

Chapter 10

Credit Market Imperfections: Credit Frictions, Financial Crises, and Social Security

Topics

- Credit Market Imperfections and Consumption.
- Asymmetric Information and the Financial Crisis.
- Limited Commitment and the Financial Crisis.
- Social Security Programs.

Credit Market Imperfections

- Asymmetric information:
- Limited commitment.
- This implies that Ricardian equivalence does not hold, in general.

Credit Market Imperfections

- Asymmetric information:
 - asymmetric information exists in that a particular borrower knows more about his or her own creditworthiness than do potential lenders.
 - This credit market friction then leads to differences between the interest rates at which consumers can lend and borrow.
 - The loan interest rate reflects a **default premium** which acts to compensate lenders for the fact that some borrowers will default on their loans
 - Even good borrowers who will not default must pay the default premium, as lenders are unable to distinguish between good and bad borrowers.

Credit Market Imperfections

- Limited commitment:
 - limited commitment, refers to situations in which it is impossible for a market participant to commit in advance to some future action.
 - In credit markets, there can be lack of commitment in the sense that a borrower cannot commit to repaying a loan.
 - Limited commitment can lead to situations where consumers are constrained in their borrowing by how much wealth they have that can serve as collateral—their **collateralizable wealth**.
 - **For a typical consumer, collateralizable wealth is restricted to** houses and cars, but could potentially include other assets

Credit Market Imperfections and Consumption

- Assume that lenders can lend at a lower interest rate than the one faced by borrowers.
- The government borrows and lends at the interest rate that lenders face.
- This implies that Ricardian equivalence does not hold, in general.
- How a consumer who is credit-constrained can be affected by a change in taxes that would not have any effect on the consumer's choices if there were perfect credit markets.

Budget Constraint

- Consider a consumer who lends at a real interest rate r_1 and borrows at a real interest rate r_2 , where $r_2 > r_1$.
- Lender: consumer is lender if $s \geq 0$, then

$$c \leq y - t \text{ and } c' = y' - t' + s(1 + r_1)$$

and lifetime budget constraint is

$$c + c'/(1 + r_1) = y + y'/(1 + r_1) - t - t'/(1 + r_1) = we_1$$

- Borrower: consumer is borrower if $s \leq 0$ then

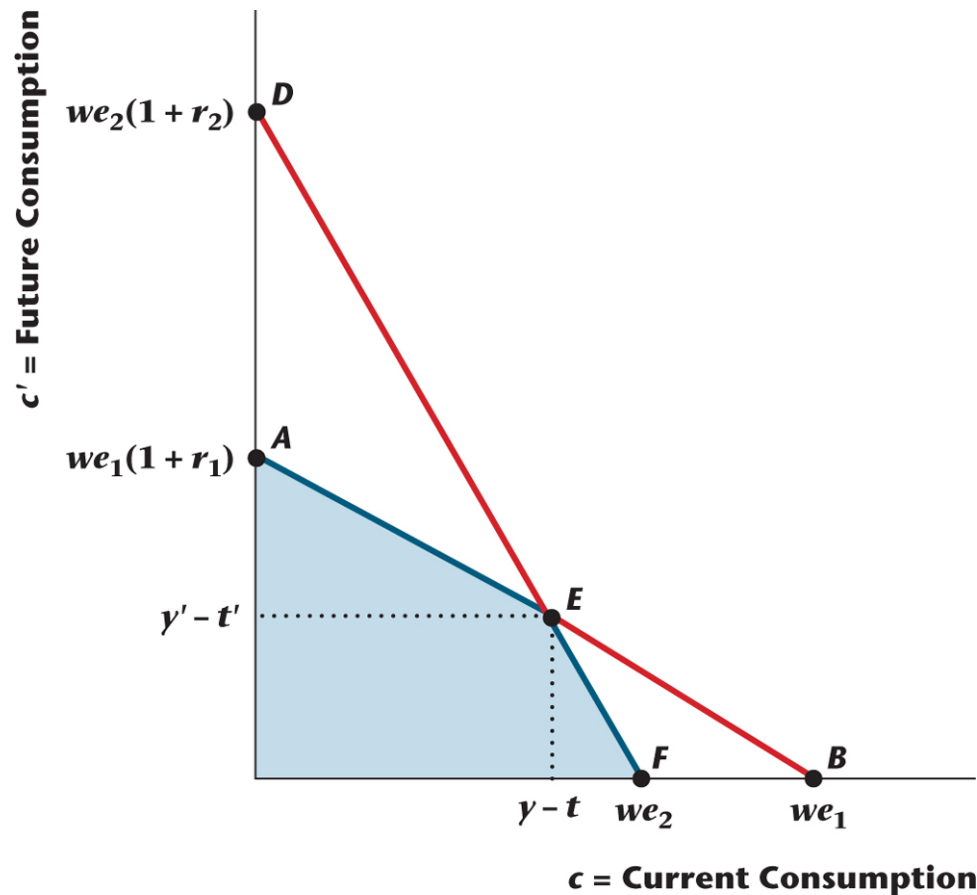
$$c \geq y - t \text{ and } c' = y' - t' + s(1 + r_2)$$

