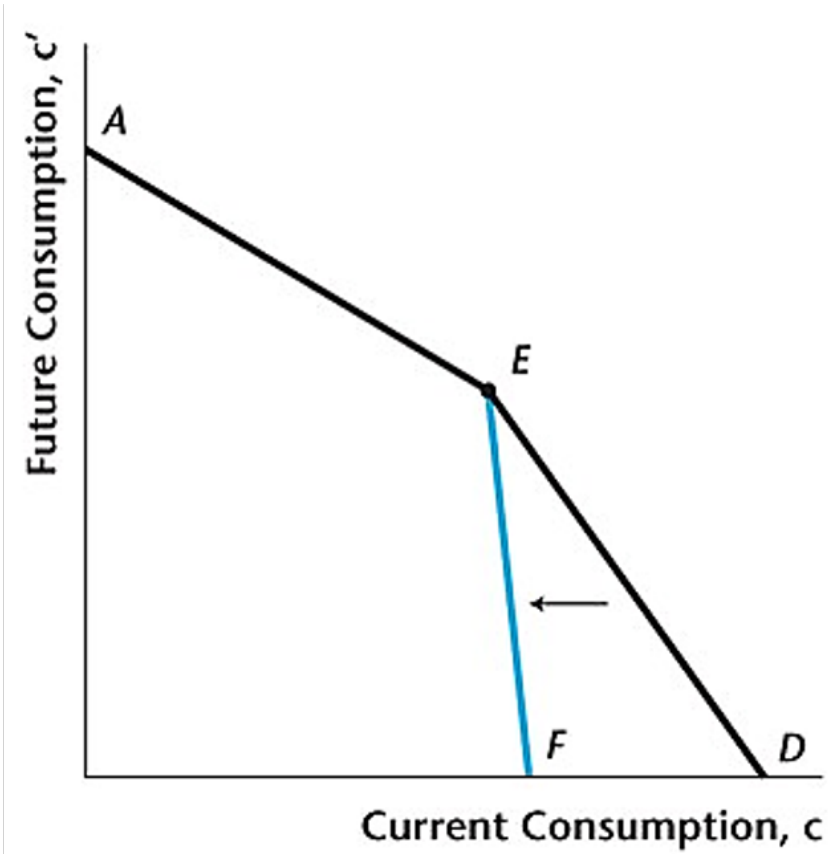
$$r_2^* = \frac{1+r_1}{a} - 1$$

Model Description-III

$$r_2^* = \frac{1 + r_1}{a} - 1$$

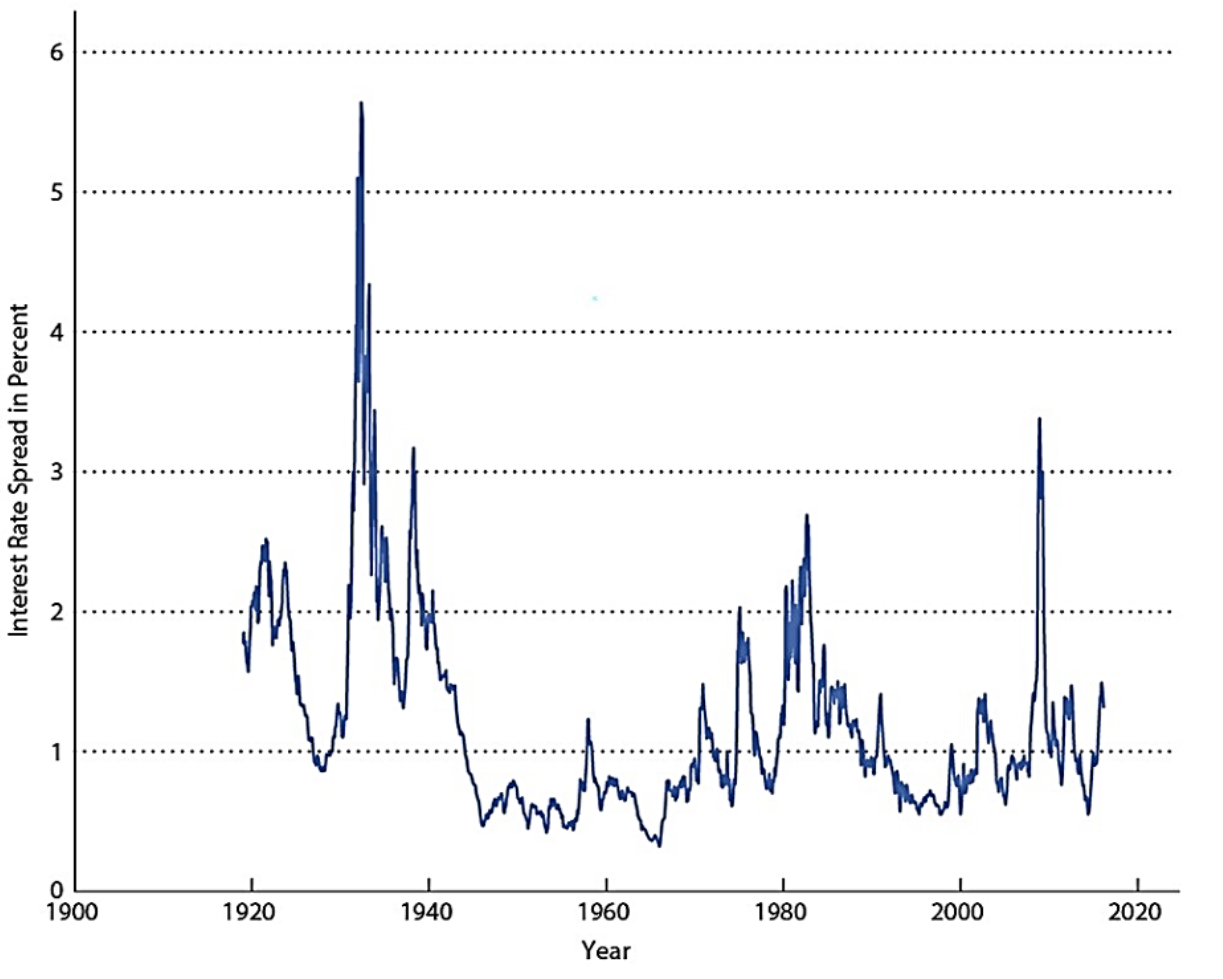
- A few things to notice about the equilibrium interest rate(s)!
  - If everyone a good borrower, $a =$, so $r_2^* = 1$
  - If bad borrowers, $r_2^* > r_1$
  - Implicitly, good borrowers pay for bad
  - Preventing default (as in student loans!) helps people who wouldn't have defaulted
- An increase in non-creditworthy/bad borrowers increases borrowing interest rates (sharpens the kink)

Increase in Bad Borrowers Sharpens the Kink!



Bad news for anyone to the right of E!

Credit Spreads Fluctuate Wildly!



BAA-rated bonds minus AAA rated bonds (unconditional pr(default in next year)≈0.02% and 0.37% respectively)

Another possibility-limited commitment

- In the previous model, we emphasized *asymmetric information*
- In this model, we will use a model of *limited commitment*
- The idea behind limited commitment is that we can't promise to do what is in our interest not to do!
- Imagine everyone can default freely–can a loan market still exist?
- Yes! A good example is home loans–*collateral* helps make it in your interest to keep your promise
- Much of the short-term money market in the U.S. depends on "repo" loans, which use treasuries as collateral

Limited Commitment Model-I

- Idea: now consumers own some asset, such as housing H, which has a value pH in the future
- But can't sell H quickly! ("illiquid" asset)
- Their lifetime wealth is:

$$we = y - t + \frac{y' - t' + pH}{1 + r}$$

- However, they have a **borrowing constraint**: they can't borrow more than the collateral they post pH:

