International Money and Banking: 12. Default Risk and Collateral

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Moving Beyond Risk-Free Interest Rates

- We have discussed how monetary policy affects the benchmark interest rates on government bonds, such as US Treasury bonds.
- These bonds are considered essentially risk-free.
- These interest rates tend to influence the interest rates on all other types of lending. If one can obtain an $x\%$ return on a risk-free investment over N years, then an N-year investment that involves risk will have to provide a higher return.
- In this lecture, we will look at risky lending: What determines the lending rates paid by corporations and households and governments?
- We will also briefly discuss why governments can find themselves "shut out" of the bond market, with people unwilling to lend to them.

Default Risk and Borrowing Rates

- An alternative to investing in risk-free bonds is to lend to households and businesses (or governments) who may default on the bond, i.e. fail to pay you back as much as they should.
- Suppose the interest rate on safe risk-free bonds is $S\%$. Now consider an investment that has an interest rate $R\%$ but a probability of complete default (no money paid back) of $p\%$.
- This loan has
  - A probability $1 - 0.01p$ of a return of $R\%$.
  - A probability $0.01p$ of a return of -100%: Losing all your money.
- So, the expected return is

$$[(1 - 0.01p)\, R + 0.01p(-100)]\,\%$$

- $0.01Rp$ will be small so the expected return is approximately $(R - p)\,\%$.
- To deliver the same expected return as the risk-free bond, this investment has to have $R - p = S$, so its interest rate needs to be $R = S + p$.

Collateral and Borrowing Rates

- In some cases, the defaults associated with risky investments don't have to mean losing all your money. For example, if a bank loans money to Janet to purchase a house, the house will usually be used as **collateral** to secure the loan. If Janet doesn't pay back the loan, the bank gets the house.
- Consider the case where a fraction c, with $0 \leq c \leq 1$ of the loan can be recovered from collateral.
- This loan has
  - A probability $1 - 0.01p$ of a return of $R\%$.
  - A probability $0.01p$ of a return of $-100\,(1-c)\,\%$: Losing $100\,(1-c)\,\%$ of your money.
- So, the expected return is

$$[(1 - 0.01p)\,R + 0.01p(-100)\,(1-c)]\,\%$$

- $0.01Rp$ will be small so the expected return is approximately $(R - p\,(1-c))\,\%$.
- To deliver the same expected return as the risk-free bond, this loan has to have $R - p\,(1-c) = S$, so its interest rate needs to be $R = S + p\,(1-c)$. Collateralised loans should have lower interest rates.

Risk Aversion

- In the examples just discussed, investors only cared about the expected average return on their investment.
- In reality, people also care about **risk**. For investors that are **risk averse**, an investment that provides a guaranteed return of 5% is preferred to one that has an equal chance of returning zero or 10%.
- For this reason, an investment with a default risk of p percent and no collateral will usually have to pay a risk premium of greater than p.
- Also, attitudes to risk from investors could change over time. During some periods, investors may be particularly averse to risk while at other times they may be willing to take more risk than usual.
- For these reasons, risk premia on various types of investments can move around over time for other reasons than default risk or expected collateral values.

Section C Examples: Default Risk and Collateral

Financial market participants have the option to buy two bonds. One bond is safe and gives a return of 4 percent over one year. The other bond is risky and has a 10 percent chance over the year of all of the investment being lost. If investors are risk neutral and both bonds are purchased by some investors, what will be the approximate rate of return on the risky bond?

- In this case $S = 4$ and $p = 10$.

$$R = S + p = 4 + 10 = 14$$

- The risky bond must have a rate of return of 14%

A risk-neutral banker is making a car loan to Janet. The banker could purchase a safe bond that provides a return of 4% over the next year. Janet has a 5 percent chance of defaulting during this period and, if she does, the banker will end up repossessing the car but losing 10 percent of the money she loaned to Janet. What will be the interest rate on Janet's car loan?

- In this case $S = 4$ and $p = 5$ and $c = 0.9$.

