Principles of Finance

Prof. Dr. Dennis A. V. Dittrich

2014

Guest Lecture: Urban Economics

On Friday December 12th we will have a lecture of Dr. Wendland and discussion afterwards with the topic ‚Urban Economicsd (room Berlin from 10.00 to 12.30)

In particular Dr. Wendland will focus on the real estate market in Berlin, its development and some methods of real estate evaluation.

In the coming term (Spring 2015) Dr. Wendland is going to teach two classes at Touro with the focus on Real Estate b U**Real Estate Management**V and U**Urban Economics**V.

Attendance is mandatory

Quizzes as Homework

You are encouraged to hand in the solution to the problem sets jointly in groups of up to three students. Every member of the group should be able to explain their solution if asked to do so.

`http://economicscience.net/content/principles-finance-2014`

2nd problem set due on Dec. 18th, beginning of lecture.

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Yes, because the absence of 8nancial markets means that funds cannot be channeled to people who have the most productive use for them. Entrepreneurs then cannot acquire funds to set up businesses that would help the economy grow rapidly.

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Wine is more di=cult to transport than gold and is also more perishable. Gold is thus a better store of value than wine and also leads to lower transactions cost. It is therefore a better candidate for use as money.

Is it better for bondholders right now when the yield to maturity increases or decreases?

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When the yield to maturity increases, this represents a decrease in the price of the bond. If the bondholder were to sell the bond at a lower price, the capital gains would be smaller (capital losses larger) and therefore the bondholder would be worse oe.

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People are more likely to buy houses because the real interest rate when purchasing a house has fallen from 3% (= 5% - 2%) to 1% (= 10% - 9%). The real cost of 8nancing the house is thus lower, even though nominal mortgage rates have risen. (If the tax deductibility of interest payments is allowed for, then it becomes even more likely that people will buy houses.)

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Whenever the current price P is greater than face value F of a discount bond, the yield to maturity will be negative.

It is possible for a coupon bond to have a negative nominal interest rate, as long as the coupon payment and face value are low relative to the current price. As an example, with a one-year coupon bond, the yield to maturity is given as $i = (C + F - P)/P$; in this case whenever $C + F < P$, i will be negative.

It is impossible for a perpetuity to have a negative nominal interest rate, since this would require either the coupon payment or the price to be negative.

Consider a coupon bond that has a \$1,000 par value and a coupon rate of 10%. The bond is currently selling for \$1,044.89 and has two years to maturity. What is the bond's yield to maturity?

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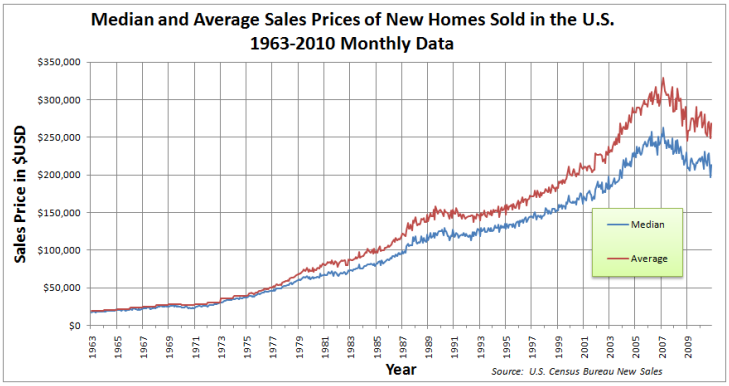
$$\$1044.89 = \frac{\$100}{(1+i)} + \frac{\$100}{(1+i)^2} + \frac{\$1000}{(1+i)^2}$$

Solving for i gives a yield to maturity of 0.075, or 7.5%.

$$i = \frac{-99489 - 100\sqrt{1151879}}{104489} \approx -1.9793$$

$$i = \frac{-99489 + 100\sqrt{1151879}}{104489} = 0.075$$

Interest Rates & Yield Curves



- numbers of foreclosures in USA began to increase in 2006
- USA housing prices began declining in early 2007: Begin of the Great Recession