and lifetime Budget Constraint:

$$c + c'/(1 + r_2) = y + y'/(1 + r_2) - t - t'/(1 + r_2) = we_2$$

Figure 10.1

A Consumer Facing Different Lending and Borrowing Rates



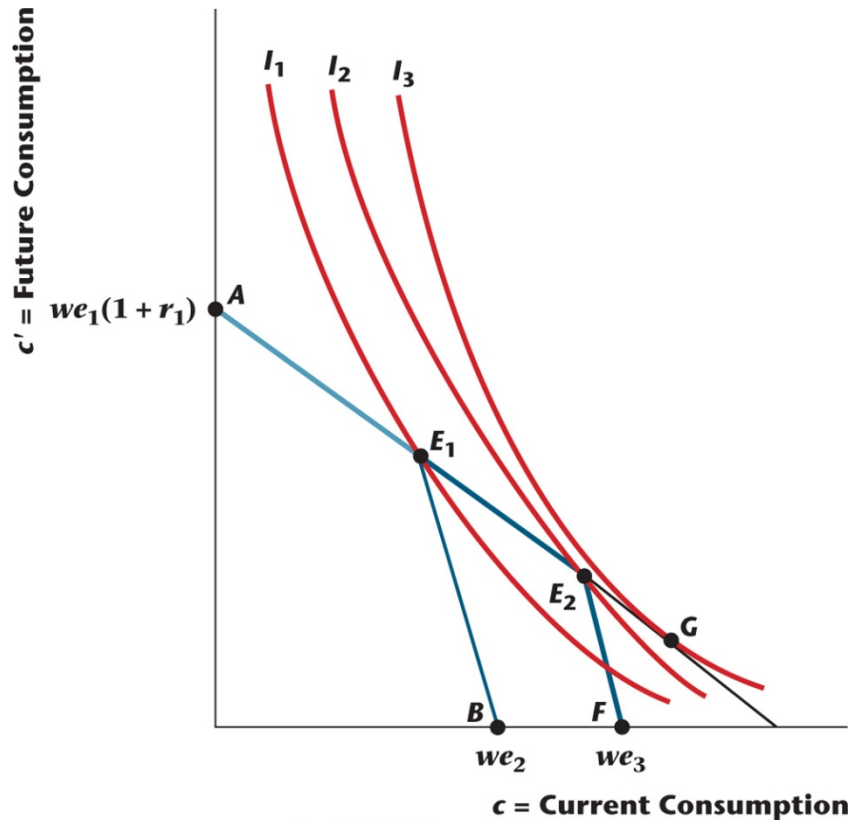
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For this consumer, at the endowment point, the lending rate is too low to make lending worthwhile, and the borrowing rate is too high to make borrowing worthwhile.

When the borrowing rate of interest is higher than the lending rate, there is a kinked budget constraint, AEF , with the kink at the endowment point E .

Figure 10.2

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



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- period 1 consumption increases by the amount of the tax cut, $-\Delta t$.
- But with perfect credit market (Ricardian Equivalence), consumer would save the entire tax cut and consumption would be unaffected.
- The consumer would like to consume at point G if he or she could borrow at the interest rate r_1

The consumer receives a current tax cut, with a future increase in taxes, and this shifts the budget constraint from AE_1B to AE_2F . The consumer's optimal consumption bundle shifts from E_1 to E_2 , and the consumer will consume the entire tax cut.