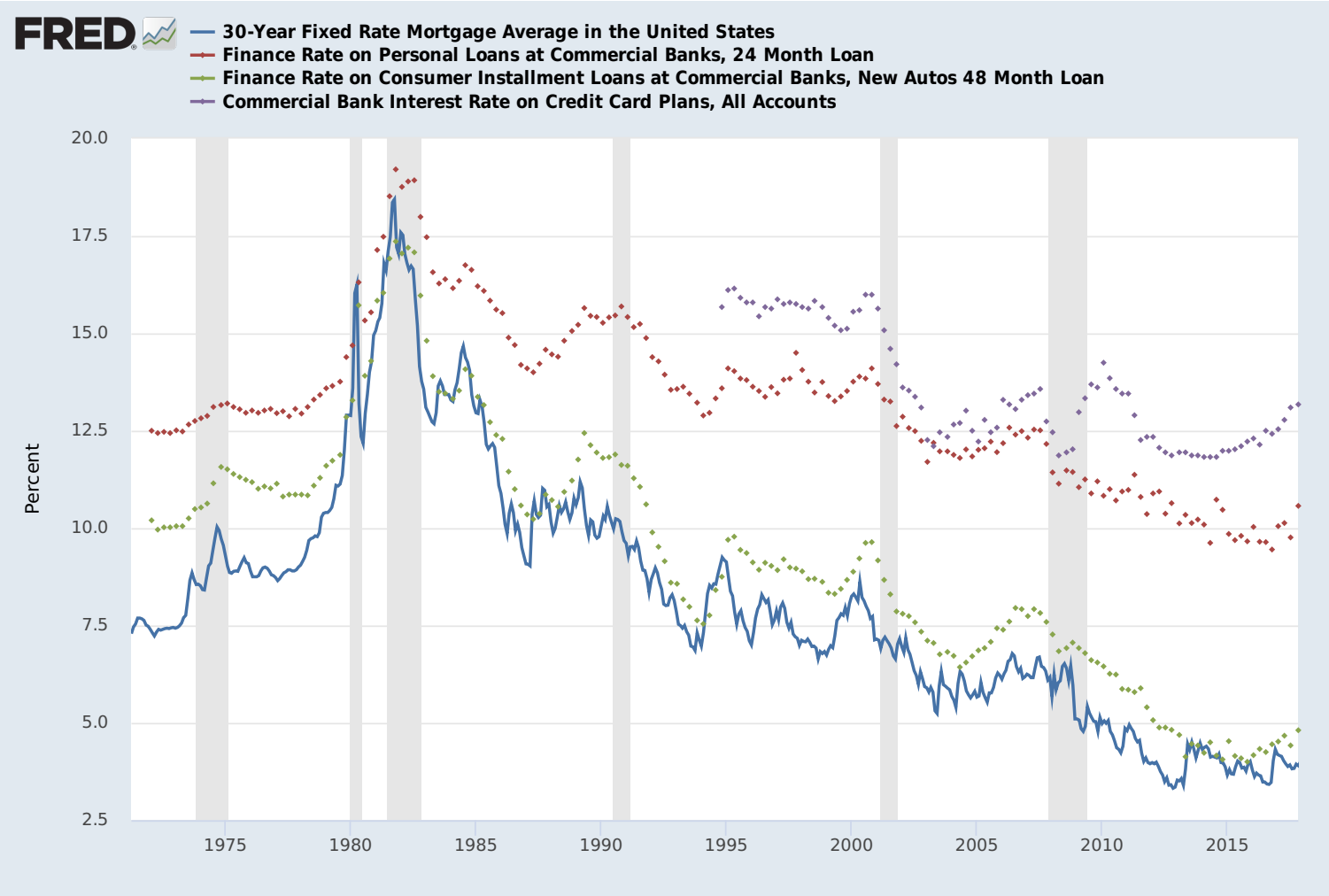
$$R = S + p\,(1 - c) = 4 + 5\,(1 - 0.9) = 4.5$$

- Janet's car loan will have an interest rate of 4.5%

Four Types of Household Borrowing

- To assess whether this framework helps to explain variations in interest rates across different categories of borrowers, consider four different types of loans to households:
  1. **Credit Cards**: No collateral. Can be used for any purpose (e.g. shopping for clothes). No set schedule for repayments apart from a small minimum monthly payment. Attractive to irresponsible borrowers who may not pay back.
  2. **Personal Loans**: No collateral. Usually screened by a bank manager as being for a particular purpose. Generally, a set schedule for repayments.
  3. **Car Loans**: The car can be used as collateral. But it's not great collateral: Cars lose value quickly. Set schedule for repayments.
  4. **Mortgages**: The house is used as collateral and usually it's pretty good collateral. Set schedule for repayments and people are generally very reluctant to default and lose their home.
- This suggests interest rates on credit cards should be the highest, then personal loans, then car loans, then mortgages.
- The chart on the next page confirms that this is indeed the case.

