HE1002 Macroeconomics I

Problem Sheet 8 – Problems & Solutions

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Problem 8-1

For each scenario, indicate whether it is an example of moral hazard or adverse selection.

(a) You decide to buy a new car instead of a used car because you are worried about the quality of the used car.

Solution:

Adverse selection. The buyer has different information about the quality/riskiness of the used car compared to the seller. This information asymmetry can lead to failure of the transaction.

(b) You sell your condominium because you fear there will be a large special assessment next year. There has been no official notice of an upcoming assessment.

Solution:

Adverse selection. The seller has different (superior) information about the worth/riskiness of the condo compared to potential buyers. The seller benefits from this information asymmetry.

(c) The owner of a company has just secured a new line of credit from the bank. He decides to change his business plan and open a second office in a foreign country.

Solution:

Moral hazard. Opening a second office is risky, but the consequences of failure are partially shared with the bank (the lender).

(d) A firm that has purchased a large insurance policy becomes careless about setting the security alarm.

Solution:

Moral hazard. The carelessness about the alarm is risky behavior, but the consequences are covered by the insurance policy.

(e) A number of households find themselves owing more on their mortgages than their houses are currently worth. Some of them decide to abandon the house and walk away.

Solution:

Moral hazard. Walking away from the mortgage is risky behavior by the borrower, but the consequences beyond loss of the house are not borne by the borrower.

(f) The owners of a company suspect there will be more competition from foreign producers in upcoming years. They have just issued new shares of stock in their company.

Solution:

Adverse selection. The owners have superior information about the worth/riskiness of the company's shares compared to potential investors. The owners benefit from issuing shares at higher valuations.

Problem 8-2

The chapter discusses three main functions of a banking system. Classify each of the following by the function it best represents.

(a) Wyatt can get cash out of the ATM at any time of day or night.

Solution:

Provision of liquidity. Having cash easily available when you want it, without the downsides of holding physical cash at home.

(b) Instead of lending all her savings out to one borrower, Xander's bank makes the money in her savings account available to a variety of firms, with different characteristics and risk profiles, wishing to invest.

Solution:

Risk management and diversification. The bank helps savers diversify risk by providing funds to a large pool of borrowers with different risk profiles.

(c) When Yao's car suddenly breaks down, she can quickly withdraw funds from her savings account to pay the mechanic and rent a car.

Solution:

Provision of liquidity. Having cash easily available when you want it, without the downsides of holding physical cash.

(d) Zirwat can get start-up funds for her new hair salon from a bank, instead of having to find people in her neighborhood willing to lend their extra money.

Solution:

Financial intermediation. The bank helps facilitate the flow of money from savers to borrowers.

Problem 8-3

After graduating, you take an unusual job: consulting with the queen of a small, newly populated island. For each quote from the queen below, explain how a banking system could help with the issue described, referring to one of the three functions of banks.

(a) "When my subjects have money left over after spending, they want to keep it somewhere safe and earn some interest on it. But that's hard for most of them because they have no way of finding out who wants to borrow and whether it would be a good idea to lend to them."

Solution:

Bank Function: Financial Intermediation – The bank can keep money safe while allowing depositors to earn interest. Additionally, banks evaluate credit-worthiness and help match savers with borrowers who have legitimate needs.

(b) "My subjects are lucky that we have very little crime, so they can safely keep their extra money inside their houses and take only what cash they need for a day's spending. However, many of them have complained that if an emergency occurs when they're all the way on the other side of the island, they can't access their funds."

Solution:

Bank Function: Provision of Liquidity – A bank provides access to funds on demand, regardless of location, through fractional reserve banking. Fractional reserve banking allows banks to keep only a fraction of deposits as reserves while lending out the rest, ensuring sufficient cash is available for withdrawals and emergencies.

(c) "Some of my subjects who are in the know about good borrowers have been making loans and earning interest. But lately there have been a couple of borrowers who defaulted on loans, and when they did, the lenders were totally out of luck. If only there were some easy way for them to divide their savings among several different borrowers, they might feel safe enough to start lending again!"

Solution:

Bank Function: Risk Management and Diversification – The bank can pool funds from many savers and lend to multiple borrowers, spreading the risk of loss due to a single borrower defaulting. This encourages more lending and borrowing.

Problem 8-4

Categorize each of the following as a type of savings or investment in the economic sense.

