60 points total

Budget constraints

Andrea

Andrea earns 30 euro/day by producing and selling six (6) coppe of gelato (G) which he sells for 5 euro/coppe (P_G). He spends all of this income on either trippa (T) or vino from Carmignano (C). The prices he faces for these items are 10 euro/piatto (P_T) (for trippa), and 15 euro/ bottiglia (P_C) (for Carmignano vino). His expenditures and earnings are displayed in the following chart:

|	$Q = 1$	$Q = 2$	$Q = 3$	$Q = 4$	$Q = 5$	$Q = 6$	Exp
Trippa (T); $P_T = 10$	10	20	30				$P_T \times T$
Vino (C) : $P_C = 15$	15	30					$P_C \times V$
Gelato (G) : $P_G = 5$	5	10	15	20	25	30	$P_G \times G$

Prices are assumed exogenous to Andrea. Also assume he takes as exogenous that he produces six (6) coppe each day, meaning he views his income from making and selling gelato as given, i.e. exogenous, at 30 euro/day.

1. Assume Andrea can can purchase fractions of vino, e.g., $\frac{1}{3}$, but only integer amounts of trippa What are the feasible pairs (C, T) he could afford?

Answer: He has 30 euro to spend. If he buys zero trippa he can purchase two (2) units of vino: $(2, 0)$. If he buys one unit of trippa, he has 20 euro to spend on vino, so he can purches $\frac{20}{15} = \frac{4}{3}$ units of vino: $(\frac{4}{3}, 1)$; if he purchases two (2) units of trippa, he has 10 euro to spend on vino, so he can buy $\frac{10}{15}$ units of vino: $(\frac{2}{3}, 2)$; if he purchases three units of trippa, he has no money left to purchase vino: $(0, 3)$. Summarized below:

$$(2, 0), \left(1\frac{1}{3}, 1\right), \left(\frac{2}{3}, 2\right), (0, 3).$$

2. With trippa (T) measured on the vertical axis and Carmignano vino (C) on the vertical axis, graph all these pairs.
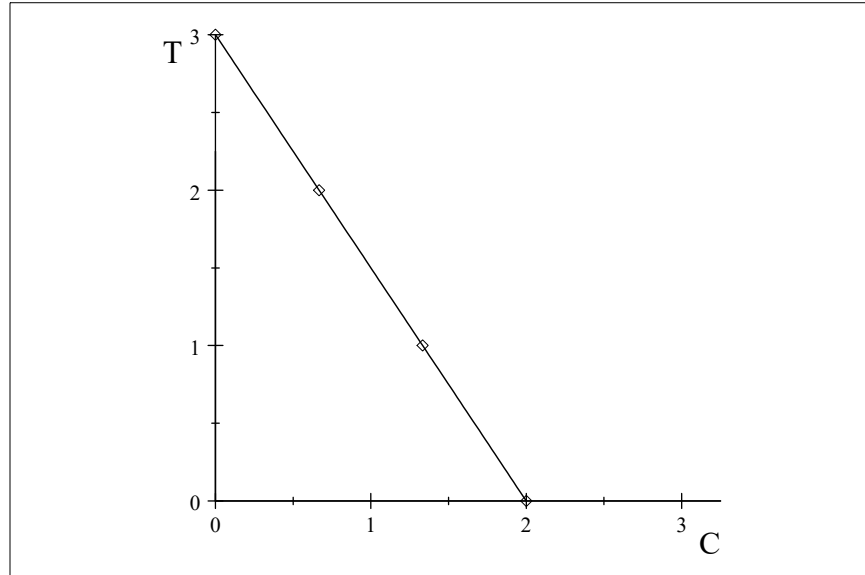
3. What is the relative price of C, i.e., how many units of T does it take to get one unit of C?