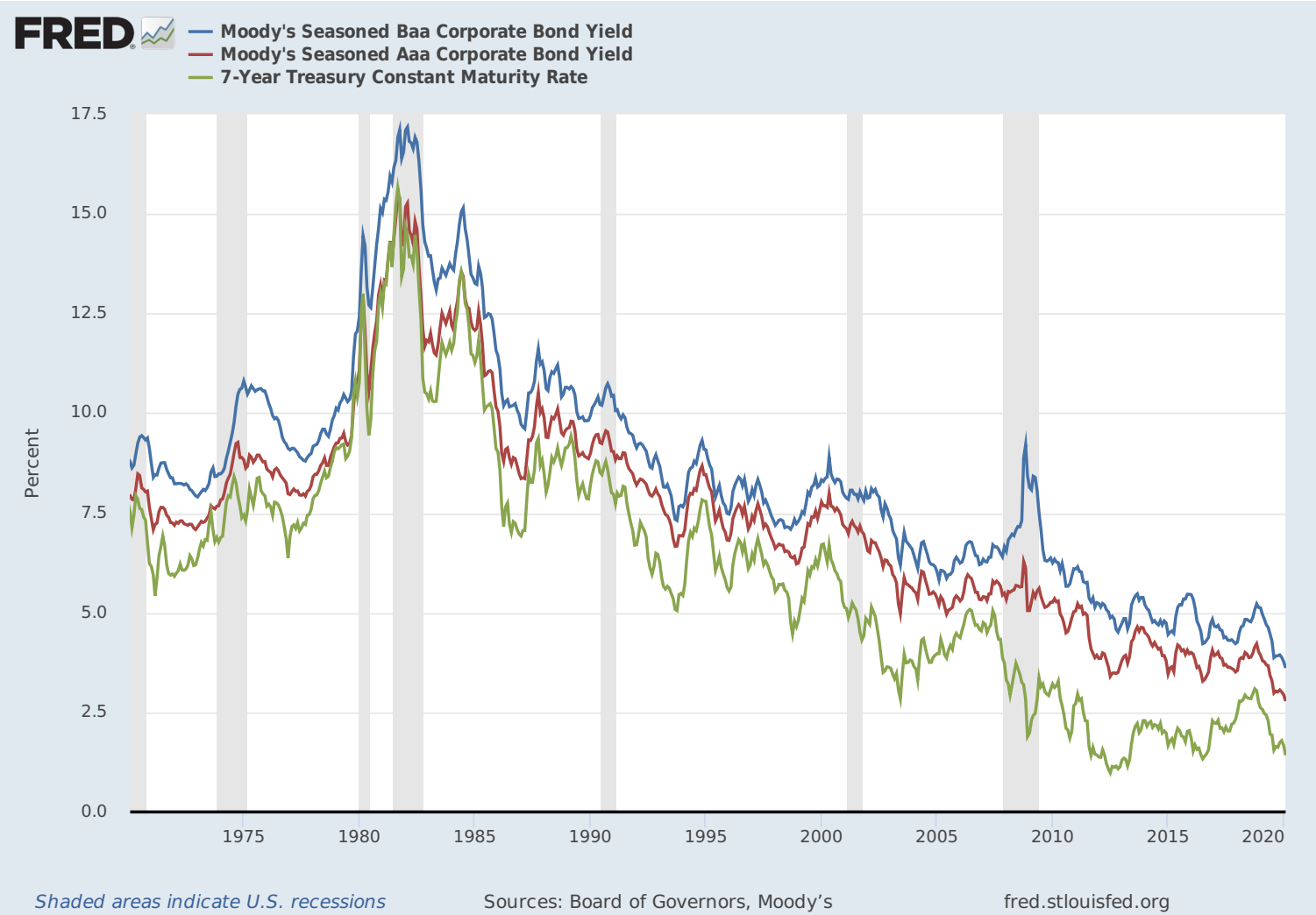
Interest Rates on Different Types of Household Borrowing