Expectations Theory

- The interest rate on a long-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond
- Buyers of bonds do not prefer bonds of one maturity over another; they will not hold any quantity of a bond if its expected return is less than that of another bond with a die erent maturity
- Bond holders consider bonds with die erent maturities to be perfect substitutes

Expectations Theory: Example

- Let the current rate on one-year bond be 6%.
- You expect the interest rate on a one-year bond to be 8% next year.
- Then the expected return for buying two one-year bonds (8rst one and after it matures the second) averages $(6\% + 8\%)/2 = 7\%$.
- The interest rate on a two-year bond must be 7% for you to be willing to purchase it.

True, False, or Uncertain?

UAccording to the expectation theory of the term structure of interest rates, it is better to invest on one-year bonds, reinvested over two years, than to invest in a two year bond, if interest rates on one-year bonds are expected to be the same in both years.V

Yield curve and expectations

Upward-sloping Investors expect the economy to grow in the future, this growth is associated with a greater expectation that in–ation will rise in the future rather than fall, and, consequently, interest rates to go up in the future:
long-term rates are above short-term rates

Flat Investors have no clear prediction about the future development of the economy:
short- and long-term rates are the same

Inverted Investors expect the economy will slow or even decline in the future; a predictor of economic recession:
long-term rates are below short-term rates

Expectations Theory

- Explains why the term structure of interest rates changes at die erent times
- Explains why interest rates on bonds with die erent maturities move together over time (observation 1)
- Explains why yield curves tend to slope up when short-term rates are low and slope down when short-term rates are high (observation 2)
- Cannot explain why yield curves usually slope upward (observation 3)

Segmented Markets Theory

- Bonds of die erent maturities are not substitutes at all
- The interest rate for each bond with a die erent maturity is determined by the demand for and supply of that bond
- Investors have preferences for bonds of one maturity over another
- If investors generally prefer bonds with shorter maturities that have less interest-rate risk, then this explains why yield curves usually slope upward (observation 3)

If bond investors decide that 30-year bonds are no longer as desirable an investment, predict what will happen to the yield curve, assuming

a) the expectation theory of the term structure holds.

b) the segmented markets theory of the term structure holds.

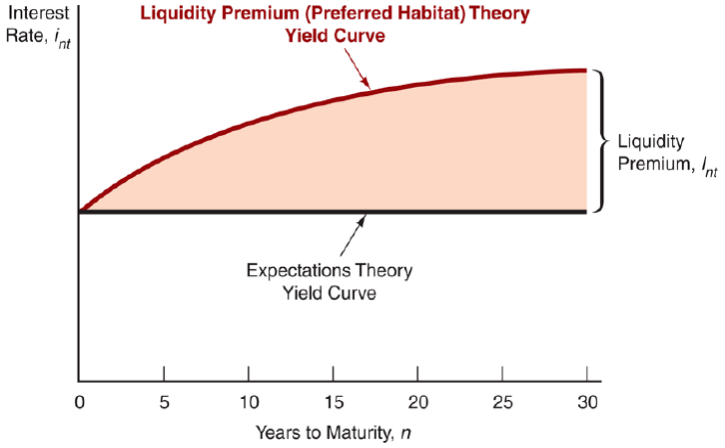
Liquidity Premium & Preferred Habitat Theories

Liquidity Premium Theory The interest rate on a long-term bond will equal an average of short-term interest rates expected to occur over the life of the long-term bond plus a liquidity premium that responds to supply and demand conditions for that bond

Preferred Habitat Theory Bonds of die erent maturities are partial (not perfect) substitutes

- Investors have a preference for bonds of one maturity over another
- They will be willing to buy bonds of die erent maturities only if they earn a somewhat higher expected return
- Investors are likely to prefer short-term bonds over longer-term bonds