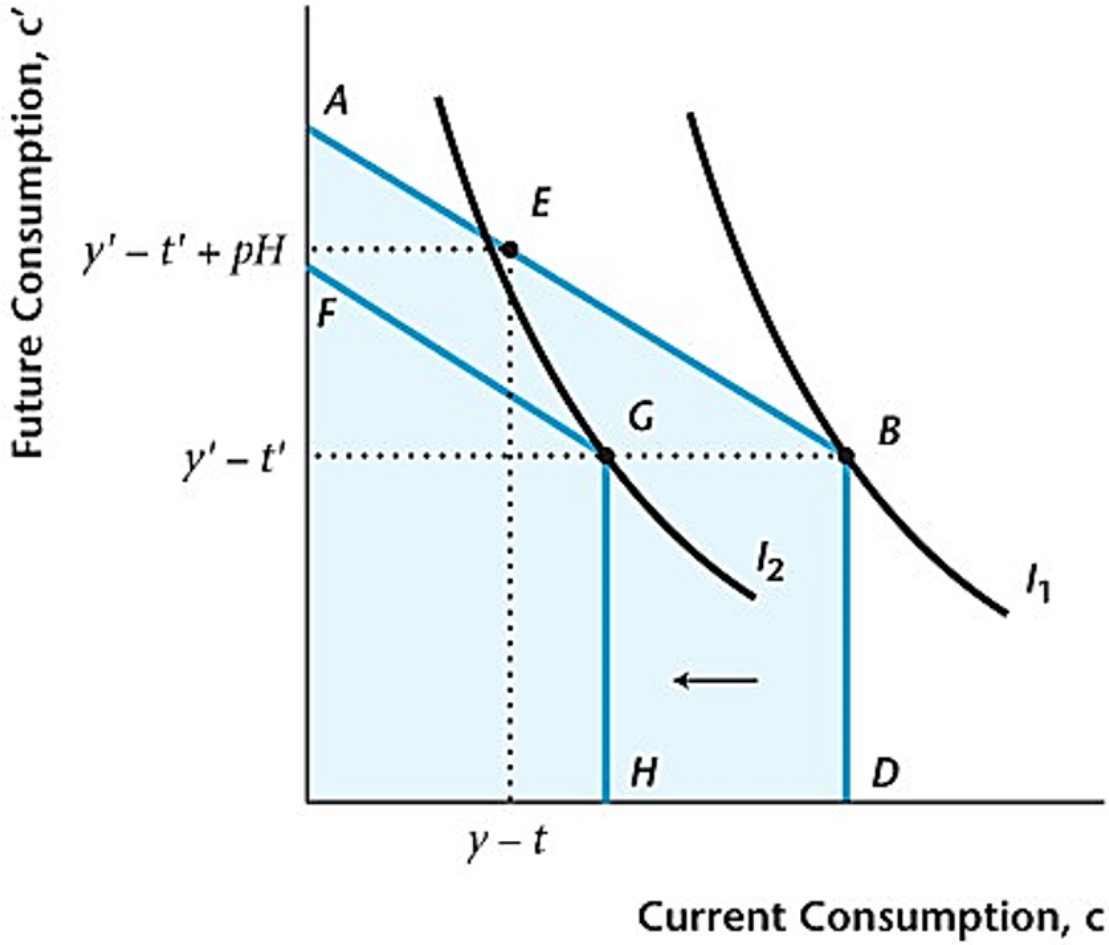
$$-s(1 + r) \leq pH$$

- So their maximum borrowing is less than or equal to what they can pay back if the collateral is reposessed
- This gives the constraint on consumption:

$$c \leq y - t + \frac{pH}{1 + r}$$

- Let's graph it!