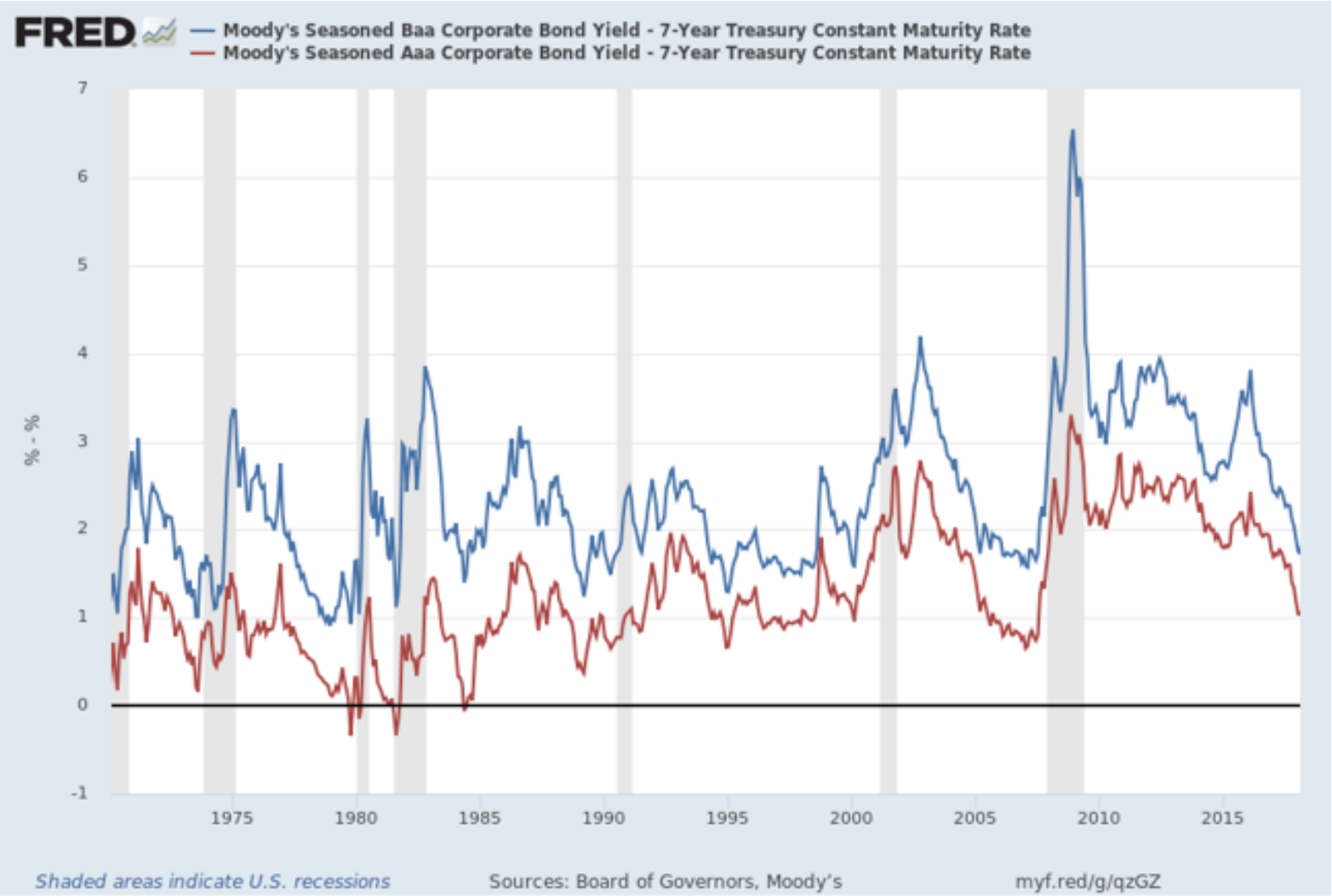
Corporate Bond Rates

- Large public corporations have their credit-worthiness rated by independent ratings agencies such as Moody's and Standard and Poor's.
- Moody's system gives the highest-rated firms get an AAA rating while firms that are an "adequate" credit risk are given a BAA rating.
- Corporate bond yields tend to move in line with yields on Treasuries of similar maturities, usually around seven years.
- But BAA bond yields are higher than AAA rates. This reflects higher perceived default rates.
- Because default risk goes up and down over the cycle, the "risk spreads" associated with these bonds tend to display a cyclical pattern, rising during and after recessions, when corporate default risks are high.
- These risk spreads spiked upwards to all-time highs during the period after the Lehmans bankruptcy. They have come back down now but are still high by historical standards.

Relationship Between Treasury and Corporate Bonds



Risk Spreads are Cyclical



The Credit Channel of Monetary Policy

- We have described how monetary policy affects risk-free interest rates.
- But to the extent that monetary policy affects household and corporate default risks, monetary policy can affect the actual borrowing rates faced by the private sector by more than the rates seen in money markets or markets for government debt.
- Another issue is the effect of monetary policy on asset prices. We will not have time to discuss this issue in detail here but it is generally accepted that higher interest rates reduce the value of important assets such as house prices. Assets like these often act as collateral in loan agreements. By reducing the value of this collateral, monetary policy can further affect risk spreads on debt.
- These factors mean that central banks need to do more than just watch the money markets and the yield curve. They also need to monitor how default premia and other factors that affect borrowing rates for firms and households.
- This credit channel—and the role that it played in the Great Depression—was one of Ben Bernanke's main areas of research prior to joining the Fed. See the link to his speech "The Financial Accelerator and the Credit Channel" on the website.

Sovereign Default Risk

- The examples so far have focused on households and businesses. However, governments can also default on their obligations.
- Suppose investors go from seeing no chance of default to seeing a ten percent chance that a government will default over the next year, leading to a 50 percent write-down on its outstanding debts.