Answer: It takes 10 euro to buy one unit of trippa (T), and 15 euro to buy one unit of Carmignano vino (C). So Andrea could, for say, 20 euro, buy either one two units of T or $\frac{4}{3}$ units of C. His opportunity cost of purchasing $\frac{4}{3}$ more units of C is 2 units of T, so the relative price is $\frac{2}{\frac{4}{3}} = \frac{6}{4} = \frac{3}{2}$ units of T/unit of C. Alternatively, $\frac{P_C}{P_T} = \frac{15}{10} = \frac{3}{2}$.

4. Now imagine Andrea can purchase T and C in as fine an increment as imaginable. That is, he could purchase, say, $\frac{18}{1000}$ units of T, or of C, or even $\frac{181}{10000}$. Let G measure coppe di gelati, and P_G measure the Euro price of a coppa; Let P_C and P_T measure the Euro price of Carmignano vino and trippa, respectively. Again, assume Andrea always produces six (6) coppe di gelati. What is the equation in slope-intercept form (with T on the left-hand-side of the equation) that expresses the budget constraint (in symbols) for Andrea?

A: Expenditure equals receipts:
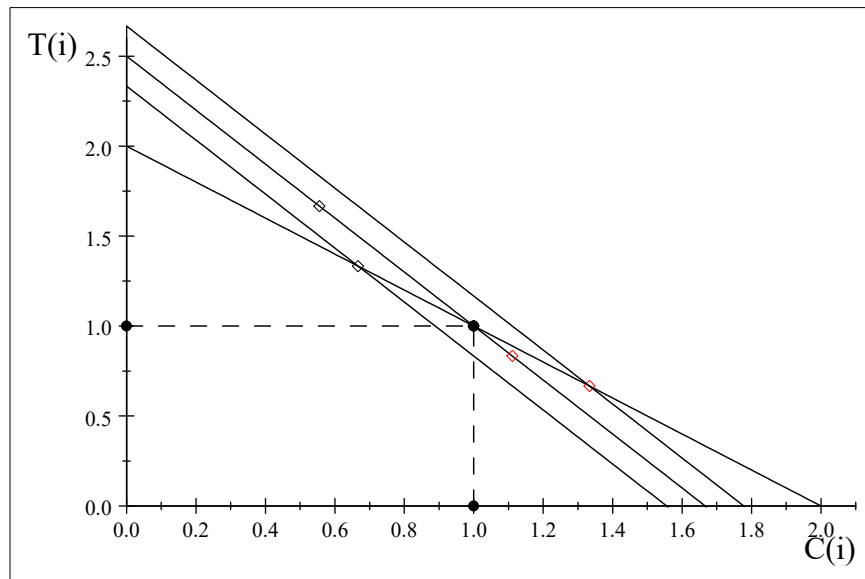
$$P_G \times 6 = P_T T_A + P_C C_A;$$

Put T_A on lhs:

$$T_A = \frac{P_G}{P_T} \times 6 - \frac{P_C}{P_T} C_A.$$

5. Supposr ther is inflation, that is, suppose P_G, P_T, and P_C all increase by the same percentage. What happens to the slope and the intercept of the budget constraint?

Niente.

Alex and Bobby

T(i) on vertical axis, C(i) on horizontal axis.

Andy black pts, Bobby red pts

Consider the above figure that depicts the two POW's, Andy and Bob. They each receive an endowment of one (1) unit of coffee and one (1) unit of tea. The five points depicted on the graph are:

$$\overbrace{\left(\frac{5}{9},\frac{5}{3}\right)}^{\#1};\ \overbrace{\left(\frac{6}{9},\frac{12}{9}\right)}^{\#2};\ \overbrace{(1,1)}^{\#3};\ \overbrace{\left(\frac{10}{9},\frac{5}{6}\right)}^{\#4};\ \overbrace{\left(\frac{12}{9},\frac{6}{9}\right)}^{\#5}.$$

The four downward-sloping lines are budget constraints. We label them according to the height of their vertical intercepts: Line A has the lowest vertical intercept, line B the second lowest, line C the third lowest, and line D the highest. Line A has a slope of minus 1 (-1), while lines B,C, and D have slopes of minus one-and-a-half (-1.5).