Effects of a Tax Cut with Credit Market Imperfections

- Suppose a consumer initially is credit constrained – that is he or she saves zero.
- For such a consumer, the entire tax cut will be spent on current consumption.
- This is very different from the case with no credit market imperfections, where the consumer will save the entire tax cut to pay higher future taxes.
- A preferable policy might be to target particular groups of people—for example, small businesses, farmers, or homeowners—with direct government credit programs

Credit Market Imperfections and Financial Crises

- Two key credit market *frictions*: asymmetric information and limited commitment.
- Asymmetric information: Would-be borrowers know more about their characteristics than do lenders.
- Limited Commitment: Borrowers may choose to default – lender can overcome limited commitment with collateral.

Asymmetric Information in Credit Markets

- Lending carried out through banks.
- Deposit rate at banks is r_1 , loan rate is r_2 .
- Fraction a of borrowers never defaults, fraction $(1 - a)$ always defaults – bank cannot tell the good borrowers from the bad ones.
- All good borrowers are identical, borrow L .
- Bad borrowers mimic the good ones.

Asymmetric Information – Deposit Rate and Loan Rate

- The average profit the bank makes on each loan is:

$$\pi = aL(1+r_2) - L(1+r_1) = L[a(1+r_2) - (1+r_1)]$$

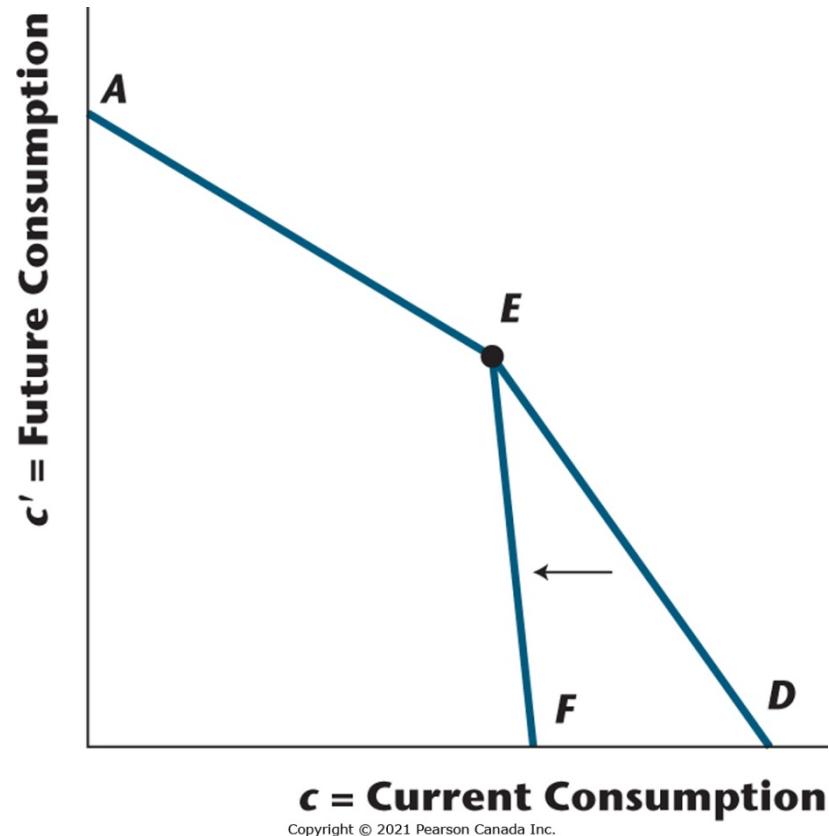
- Zero profits for the bank implies:

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

- Therefore, there is a default premium ($r_2 > r_1$) when $a < 1$.
The default premium increases as **a** decreases.

Figure 10.3

Asymmetric Information in the Credit Market and the Effect of a Decrease in Creditworthy Borrowers