Limited Commitment with Collateral

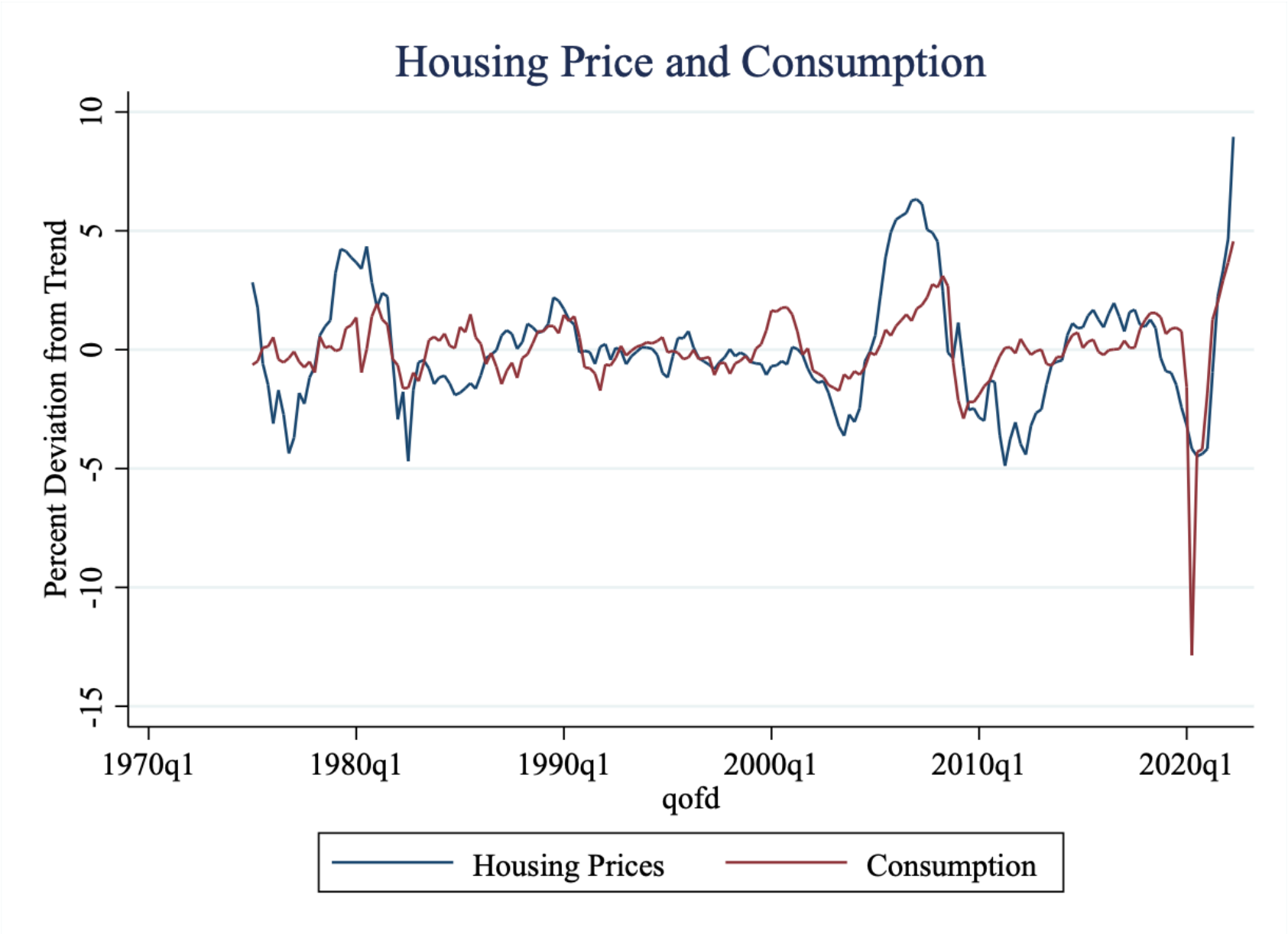


Now kink is inifinite! A shift in value of collateral p shifts in borrower's budget constraint like a decrease in a did before!

Data Check!