The scenario depicted in this figure is a comparison of autarky and free trade. Points #1 and #2 are most-preferred pairs of coffee and tea for Andy while points #4 and #5 are most preferred pairs of coffee and tea for Bob.

10 points each for the following four questions.

**1**. Explain why line A must represent the autarkic budget constraint for both Andy and Bob.

A: Line A. Along line A (which goes through the endowment point), Andy's preferred choice is $\left(\frac{6}{9},\frac{12}{3}\right)$ while Bob's is $\left(\frac{12}{9},\frac{6}{9}\right)$. Hence, market or aggregate demand for coffee is $\frac{18}{9}=2$, which equals total supply. (Total demand for tea is also two (2), which also equals total supply). In other words, ED=0 in this case.

2. Now consider the case in which Andy and Bob each receive their endowment of $(1,1)$, but their camp trades with the French camp, and the

free-trade relative price of coffee is 1.5, that is, $p_{FT} = 1.5$. Explain why line C represents the budget constraint for both Andy and Bob.

3. Point #1 $\left(\frac{5}{9}, \frac{5}{3}\right)$ and point #4 $\left(\frac{10}{9}, \frac{5}{6}\right)$ represent the most-preferred choices of Andy and Bob, respectively, in this free-trade scenario in which they both get the endowment of $(1, 1)$ and trade takes place with arbitrage and an equilibrium free-trade price of 1.5. Make the argument that in this scenario Andy is better off than he was in autarky and Bob is worse off.

Answer
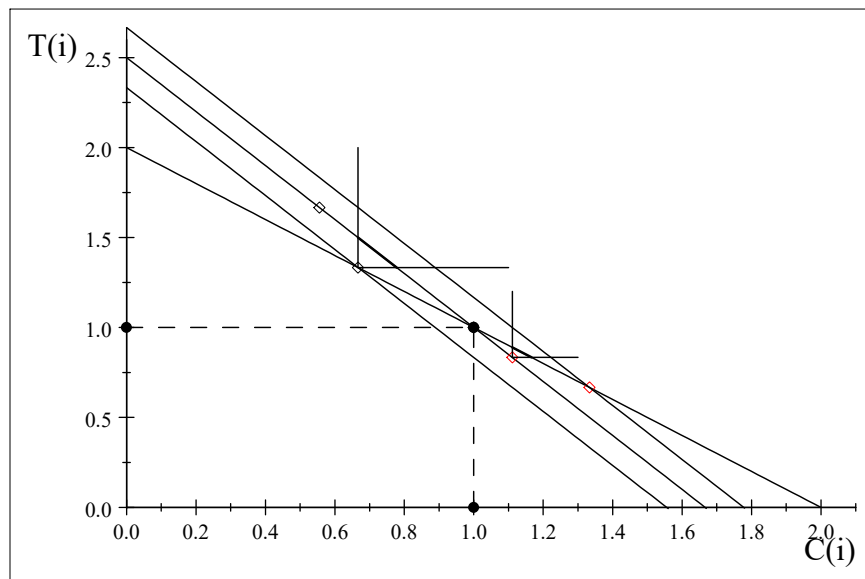
Andy black pts, Bobby red pts

Answer: Andy preferred #2 in autarky. With free trade, his budget constraint is line C. He could choose any point along line C, some of which (depicted by the thick line segment on line C northeast of #2) consist of more of both coffee and tea. So Andy *could* pick a coffee-tea pair that is more preferred than #2. He might pick a point like #1, which has less coffee and more tea than #2, but we know-because he picked it-that it must be preferred to any of the points in the thick line segment northeast of #2, which are in turn preferred to #2. Andy must be better off.

Bob: His most-preferred point in free trade is #4. The thick line segment along line A northeast of #4 shows pars of coffee and tea that Bob could have picked in autarky, and any of them would be more preferred than #4 (more is better). So any point he picked in autarky–such as #5–must be more preferred than any of the points in the thick line segment northeast of #4. Hence, #5 must be more preferred than #4. Bob loses.