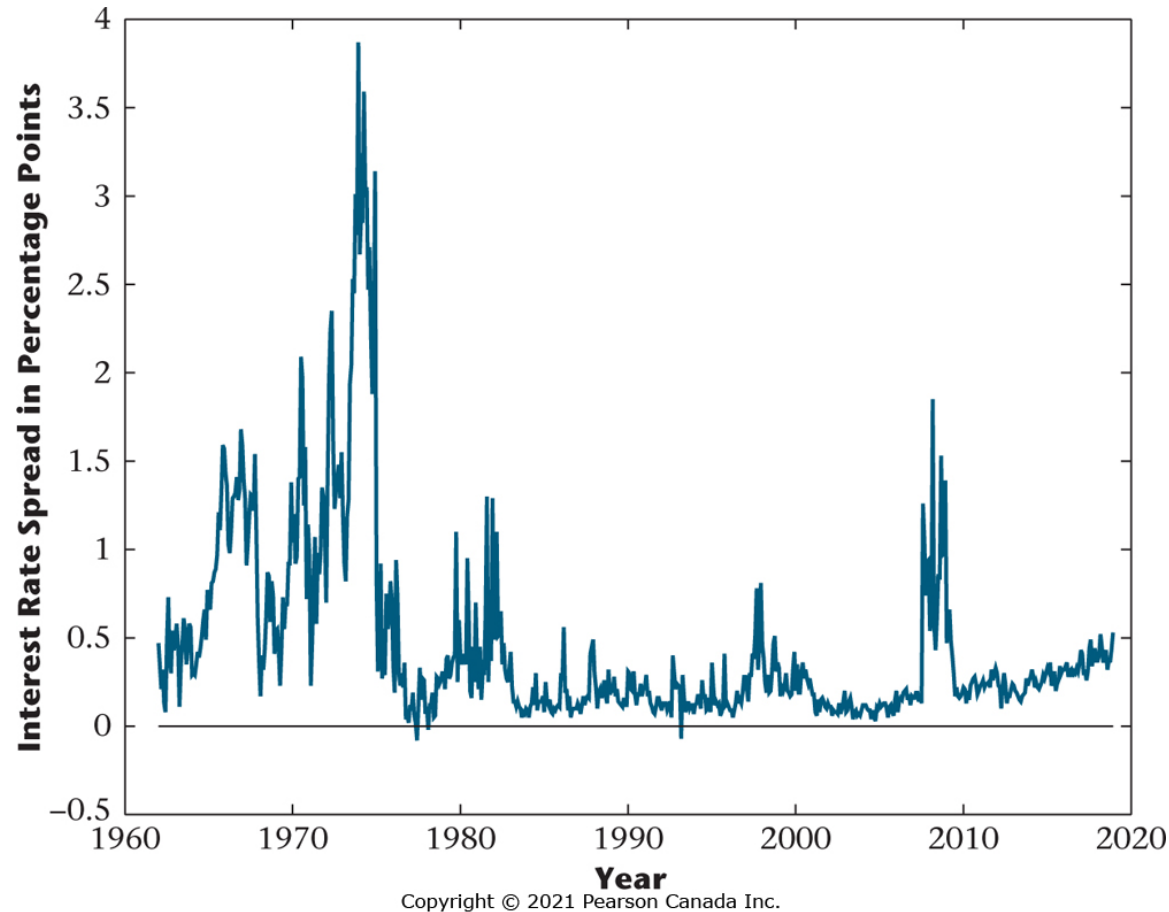
Asymmetric information creates a kinked budget constraint AED , with the kink at the endowment point E . A decrease in the fraction of creditworthy borrowers in the population shifts the budget constraint to AEF .

Effect of a Decrease in the Fraction of Creditworthy Borrowers

- Default premium increases – even good borrowers face higher loan rates.
- Budget constraint shifts in.
- Consumption falls for all borrowers.
- Matches observations from the current financial crisis – increase in credit market uncertainty, reduction in lending, decrease in consumption expenditures.

Figure 10.4

Interest Rate Spread



The figure depicts the difference between the interest rates on prime short-term corporate paper and short-term Government of Canada debt. This spread was high during the 1974–1975, 1981–1982, and 2008–2009 recessions, but not during the 1990–1992 recession.

Limited Commitment and Credit Markets

- Borrowers need incentives not to default on their debts – these incentives typically provided by collateral requirements.
- Examples: House is collateral for a mortgage loan, car is collateral for a car loan.
- For macroeconomic activity, the use of collateral in loan contracts can potentially be very important.
- For example, mortgages are used by homeowners not only to finance the purchase of homes but also to finance consumption.
- A decrease in house prices decreases the quantity of lending/borrowing in the economy and a drop in the current aggregate consumption.

Example

H = quantity of housing owned by consumer.

p = price of housing.