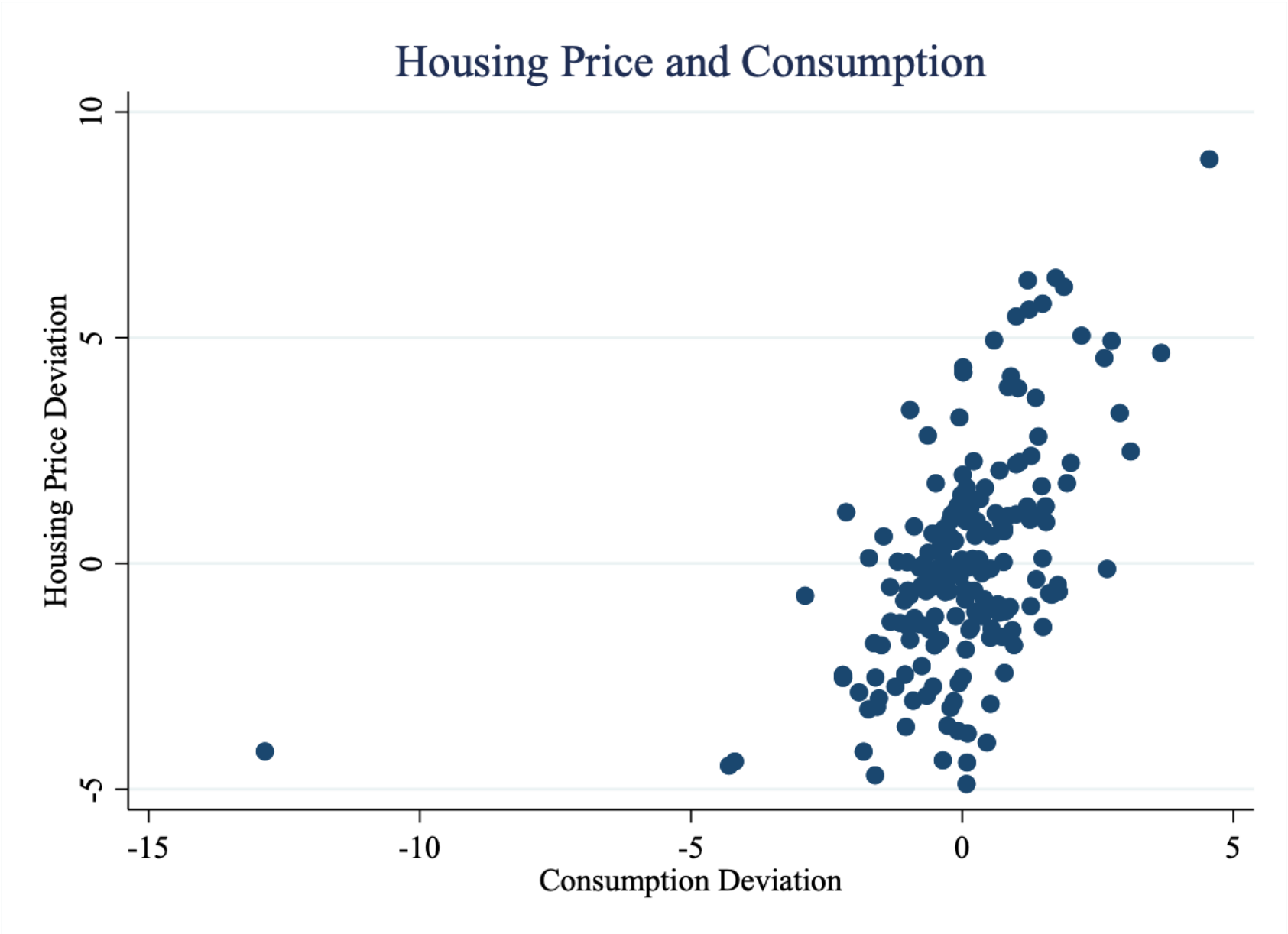
- Many venues of causality, but let's check the relationship between housing prices and consumption!

Housing Market and Consumption



Housing in the U.S.

Housing Market and Consumption



(Covid is big outlier!)

Social Security

- Many ways to run a retirement system
- U.S. uses a "pay-as-you-go" system, in which young pay for old (no "lock box")
- Could alternatively have a "fully funded" system
- Let's look at/model the consequences of each!