4. Now imagine that Andy and Bob had traded in autarky and had gotten their preferred amounts of coffee and tea, but before consuming anything they were allowed to trade in the "world" economy at $p_{FT} = 1.5$ This is depicted in the above diagrams by depicting lined B and D going through

their autarkic equilibrium consumption points, respectively, but with slope $p_{FT} = 1.5$. Make the argument that both Andy and Bob must be better off in this new free-trade scenario than they would have been in autarky.

Money and nominal prices

Consider an endowment economy in which there are two commodities, C and T. The relative price $\frac{P_C}{P_T}$ is found by our usual methods, and turns out to be one (1), i.e., $\frac{P_C}{P_T} = 1$.

This economy is not a barter economy, but rather all transactions are carried out with money. The demand for money is this economy is given as

$$L^D = kP_I \cdot Y.$$

We assume $Y = 1$, $k = \frac{1}{2}$, and $P_I = P_I$ is a **price index** expressed as

$$P_I = \frac{1}{4}P_C + \frac{3}{4}P_T.$$

Hence, money demand for this economy is given as

$$L^D = \overbrace{\left(\frac{1}{2}\right)}^{k} \cdot \overbrace{\left(\frac{1}{4}P_C + \frac{3}{4}P_T\right)}^{P_I} \cdot \overbrace{(1)}^{Y}$$
$$= \frac{1}{2}P_I$$
$$= \frac{1}{2}\left(\frac{1}{4}P_C + \frac{3}{4}P_T\right).$$

Money supply, $\bar{L}^s$, is exogenous and equal to three (3).

1. What is the value of P_I?

   A: Equate money demand to money supply, solve:
   $$\frac{1}{2}P_I = 3;$$
   $$P_I = 6.$$

2. What are the values of P_C and P_T?

   A: We know
   $$\frac{P_C}{P_T} = 1;$$
   $$P_C = P_T.$$

Hence,
$$P_I = \frac{1}{4}P_C + \frac{3}{4}P_T$$
$$= P_C.$$
$$P_I = 6.$$

So,

$$P_T = P_C = 6.$$

Travels and other

1. Rivoli argues that in the absence of slavery, cotton production in the US South would have been much more difficult. What are her arguments about why a free labor market would not have worked?

A: The availability of almost-free land on the frontier made owning your own farm preferable to the kind of regimented hard work–and ready availability throughout the year at intermitten and somewhat random times– necessary for cotton production (indentured servitude had problems because of this). What difference did race make?

2. Where was the competition? Why were India and China not competitors with the Antebellum US south in cotton production?

Broadly speaking, no property rights which implies no incentives to be productive (produce Eli Whitney's). Also kleptocracy. Both China and India had things similar to slavery, but didn't have the incentives available to be a cotton-producing dynamo.

3. Look at graph on page 34. What can you say about the *relative* price of cotton vis a vis the price of a basket of other goods (The CPI) over the time span covered?

4. Modern agricultural subsidies in the US were part of the "New Deal" policies of the FDR administration implemented during the Great Depression (see page 33).

a. One program paid farmers **not** to plant. What intended and perhaps non-intended consequences arose from this?

effects on prices, effects on sharecroppers, tractor substitution.

b. Speculate on why these policies have remained long past the end of the Great Depression.

Look ahead to "dogs snarling together" (start of chapter 10) for some ideas.

5. The Farm Bill of of 2008: How did it pass in the face of widespread calls for reform?

p. 62. This is an excellent example of "logrolling," which helped get the Smoot-Hawley bill passed

6. p. x: "Who made your t-shirt? Was it a child ... chained to a sewing machine ... ?" This comment from a Georgetown student started Rivoli on her project. Did she find coercion, i.e., chaining people to their sewing machines? Could you argue there was exploitation? What might coercion or

exploitation mean if not actual chains? Are University football student-athletes exploited?

This is pretty open ended.

7. How are markets affected by transportation costs and/or tariffs? Do these factors affect one party more or less than the other? If so, in what situations?