- Assume: Housing is illiquid – can't be sold in the current period.
- However, it is possible to borrow against housing wealth, with a *collateral constraint*.

Consumer's Constraints

- Lifetime budget constraint:

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

- Collateral constraint: the quantity of borrowing in the current period

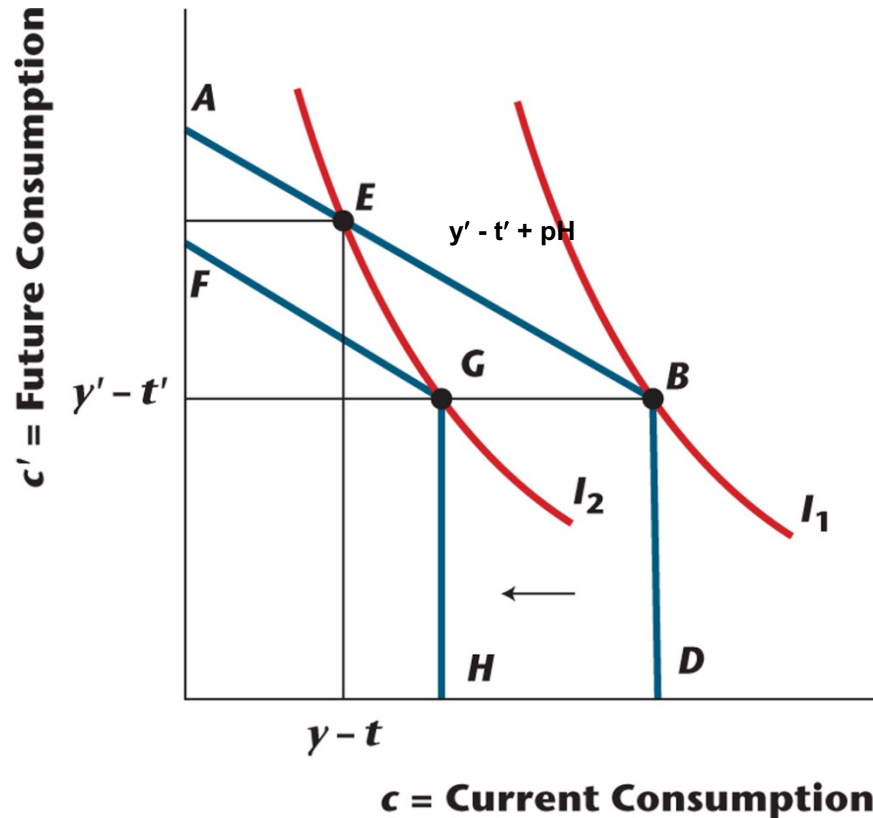
$$-s(1+r) \leq pH$$

- - $s(1+r)$ is the loan payment for the consumer in the future period and pH is the value of collateral.
- Since $s = y - t - c$
- collateral constraint becomes