Definitions:

- **Savings:** A portion of income not immediately spent on goods and services
- **Investment:** Spending on productive inputs such as factories, machinery, and inventories

(a) You buy 100 shares of Apple Computer stock. **Savings**

(b) You place part of your income in a mutual fund. **Savings**

(c) A delivery service buys 1,000 new trucks. **Investment**

(d) You put $1,000 in a certificate of deposit by giving money to the bank. **Savings**

Problem 8-5

Use the following words to fill in the blanks in the statements below about the market for loanable funds.

(a) A change that makes people want to save less will shift the quantity of loanable funds **supplied** to the **left**. The resulting new equilibrium would be a **higher** interest rate and a **lower** quantity of funds saved and invested.

(b) A change that makes people want to save more will shift the quantity of loanable funds **supplied** to the **right**. The resulting new equilibrium would be a **lower** interest rate and a **higher** quantity of funds saved and invested.

(c) A change that makes people want to invest more will shift the quantity of loanable funds **demanded** to the **right**. The resulting new equilibrium would be a **higher** interest rate and a **higher** quantity of funds saved and invested.

(d) A change that makes people want to invest less will shift the quantity of loanable funds **demanded** to the **left**. The resulting new equilibrium would be a **lower** interest rate and a **lower** quantity of funds saved and invested.

Problem 8-6

Consider the market for loanable funds. Describe the impact on the equilibrium interest rate and quantity for each scenario.

(a) Due to slow growth in the economy, fewer workers are receiving pay increases and more workers are losing their jobs.

Solution:

Supply of loanable funds decreases (people save less during recession). Supply curve shifts left. Interest rate increases, quantity of loanable funds decreases.

(b) The government decides to reduce the number of weeks a person is eligible for unemployment compensation.

Solution:

Supply of loanable funds increases (people save more due to less government support). Supply curve shifts right. Interest rate decreases, quantity of loanable funds increases.

(c) Numerous firms remain concerned about growth prospects in the economy.

Solution:

Demand for loanable funds decreases (firms invest less). Demand curve shifts left. Interest rate decreases, quantity of loanable funds decreases.

(d) The government decides to reduce income tax rates, and this reduction leads to an increase in the size of the budget deficit.

Solution:

Supply of loanable funds decreases (public savings decrease due to larger deficit). Supply curve shifts left. Interest rate increases, quantity of loanable funds decreases.

Problem 8-7

You go to the bank and purchase a $1,000 certificate of deposit (CD).

(a) Who is doing the borrowing? Who is doing the lending?

Solution:

Bank is borrowing; **you are lending**. When you purchase a CD, you are providing funds to the bank, which then uses those funds for lending to other customers.

(b) Which is higher, the interest rate paid on the 6-month CD or the 2-year CD? Why?

Solution:

The interest rate for the 2-year CD is higher. This compensates for the added opportunity cost and risk from the longer time period of the loan. Longer-term loans carry greater uncertainty.

Problem 8-8

What does the risk premium measure? During a recession, what is likely to happen to the risk premium?

Solution:

Risk Premium Definition: The risk premium is the difference between the risk-free rate (typically government bonds) and the interest rate an investor must pay on riskier assets (like corporate bonds or stocks).

During a Recession: The risk premium generally **increases** because:

- Investors face greater uncertainty about future earnings, defaults, and market stability
- Investors demand higher returns on risky assets to compensate for this higher risk
- Investors move money from risky assets to safe assets, widening the spread between risky and safe asset returns
- Firms' profits fall, making defaults more likely, so investors require larger credit spreads

Problem 8-9

You have $500 in a savings account earning 3 percent. A good friend wants to borrow $250 and has agreed to pay 5 percent interest. Should you lend your friend the money? Why or why not?

Solution:

Considerations:

- **Profitability:** Lend the money since 5% ¿ 3%, providing higher returns
- **Risk:** The savings account is essentially risk-free, while the friend may default. You could lose your principal.
- **Liquidity:** Bank savings are accessible anytime, but money lent to your friend is tied up with him.

Conclusion: Only lend if you trust your friend to repay. If you doubt their ability or willingness to repay, the higher return doesn't compensate for the risk and liquidity concerns.

Problem 8-10

Correct the economic vocabulary in the following paragraph:

Original: "When Americans invest by buying securities such as stocks and bonds or putting money in a bank, they provide funds for firms wishing to engage in diversification by buying assets used to produce goods and services..."