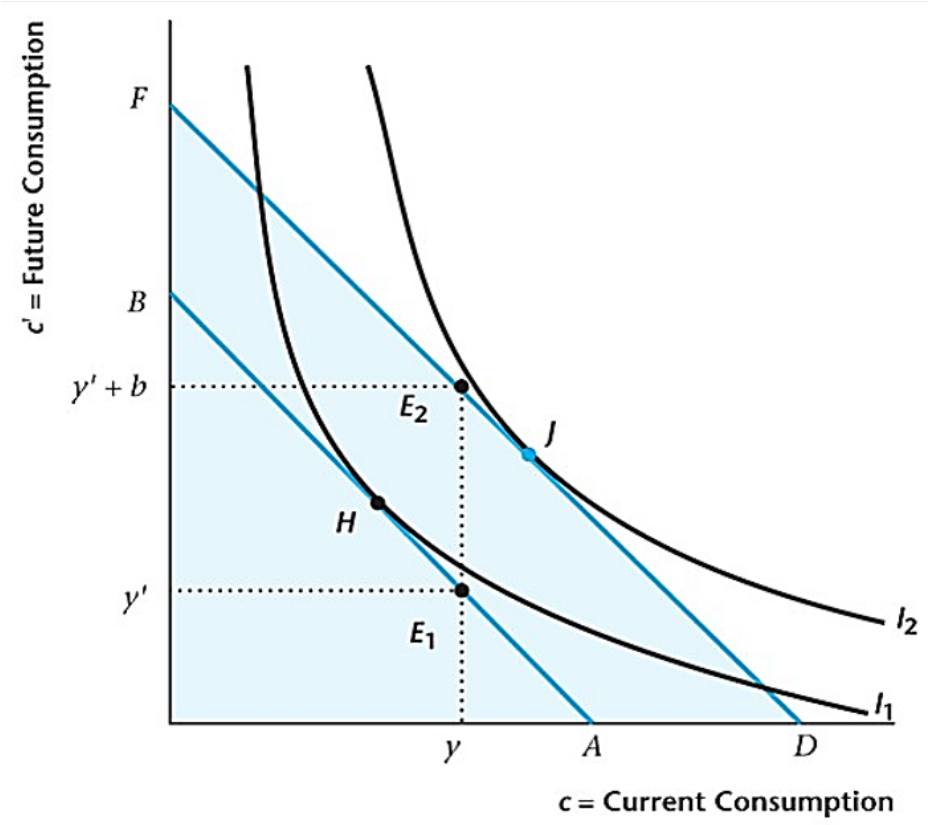
Thinking about SS

- Population grows at rate n:

$$N' = (1+n)N$$

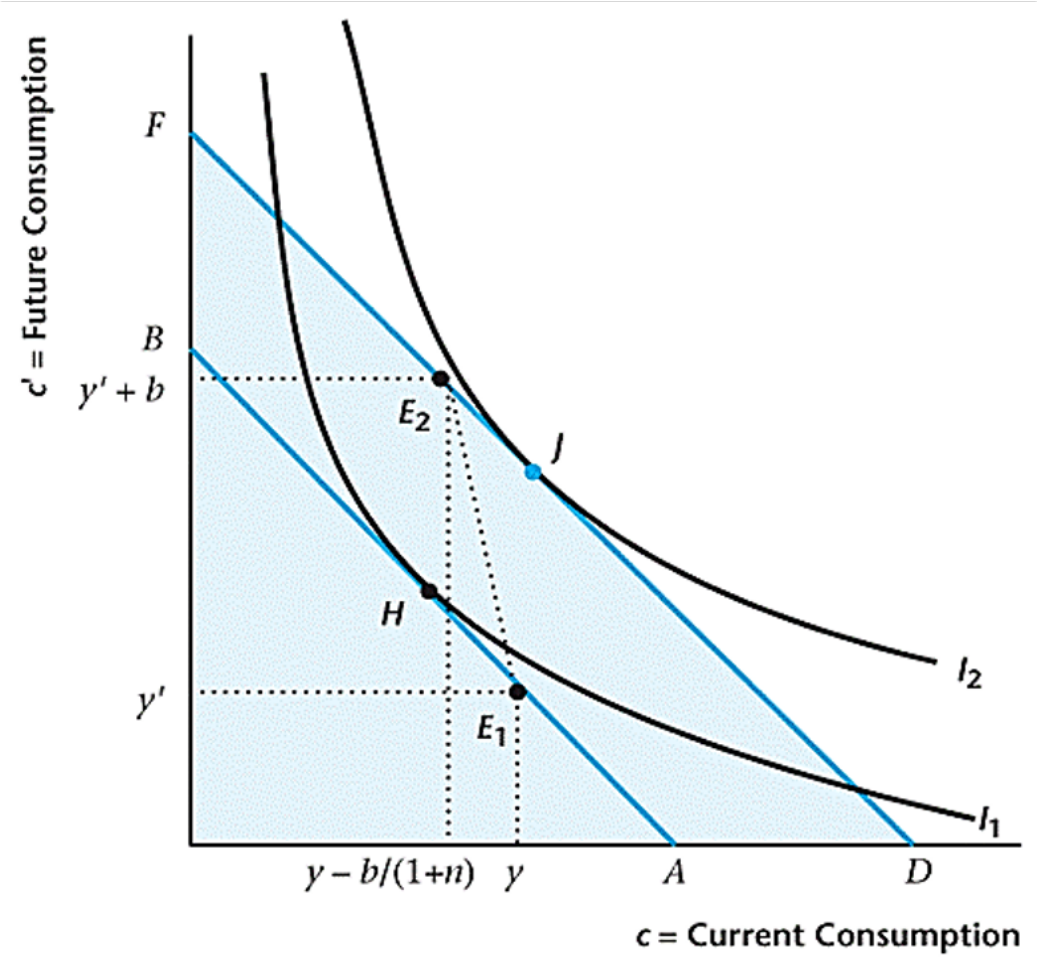
- Consumers receive y when young and y' when old
- Up to period T, there is no social security system, taxes are zero
- After period T, social security comes in and gives the old b units of consumption
- Tax for young is $t = b/(1+n)$, tax for old is $t' = -b$
- Claim: this is "free money" bc BC of old increases by b, but young by $b/(1+n)$
- Taking advantage of "Ponzi scheme" of population growth