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

Figure 10.5

Limited Commitment with a Collateral Constraint

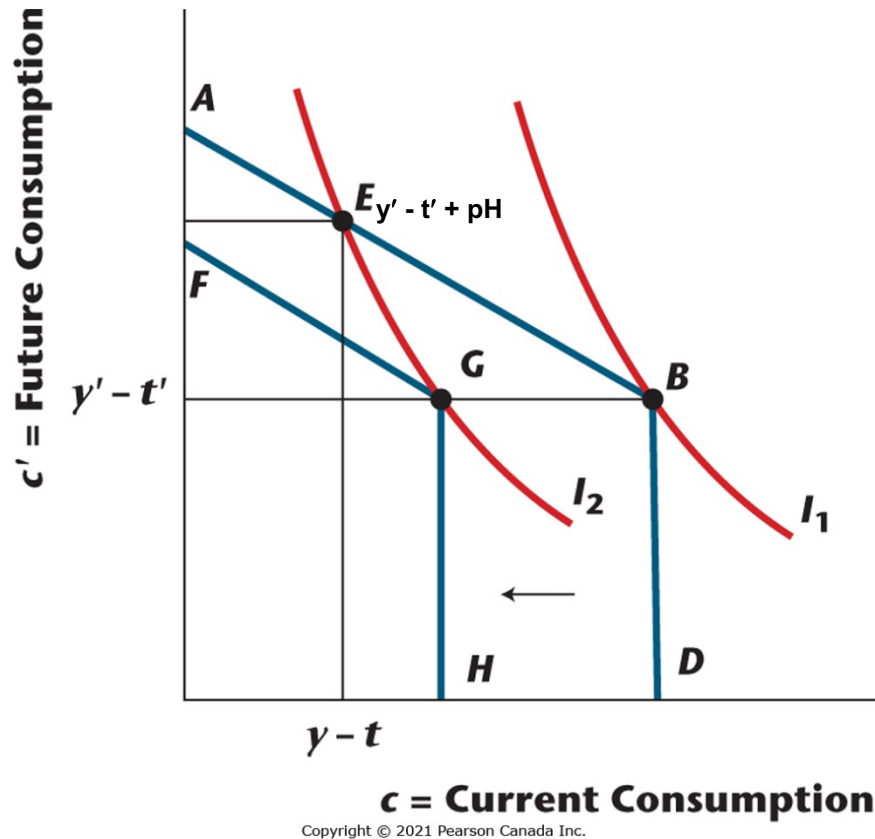


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- Since a decrease in wealth must be absorbed in a reduction in current consumption, so a constrained consumer cannot smooth consumption

The consumer can borrow only with collateralizable wealth as security against the loan. As a result, the budget constraint is kinked. Initially the budget constraint is ABD and it shifts to FGH with a decrease in the price of collateral. For a constrained borrower, this causes no change in future consumption but current consumption drops by the same amount as the decrease in the value of collateral.

Limited Commitment with a Collateral Constraint



- An unconstrained consumer will initially choose a point somewhere between A and B (but not including B) before the decrease in p , and will choose a point between F and G (but not including G) after the decrease in p .
- The unconstrained consumer can smooth the effects of the decrease in wealth resulting from the fall in p , by reducing consumption in both the current and future periods

Ricardian Equivalence, Intergenerational Redistribution and Social Security

- Social security programs are government-provided means for saving for retirement
- There are essentially two types of programs:
 1. **pay-as-you-go and**
 2. **fully funded social security**

Pay-as-you-go Social Security (1 of 2)

- Taxes on the working population pay for social security transfers to the retired each period.
- Suppose two generations alive at each date, young and old.
- The young pay social security taxes t , the old receive social security benefits b .

Population Growth

- The population grows according to the following equation. Each period, there are N' young and N old alive.

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

The Government Balances Its Budget

- Total social security benefits must equal total taxes on the young.