Corrected: "When Americans **save** by buying securities such as stocks and bonds or putting money in a bank, they provide funds for firms wishing to **invest** by buying assets used to produce goods and services..."

Explanation:

- **"Invest"** → should be "**save**": Buying securities and putting money in a bank is savings (portion of income not immediately spent), not investment.
- "**diversification**" → should be "**investment**": Investment spending refers to purchases of productive inputs. Diversification refers to spreading risk among different assets.

Original: "...banks act as a source of liquidity."

Corrected: "...banks act as a **financial intermediary**."

Explanation: In the context of matching borrowers and lenders, banks are acting as intermediaries. While banks do provide liquidity, the primary function being described here is intermediation.

Problem 8-11

In each of the following examples, name the financial product being described.

(a) A family borrows money to pay for a house. **Housing Mortgage (Loan)**

(b) A new tech start-up offers investors the ability to purchase a small part of the company to raise needed capital. **Stock (Equity)**

(c) The U.S. government offers to pay investors a 3 percent return rate next year if they finance its debt today. **Government Securities (Government Bonds/Loan)**

Problem 8-12

Evaluate each statement and say whether it describes a loan, a bond, and/or a stock.

(a) It implies ownership in the issuing firm. **Stock**

(b) Small businesses use these to raise funds for investment. **Loans**

(c) This is also known as equity financing. **Stock**

(d) We can think of this as a more liquid version of a loan. **Bond**

(e) It pays some form of interest, and principal is paid at maturity. **Loan and Bond**

Problem 8-13

Match each player in the financial system with the financial product(s) they are most associated with.

(a) **Commercial banks → Loans (iii)**

Commercial banks typically provide loans to individual borrowers and businesses as intermediaries between savers and borrowers.

(b) **Savers → Bonds (ii) and Stocks (i)**

Savers typically buy bonds and stocks as a means of savings to receive returns over time through interest or dividends.

(c) **Investment banks → Stocks (i) and Bonds (ii)**

Investment banks are most associated with stocks and bonds as they help businesses raise capital through issuing and trading stocks and bonds.

Problem 8-14

Rank the following actors in financial markets by the level of liquidity they are providing (highest to lowest).

Solution:

1. **A bank offering a no-minimum reserve requirement checking account** – Most liquid, since checking accounts allow instant access to cash and immediate transactions.
2. **The Federal Reserve offering banks the chance to borrow short-term money through the discount window** – Highly liquid, as the Fed provides short-term funds to maintain liquidity in the banking system.
3. **Investment banks offering shares in mutual funds with 30-day withdrawal penalties** – Moderately liquid — investors can access funds, but early withdrawal penalties reduce liquidity.
4. **Entrepreneurs offering equity in their businesses** – Least liquid, because ownership stakes in private firms are hard to sell or convert to cash quickly.

Problem 8-15

Rank the following assets based on their expected return, and then rank them based on their expected risk.

Expected Return Ranking (highest to lowest):

1. U.S. equities (stocks) – Highest potential returns through company growth and profits
2. Real estate – Substantial returns through appreciation and rental income
3. Commodities – High returns during inflation, but more volatile
4. U.S. fixed-income bonds – Moderate returns with regular interest payments
5. Cash – Lowest returns, just savings account interest

Expected Risk Ranking (highest to lowest):

1. Commodities – Highly volatile due to supply/demand fluctuations and geopolitical events
2. U.S. equities (stocks) – Sensitive to market swings and company performance
3. Real estate – Volatile depending on market conditions and location
4. U.S. fixed-income bonds – Less risky, especially government bonds
5. Cash – Safest asset with minimal loss risk (though susceptible to inflation)

Problem 8-16

Evaluate whether the following statements are true or false.

(a) Risk is measured by looking at the expected value (average) of an asset's returns over time. **False**

Risk is measured by looking at the standard deviation of an asset's returns over time, not the average.

(b) Market risk can be minimized with a well-diversified portfolio. **False**

Only idiosyncratic risk can be minimized through diversification. Market risk cannot be eliminated through diversification.

(c) Idiosyncratic risk is unique to a particular asset, rather than to the market as a whole. **True**

(d) A portfolio of well-diversified assets will often be less risky for the same level of return when compared to an individual asset. **True**

Diversification minimizes idiosyncratic risks, while individual assets are vulnerable to both market and idiosyncratic risks.

