

Problem Set 4 Answers

- Ch8.3. a. $u_n = 0.1/2 = 5\%$
- b. $\pi_t = 0.1 - 2(0.03) = 4\%$ every year beginning with year t .
- c. $\pi_t^e = 0$ and $\pi_t = 4\%$ forever. Inflation expectations will be forever wrong. This is unlikely.
- d. θ might increase because inflation expectations adapt to persistently positive inflation. The increase in θ has no effect on u_n .
- e. $\pi_5 = \pi_4 + 0.1 - 2(0.03) = 4\% + 4\% = 8\%$
 For $t > 5$, $\pi_t = 8\% + (t - 5)(4\%)$. So, $\pi_{10} = 28\%$; $\pi_{15} = 48\%$.
 Inflation increases by four percentage points every year.
- f. Inflation expectations will again be forever wrong. This is unlikely.
- Ch9.3. a. $u_n = 5\%$
- b. Assume the economy has been at the natural rate of unemployment for two years (this year and last year). Then, $g_{yt} = 3\%$; $g_{mt} = g_{yt} + \pi_t = 11\%$.
- c.
- | | π | u | g_{yt} | g_{mt} |
|------|-------|-----|----------|----------|
| t-1: | 8% | 5% | 3% | 11% |
| t: | 4% | 9% | -7% | -3% |
| t+1: | 4% | 5% | 13% | 17% |
| t+2: | 4% | 5% | 3% | 7% |
| t+3: | 4% | 5% | 3% | 7% |
- Ch14.4. a. No. If the nominal interest rate were negative, nobody would hold bonds. Money would be more appealing since it could be used for transactions and would earn zero—as opposed to negative—interest.
- b. Yes. The real interest rate is negative if expected inflation exceeds the nominal interest rate. Even in this case, the real interest rate on bonds (which pay nominal interest) exceeds the real interest rate on money (which does not pay nominal interest) by the nominal interest rate.
- b. A negative real interest rate makes borrowing very attractive and leads to a large demand for investment.

- c. Real rate is nominal minus inflation. So, it appears as if European countries and the US have negative real rates, and low nominal short-term rates.

Ch15.7. Let r be the real interest rate, g the growth rate of dividends, and x the risk premium. The price is given by the following expression.

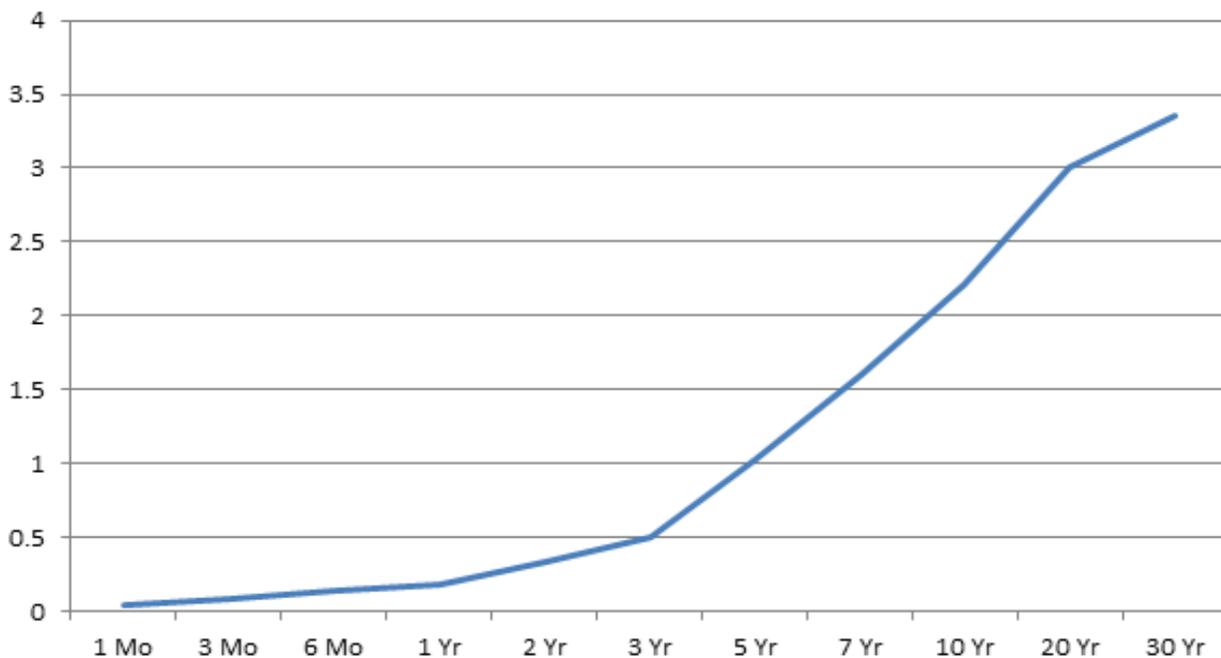
$$Q = \frac{1000}{1+r+x} + \frac{1000(1+g)}{(1+r+x)^2} + \frac{1000(1+g)^2}{(1+r+x)^3} \dots$$

$$= \left[\frac{1000}{1+r+x} \right] \left[1 + \frac{(1+g)}{(1+r+x)} + \frac{(1+g)^2}{(1+r+x)^2} + \dots \right] = \frac{1000}{(r+x-g)}$$

- a. \$50,000; \$20,000
- b. \$10,000; \$7692.31
- c. \$16,666.67; \$11,111.11
- d. The stock price increases when the risk premium falls. A fall in the risk premium is like a fall in the real interest rate.

Ch15.9. The term structure is upward sloping. Partly, this is because the short-term rate is being depressed by the Fed, while long-term rates are relatively low.

Term Structure (Yield Curve)



Ch16.2.a. $(1-0.25)(1+1.05+1.05^2)\$40,000=\$94,575$

b. $\$194,575$

c. The consumer works for three more years and will be retired for seven years, so there are 10 more years of consumption. So, since the real interest rate is zero, the consumer can consume one-tenth of her total wealth, or 19,457.50, this year.

d. Consumption could increase by \$2,000 annually.

e. Benefits imply extra annual consumption of $0.6(1.05^2)\$40,000(7/10)=\$18,522$.

Ch16.3. The EPDV of purchasing the machine is $\Pi/(r+\delta) = \$18,000/(r+0.08)$

a. Buy. EPDV= $\$138,462 > \$100,000$

b. Break-even. EPDV= $\$100,000$

c. Do not buy. EPDV= $\$78,261 < \$100,000$