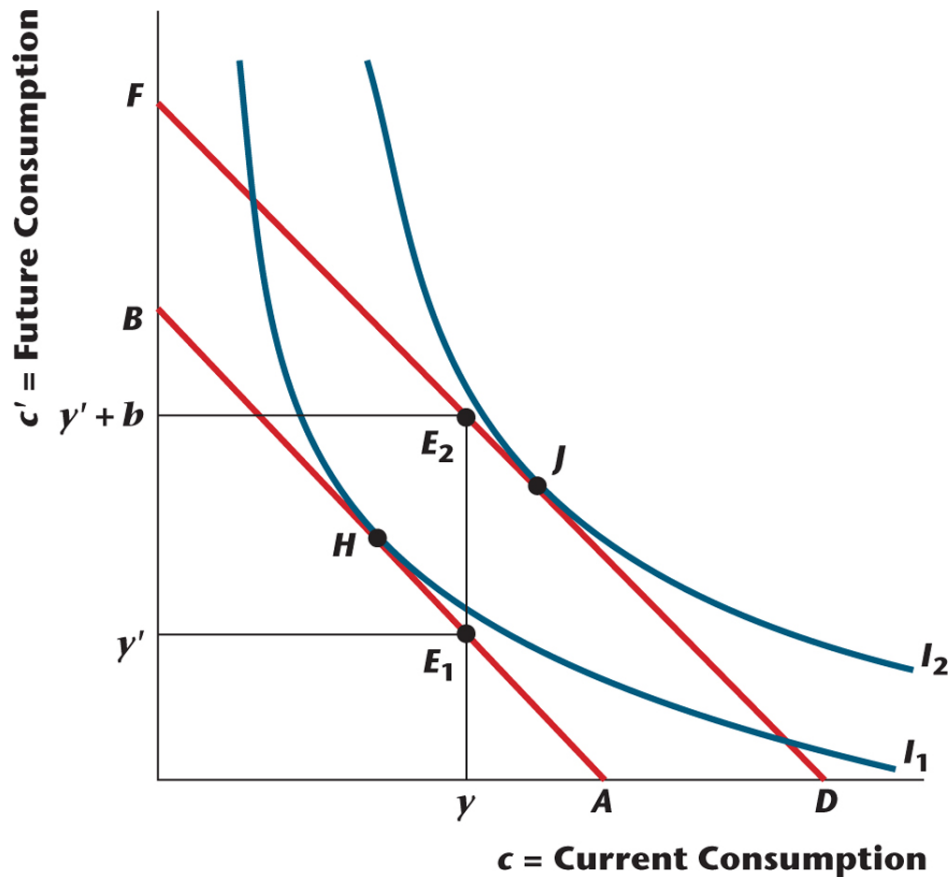
$$Nb = N't$$

- Relationship Between Taxes and Benefits:

$$t = \frac{b}{1+n}$$

Figure 10.8

Pay-as-You-Go Social Security for Consumers Who Are Old in Period T

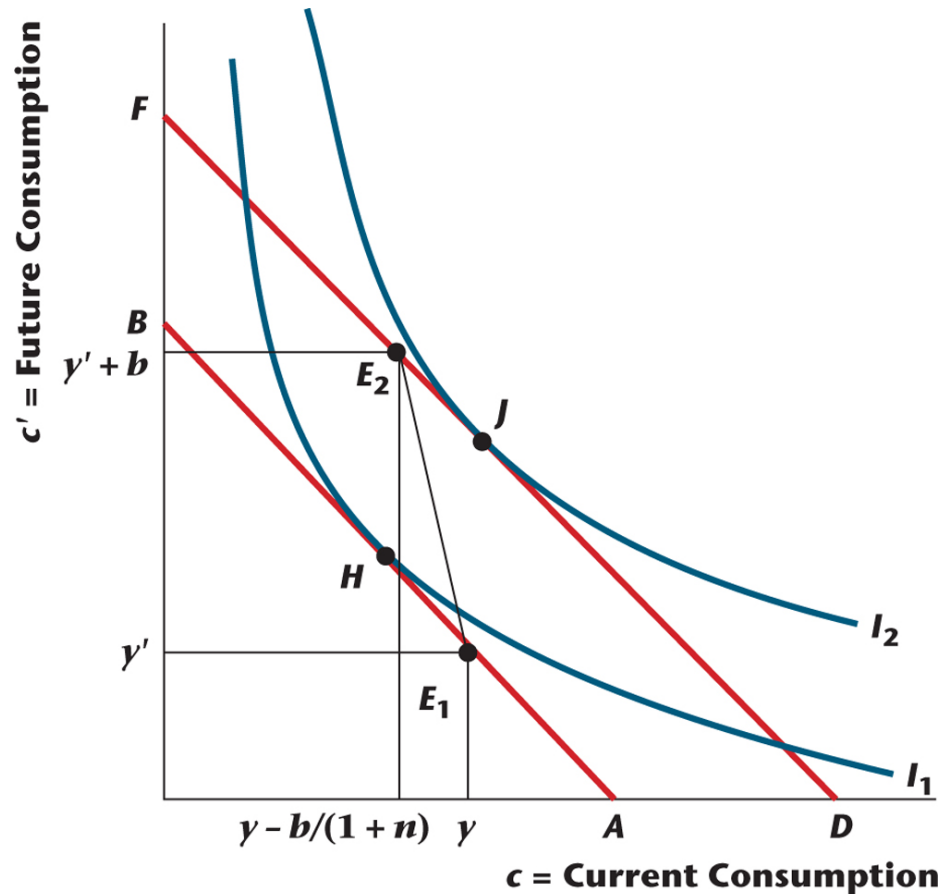


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In the period when social security is introduced, the old receive a social security benefit. The budget constraint of an old consumer shifts from AB to DF , and he or she is clearly better off.

Figure 10.9

Pay-as-You-Go Social Security for Consumers Born in Period T and Later



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- With social security benefits disposable income when old is $y' - t$ and when young is

$$y - t = y - \frac{b}{1+n}$$

- If $n > r$ then the slope of E_1E_2 is $-(1+n)$ and the budget constraint shifts out and consumer is better off.
- Budget constraint shifts in if $n < r$ and consumer is worse off.

