1 The Principle and Budget Constraint

In consumer theory (Chapter 2 through 6), we have at least two commodities in our analysis. If there is only one commodity, our analysis becomes quite prosaic. Consider the following.

Cassandra has $12 to spend on cheesecakes. Cheesecakes are sold for \( p = 3 \) each.

A. \( \text{mm} \) How many cheesecakes can she buy within budget?
B. \( \text{mm} \) Denote the number of cheesecakes by \( x \) and write Cassandra’s budget constraint in equation.
C. \( \text{m} \) Sketch her budget constraint on a graph (Tip: You just need one dimension rather than conventional two that we’ve seen in Chapter 2).

Bored enough? Here comes some twist.

D. \( \text{m} \) What would be the relative price in this case? (Tip: It doesn’t exist. Explain why).
E. \( \text{mm} \) Part of the reason why this scenario is mundane is that Principle 2.1 in Prologue does not apply. Explain why not.
F. \( \text{mmm} \) Suppose that Cassandra has decided to buy some cheesecakes today and then some in two days. Discuss whether Principle 2.1 applies in this case (assume that cheesecakes are perishable).
G. \( \text{mmm} \) While one-commodity scenario is not all that exciting, having three commodities is just too much. Explain why. (Tip: Go back to Chapter 2 and find out why two is enough).
2 Budget Constraint

Chris and Dave have been working on Problem Set #1 for two hours at the library. Chris is thinking about getting some cheesecakes and tea for a little tea break. He has $12 in his pocket now. He would like to set some money aside so he can get some cheesecakes for Dave as well. Cheesecake is $2 apiece and tea is $1 a cup. His consumption bundle is \((x_C, x_T, y_C)\), where \(x_C\) marks the number of slices he will get for himself, \(x_T\), the cups of tea and \(y_C\) is the amount of cheesecake he gets for Dave. Dave told Chris that he just needed a slice so that \(y_C\) will be always 1 regardless of price.

A. How much money can Chris spend for himself to buy \((x_C, x_T)\)?
B. On the graph with \(x_C\) on the horizontal axis and \(x_T\) on the vertical axis, sketch his budget constraint.
C. Japan exploded yesterday after a seasonal Godzilla attack and due to expected supply shortage, a cup of tea now costs $2. Update Chris’s budget constraint in item B.
D. That was a false alarm. It did not explode as it turned out. The price of tea dropped down to its initial level. However, the French took some of our cows to serve wine to. Now cheesecake is sold for $3 apiece due to expected cream cheese shortage. Update Chris’s budget constraint in item B.
E. How does a change from item B to item D compare to a change from item B to item C? Discuss similarities and differences.

3 Utility Function

Anthony has specific preferences for cheesecakes and tea \((x_C, x_T)\). He likes both cheesecakes and tea, and in general, the more, the better. However, he thinks that cheesecakes and tea always need to be consumed in 2 to 3 ratio. If they come in out of proportion, he throws away either one of them to bring them down to his preferred ratio. Max assigned Anthony’s utility level as follows:

\[
u(8, 12) = u(8, 10000) = 10, \quad u(12, 18) = u(18, 12) = 20.
\]

Cheesecakes are sold for $3 apiece and tea is $1 a cup.

A. Is Anthony’s preference monotone? Explain.
B. Does Max’s utility assignment represent Anthony’s preferences correctly? Explain. (Tip: You will use your answer to item A somewhere along the way).
C. Suppose Anthony has $27 to buy cheesecakes and tea. How many cheesecakes and tea will he buy? (Tip: Use the fact that \(x_C : x_T = 2 : 3\)).

4 The Principle

Read Landsburg’s Chapter 21: The Iowa Car Crop. In light of the Principle 2.1 in Prologue, what is a trade-off here? If auto industry is in the most efficient state, what would happen if we let Detroit cut back on production of cars by one and let Iowa grow one more car?

---