The Relationship Between the Liquidity Premium and Expectations Theory



Liquidity Premium and Preferred Habitat Theories

$$i_{nt} = \frac{i_t + i^e_{t+1} + i^e_{t+1} i^e_{t+1} + \ldots + i^e_{t+n-1}}{n} + l_{nt}$$

where l_{nt} is the liquidity premium for the n-period bond at time t; it is always positive and rises with the term to maturity

- Interest rates on die erent maturity bonds move together over time; explained by the 8rst term in the equation
- Yield curves tend to slope upward when short-term rates are low and to be inverted when short-term rates are high; explained by the liquidity premium term in the 8rst case and by a low expected average in the second case
- Yield curves typically slope upward; explained by a larger liquidity premium as the term to maturity lengthens

Calculate the liquidity premium for each multi-year bond using the below expected future one-year bond interest rates, as well as the current interest rates on multi-year bonds.

Year	1-Year Bond Rate	Multi-Year Bond Rate
1	2%	2%
2	3%	3%
3	4%	5%
4	6%	6%

The Stock Market, the Theory of Rational Expectations, and the Ef cient Market Hypothesis

- What are the two main sources of cash –ows for a stockholder?
- How reliably can these cash –ows be estimated?
- Compare the problem of estimating stock cash –ows to estimating bond cash –ows.
- Which security would you predict to be more volatile?

Computing the Price of Common Stock

The One-Period Valuation Model

$$P_0 = \frac{D_1}{1+k_e} + \frac{P_1}{1+k_e}$$

P_0 current price of the stock
D_1 dividend paid at the end of year 1
k_e required return on investment in equity
P_1 sale price of the stock at the end of year 1

What is the price of a share of stock that pays a \$1 per year dividend and that you expect to be able to sell in one year for \$20, assuming you require a 15% return?

The Generalized Dividend Valuation Model

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \frac{D_3}{(1+k_e)^3} + ... + \frac{P_n}{(1+k_e)^n}$$

If P_n is far is the future, it will not aect P_0:

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_e)^t}$$

The price of the stock is determined only by the present value of the future dividend stream.

The Gordon Growth Model

Intrinsic value of a stock, based on a future series of dividends that grow at a constant rate

$$P_0 = \frac{D_0(1+g)}{(k_e-g)} = \frac{D_1}{(k_e-g)}$$

D_0 most recent dividend paid
g expected constant growth rate of dividends
k_e required return on an investment in equity

- Dividends are assumed to continue growing at a constant rate forever
- The growth rate is assumed to be less than the required return on equity

After careful analysis, you have determined that a 8rm's dividends should grow at 7%, on average, in the foreseeable future. The 8rm's last dividend was \$3.

What is the current price of this stock, assuming the required return is 18%?

The Global Financial Crisis and the Stock Market

- Financial crisis that started in August 2007 led to one of the worst bear markets in 50 years.
- Downward revision of growth prospects: $\downarrow g$.
- Increased uncertainty: $\uparrow k_e$

$\rightarrow$ Gordon model predicts a drop in stock prices.

If monetary policy becomes more transparent about the future course of interest rates, how would that ae ect stock prices, if at all?

Prices and Information

Superior information about an asset can increase its perceived value by reducing its perceived risk

- Information is important for individuals to value each asset.
- When new information is released about a 8rm, expectations and prices change.
- Market participants constantly receive information and revise their expectations, so stock prices change frequently.

The Theory of Rational Expectations

Adaptive expectations:

- Expectations are formed from past experience only.
- Changes in expectations will occur slowly over time as data changes.
- However, people use more than just past data to form their expectations and sometimes change their expectations quickly.
- Expectations will be identical to optimal forecasts using all available information
- Even though a rational expectation equals the optimal forecast using all available information, a prediction based on it may not always be perfectly accurate
  - It takes too much ev ort to make the expectation the best guess possible
  - Best guess will not be accurate because predictor is unaware of some relevant information

UAn e=cient market is one in which no one ever pro8ts from having better information than the rest.V

Is this statement true, false, or uncertain?

