1. *Risk versus Return* is an old adage on Wall Street. If higher expected returns are a “good” and greater risk of loss is a “bad,” what does a typical investor’s risk-return indifference map look like?

With risk on the y-axis and return on the x-axis, the curve will be upward sloping. It probably will also have a concave shape (bowed down).

With risk on the x-axis and return on the y-axis, the curve will be upward sloping. It probably will also have a convex shape (curved up).

2. Jane has a weekly income of $100. She buys apples and pears, on which she spends all of her income. Initially, the price of one apple is $5 and the price of one pear is $10. At those prices, she buys 10 apples and 5 pears (bundle A). In answering the following questions, draw a new diagram for each part and only compare two bundles in each diagram.

(a) The price of apples increases to $10 and the price of pears falls to $5. Jane then selects a bundle (bundle B) of 5 apples and 10 pears. Can you tell from just this information which bundle (A or B) Jane prefers?

To identify Jane’s preferences, check if there are bundles that are equally affordable (both on or below her budget line) but where Jane chooses one over the other one. In that case, Jane has revealed which one she preferred.

Expenditures are always \( P_A A + P_P P \)

Bundle A at the old prices costs \( 5 \times 10 + 10 \times 5 = 100 \)

Bundle B at the old prices costs \( 5 \times 5 + 10 \times 10 = 125 \). She could not have afforded bundle B at the old prices, so we don’t know which she preferred.

At the new prices, bundle A costs \( 10 \times 10 + 5 \times 5 = 125 \)

Bundle B at the new prices costs \( 10 \times 5 + 5 \times 10 = 100 \)

Again, we can’t tell from this which she prefers.

(b) Now suppose that, instead, at the new prices Jane prefers to select a bundle, C, of 6 pears and 7 apples. Can you now tell whether she prefers bundle A to bundle C?

At the new prices, bundle C costs \( 10 \times 6 + 5 \times 7 = 95 \). The fact that she chooses C at the new prices and not A doesn’t tell us anything, because she couldn’t afford A anyway.

However, at the old prices bundle C costs \( 5 \times 6 + 10 \times 7 = 100 \). This means that bundle C is on her old budget constraint. The fact that she bought bundle A at the old prices but could also have afforded bundle C tells us that she likes A better than C.
(c) Now assume that at the initial price for apples and pears, Jane selected a bundle of 8 apples and 4 pears (bundle D) and at the new prices she selected bundle B. Can you tell if she preferred bundle B to bundle D or vice versa?

At the old prices, recall that bundle B is not affordable given Jane’s budget.

At the new prices, bundle B costs $100. Bundle D purchased at the new prices would have cost $10*8 + $5*4 = $100. The fact that Jane chooses B at the new prices and not D, which she can also afford, tells us that she prefers B to D.

3. Suppose that Sarah’s marginal value of apples in terms of bananas is greater than the relative price of apples in terms of bananas. Show this graphically, along with Sarah’s optimal choice. Will Sarah want to buy some apples or sell some apples?

This means that Sarah is willing to give up many more bananas for an apple than she needs to given the prices. We know that she will therefore want to buy some apples.

![Graph showing Sarah's original position and optimal choice.]

4. Suppose that Smith’s runs a commercial taking actual customers coming out of the store and a list of what each purchased and then show you than these same purchases cost 10% more at Albertson’s. Does this mean you should switch to shopping at Smith’s?

No—people will purchase bundles according to their relative prices. If the relative prices are different, then this commercial is meaningless. For example, suppose that apples cost $1 at Smiths and bananas cost 50 cents. Further suppose that apples cost 25 cents at Albertsons and bananas cost 75 cents. The relative price of bananas in terms of apples is lower at Smith’s and you would expect people to purchase relatively more bananas at Smiths. So say a person chooses 4 bananas and one apple at Smiths—this bundle costs more at Albertsons, but at Albertsons the consumer would probably choose a different bundle.

5. The Smith family has an income of $1000 per month, which they spend on doctor visits and all other goods. Suppose doctor visits cost $100.
a. Suppose the government decides to pay half of the Smith family’s medical expenses, so that doctor visits only cost them $50. They now choose 8 visits. Draw the Smith family’s original budget line and new budget line. Show their new optimal point. Call that point P. What are the coordinates of P?

b. Suppose a new government is elected which does away with this policy. Instead the government gives the Smith family a cash grant of $400. Show the new budget line in your graph above. Does the budget line go above, below, or through point P? How do you know?

   *It goes through point P: at doctor visit price of $100 bundle P costs $600 + $100*8 = $1400. This is affordable to the family with the cash grant.*

c. Which of these two programs is the most expensive for the government? Which will the Smith family prefer?

   *If everyone is like the Smith’s, the cost is the same. With the price subsidy, the government pays $50*8=$400—the same as the cash grant.*

   *The Smith family prefers to have the cash grant. Why? Because we know that at a doctor visits price of $50, they buy a bundle that is affordable with the cash grant. So they can’t be any worse off with the cash grant. In fact, they may prefer other bundles to P—buying fewer doctor visits and spending more on other things. In other words, their optimal choice along the BC with the cash grant may be above the indifference curve that goes through point P.*
6. Sharon can work up to 24 hours a day. Her wage is $15 an hour.
   a. Draw her budget constraint. Be sure to label all intercepts.

![Budget Constraint Diagram]

   a.

   b. What is the slope of the budget constraint? Explain how the slope relates to an opportunity cost.

   The blue line represents the original budget constraint. Its slope is \(-15\) — the wage. The wage is the opportunity cost of leisure — the price of leisure in terms of dollars foregone that could have been spent on other stuff.

7. George S. Oros has $1000 today and expects to receive $2000 a year from now. His savings account pays an annual interest rate of 25%. The bank is also willing to lend money at the same interest rate.

   a. Suppose that George saves all of his money to spend next year. How much money will he be able to spend today and next year?

   \( C_0 = 0, \ C_1 = 2000 + 1000(1.25) = 3250 \)
b. Suppose that he borrows $800 and spends $1800 today. How much will he be able to spend next year?

\[ 2000 - 800(1.25) = 1000 \]

c. Draw a budget constraint with “spending today” on the x-axis and “spending next year” of the y-axis. What is its slope? How does this reflect the relative price (price ratio) of spending today in terms of spending next year?

\[ \text{Slope is } -1.25 = -(1+r) \]

It represents the opportunity cost of spending a dollar today in terms of dollars of foregone consumption next period.