If $n > r$, the budget constraint shifts out from AB to DF , and the consumer is better off.

Pay-as-you-go Social Security

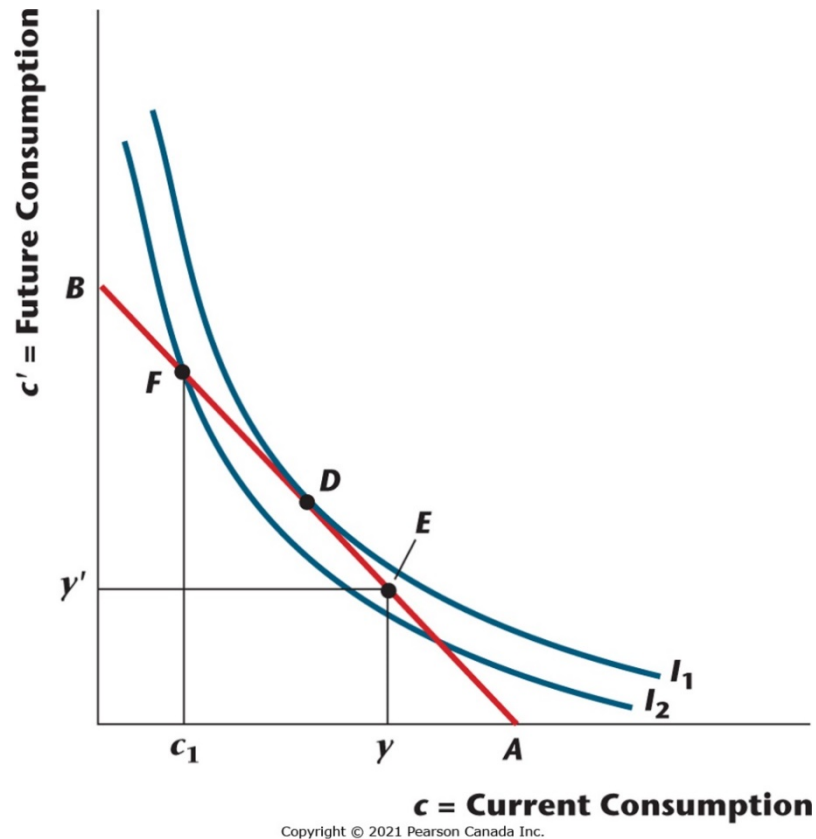
- Pay-as-you-go is beneficial, makes everyone better off, only if the population growth rate exceeds the real interest rate ($n > r$).
- Otherwise, the old in the initial period are made better off at the expense of the current young and future generation.
- The interpretation is that the population growth rate is the implied rate of return for an individual from the social security system, so social security is only worthwhile if the return exceeds what could be obtained in private credit markets.

Fully Funded Social Security

- Essentially a mandated savings program where assets are acquired by the young, with these assets sold in retirement.
- Fully funded social security is effectively a forced savings program, and it matters only if the amount of social security saving is a binding constraint on consumers.
- That is, fully funded social security makes a difference only if the social security system mandates a higher level of saving than the consumer would choose in the absence of the program.

Figure 10.10

Fully Funded Social Security When Mandated Retirement Saving is Binding



With binding mandated retirement saving, the consumer must choose point F rather than D and is, therefore, worse off.

Fully Funded Social Security

- Fully funded programs encounter two problems.
- First, they potentially allow public pension funds to be run inefficiently because of political interference.
- This problem occurs if the government manages the public pension fund rather than letting retirees manage their own retirement accounts.
- For example, in Canada, the CPP is a mixed fully funded and pay-as-you-go system, and has been the target of groups that advocate socially responsible investing.

Fully Funded Social Security

- A pay-as-you-go system avoids the issue entirely.
- With pay-as-you-go, the government is not put in the position of deciding which investments are morally appropriate and which are not, and political activity can be focused in ways that are potentially much more productive.

Fully Funded Social Security

- A second problem with fully funded social security programs is that they may be subject to a **moral hazard problem**.
- if retirement accounts were insured, then the managers of retirement accounts would tend to take on too much risk
- The provision of government insurance for retirement accounts, and the necessary regulation required to solve the moral hazard problem, potentially create enough costs that a pay-as-you-go system would be preferable.