- This means that they will need to pay a five percent premium on their debt relative to safe assets.
- What happens, however, if this interest cost imposes too large a burden on a government, i.e. if they do not have access to enough funds to make the interest payments associated with these high costs of funding?
- In this case, at some point, the market for these bonds may cease to operate: Markets may quickly decide that the debt burden is unsustainable. Unable to "roll over" its debt, the government's default can go quickly from being unlikely to being likely. This closing of the bond market can often be an abrupt event, a crisis that people did not see coming.
- In many cases, a default and a write-down of debts are required to restore the country to a point where its debts are sustainable.

Peter Boone's Graph on Italy

Ceteris Paribus, Italy needs an additional 6% GDP primary surplus to keep debt stable !

Sovereign Risk and Central Banks

- This issue has come to the fore in Europe over the past decade. Greece has had a sovereign default and markets have also worried at various times that other countries (Spain, Italy, Portugal, Ireland) may also default.
- Going back to Goodhart's paper that we talked about at the start of the course, recall that he discussed how central banks had often been called on to finance governments as a last resort.
- Countries with high debt but central banks willing to buy government bonds (UK, US) have maintained low government bond yields in recent years despite mounting levels of public debt.
- The euro area has a prohibition on central banks directly purchasing government bonds. This means that if financial markets don't want to purchase a government's bonds, euro area governments cannot turn to the central banks to raise the money to pay off old bonds. The result may be a sovereign default.
- Since the ECB announced the OMT programme, sovereign bond yields in the euro area have come down but there are still many legal and practical questions about how OMT would operate.

Recap: Key Points from Part 12

Things you need to understand from these notes:

1. How default risk affects interest rates.
2. How the value of collateral affects interest rates.
3. The role of risk aversion in affecting interest rates.
4. How default risk and collateral explain real-world interest rates.
5. How risk spreads change over time.
6. The credit channel of monetary policy.
7. Sovereign default risk.
8. Why bond markets can close quickly leading to default.
9. Why central banks as "sovereign lender of last resort" affects sovereign bond yields.