Rationale Behind the Theory

- The incentives for equating expectations with optimal forecasts are especially strong in 8nancial markets. In these markets, people with better forecasts of the future get rich.
- The application of the theory of rational expectations to 8nancial markets (where it is called the e=cient market hypothesis or the theory of e=cient capital markets) is thus particularly useful

Implications of the Theory

- If there is a change in the way a variable moves, the way in which expectations of the variable are formed will change as well
  - Changes in the conduct of monetary policy (e.g. target the federal funds rate)
- The forecast errors of expectations will, on average, be zero and cannot be predicted ahead of time.

Recall: Rate of Return from Holding a Security

... equals the sum of the capital gain on the security, plus any cash payments divided by the initial purchase price of the security:

$$R = \frac{P_{t+1} - P_t + C}{P_t}$$

- R rate of return
- P_t price of security at time t, the beginning of the holding period
- P_{t+1} price of security at time $t+1$, the end of the holding period
- C cash payment (coupon or dividend) made during the holding period

The Ef cient Market Hypothesis: Rational Expectations in Financial Markets

- At the beginning of the period, we know P_t and C.
- P_{t+1} is unknown and we must form an expectation of it.
- The expected return then is

$$R^e = \frac{P^e_{t+1} - P_t + C}{P_t}$$

- Expectations of future prices are equal to optimal forecasts using all currently available information so

$$P^e_{t+1} = P^{of}_{t+1} \Rightarrow R^e = R^{of}$$

- Supply and Demand analysis states R^e will equal the equilibrium return R^*, so $R^{of} = R^*$.

The Ef cient Market Hypothesis: Rational Expectations in Financial Markets

- Current prices in a 8nancial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return
- In an e=cient market, a security's price fully re–ects all available information

$R^{of} > R^* \Rightarrow P_t \uparrow \Rightarrow R^{of} \downarrow$

$R^{of} < R^* \Rightarrow P_t \downarrow \Rightarrow R^{of} \uparrow$

until

$R^{of} = R^*$

In an e1 cient market, all unexploited pront opportunities will be eliminated

UForecasters' predictions of in–ation are notoriously inaccurate, so their expectations of in–ation cannot be rational.V

Is this statement true, false, or uncertain?

If a forecaster spends hours every day studying data to forecast interest rates, but his expectations are not as accurate as predicting that tomorrow's interest rates will be identical to today's interest rate, are his expectations rational?

If the public expects a corporation to lose $5 per share this quarter and it actually loses $4, which is still the largest loss in the history of the company, what does the e=cient market hypothesis say will happen to the price of the stock when the $4 loss is announced?

How Valuable are Published Reports by Investment Advisors?

- Information in newspapers and in the published reports of investment advisers is available to all market participants and is already re–ected in market prices
- Acting on this information will not yield abnormally high returns, on average
- The empirical evidence con8rms that recommendations from investment advisers cannot help us outperform the general market
- A hot tip is probably information already contained in the price of the stock
- Stock prices respond to announcements only when the information is new and unexpected
- A Ubuy and holdVstrategy is the most sensible strategy for the small investor

Why the Ef cient Market Hypothesis Does Not Imply that Financial Markets are Ef cient

- Some 8nancial economists believe all prices are always correct and re–ect **market fundamentals** (items that have a direct impact on future income streams of the securities) and so 8nancial markets are e=cient
- However, prices in markets like the stock market are unpredictable. This casts serious doubt on the stronger view that 8nancial markets are e=cient.

Behavioral Finance

- The lack of short selling (causing over-priced stocks) may be explained by loss aversion
- The large trading volume may be explained by investor overcon8dence
- Stock market bubbles may be explained by overcon8dence and social contagion