Problem 8-17

Your friend wants to buy tires where they're $30 cheaper in the next county and resell them locally. What is the term for this transaction? Would the efficient-market hypothesis predict it will be as profitable as he says?

Solution:

Term: Arbitrage – buying an asset in one market where it's cheaper and selling it in another where it's more expensive to profit from the price difference.

EMH Prediction: No, the efficient-market hypothesis predicts this will NOT be as profitable as expected because:

- EMH states that market prices already reflect all available information
- Price differences like $30 would quickly disappear as other traders exploit the difference
- The gap closes until arbitrage opportunities are eliminated
- Hence, this profit opportunity won't last as markets adjust too quickly for long-term guaranteed profits

Problem 8-18

In each example, say whether the market is behaving within the principles of the efficient-market hypothesis.

(a) The day after unrest in the Middle East, oil prices fall.

Solution:

No, not consistent with EMH. In an efficient market, the price should rise (expected supply disruption). The prices should reflect all available information immediately.

(b) Investors find very few opportunities for arbitrage in the foreign exchange market.

Solution:

Yes, consistent with EMH. In an efficient market, prices quickly reflect information, making arbitrage opportunities rare. This shows that information is quickly and accurately reflected in prices.

(c) The Dow Jones Industrial Average changes by 5 percent for an entire week with very little economic news released.

Solution:

No, not consistent with EMH. In an efficient market, prices should not change drastically without significant new information being released. This suggests the market is not efficiently incorporating available information.

Problem 8-19

In 2021, U.S. government spending was \$6.8 trillion, tax revenue was \$4.1 trillion, GDP was \$23.31 trillion, and total consumer spending was \$15.9 trillion. With no exports or imports, calculate national savings, public savings, and private savings.

Solution:
Step 1: Find Investment using GDP identity

$$\text{GDP} = C + I + G$$

$$\$23.31 \text{ trillion} = \$15.9 \text{ trillion} + I + \$6.8 \text{ trillion}$$

$$I = \$0.61 \text{ trillion}$$

Step 2: Calculate National Savings

$$\text{National savings} = \text{Investment} = \textbf{\$0.61 trillion}$$

Step 3: Calculate Public Savings

$$\text{Public savings} = \text{Taxes} - \text{Government spending} = \$4.1 - \$6.8 = \textbf{-\$2.7 trillion}$$

Step 4: Calculate Private Savings

$$\text{Private savings} = \text{National savings} - \text{Public savings} = \$0.61 - (-\$2.7) = \textbf{\$3.31 trillion}$$

Problem 8-20

A country has been running a deficit for years and decides to increase government spending.

(a) Compare the impact in a closed economy and an open economy.

Solution:

Closed Economy: All investment must come from domestic savings. When government increases spending, the budget deficit grows and public savings decrease. This reduces the supply of loanable funds, pushing interest rates up significantly.

Open Economy: Funds can flow across borders. When government spending rises, the country can borrow from abroad to finance the deficit. Foreign capital inflows offset the reduction in domestic savings, keeping interest rates from rising as much.

(b) Are you more likely to observe crowding out in a closed economy or an open economy?

Solution:

Crowding out is more likely and stronger in a closed economy. In a closed economy, increased government borrowing competes directly with private investors for the same limited pool of loanable funds, pushing interest rates up and reducing investment. In an open economy, foreign capital inflows mitigate the rise in interest rates and reduce crowding out.

Problem 8-21

Consider the U.S. loanable funds market.

(a) The government starts offering savings bonds with higher returns, increasing private savings. Which way does the supply curve shift? What happens to the interest rate and borrowing?

Solution:

Supply curve shifts RIGHT (people want to save more). Interest rate DECREASES, quantity of loanable funds increases, and borrowing increases.

(b) Suppose the economy is open. China invests surplus funds in U.S. Treasury notes. Which way does the supply curve shift?

Solution:

Supply curve shifts RIGHT (capital inflow increases supply of loanable funds).

(c) A new computer software program promises high returns on business investment. Which curve shifts? Which way?

Solution:

Demand curve shifts RIGHT (firms want to invest more). Interest rate increases, and quantity of loanable funds increases.

(d) The government reduces the capital gains tax. Which curve shifts? Which way?

Solution:

Supply curve shifts RIGHT (savers have more after-tax returns, increasing incentive to save). Interest rate decreases, and quantity of loanable funds increases.