BC Old



The old get a straight benefit of b

BC Young



The young lose $b/(1+n)$, but gain b

Consumer Wealth Change

- Consumer's lifetime wealth:

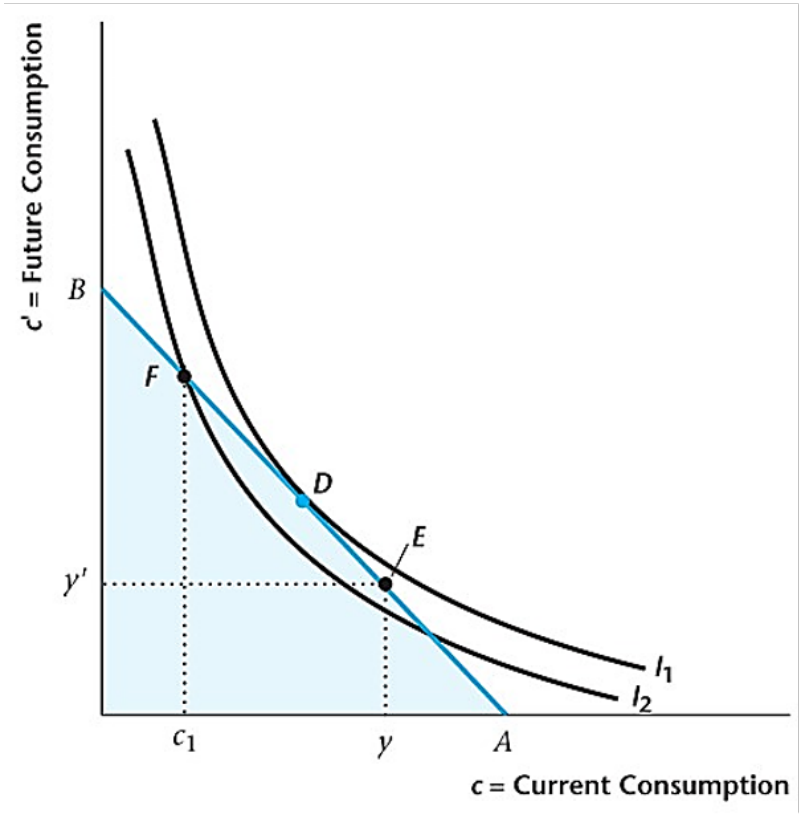
$$\begin{aligned} we &= y - \frac{b}{1+n} + \frac{y'+b}{1+r} \\ &= y + \frac{y'}{1+r} + \frac{b(n-r)}{(1+r)(1+n)} \end{aligned}$$

- If $n > r$, then everyone better off
- If $n < r$, then old better off, young worse off
- $r > n$ in data, by far.
- But core idea of Social Security is that govt can let old trade with young

Fully Funded Social Security

- Now let's turn to fully-funded Social Security (forced savings)
- In our typical model, it only makes people worse off
- If it binds, then consumer would be happier to consume more when young
- If it didn't bind, then it did nothing!
- But Social Security may be a *commitment device* for the government for low-savers who it would otherwise bail out of destitution

Fully-Funded Social Security



Conclusions

- We now have a model of imperfect credit markets
- Asymmetric information and limited commitment help "kink" the budget constraint: higher rates for borrowing than lending
- That tends to make people consume the endowment
- Reason to think it might be important (data on credit spreads, housing and consumption)
- Thinking about social security
  - Pay as you go could make everyone better off (under unrealistic assumptions)
  - Fully-funded doesn't make sense (forced savings) unless external motivation like govt commitment mechanism