

Problem Sets 5

1. The classical dichotomy and the neutrality of money: The classical dichotomy is the separation of real and nominal variables. The following questions test your understanding of this distinction.

Taia divides all of her income between spending on puzzle books and macchiatos. In 2012, she earned an hourly wage of \$28.00, the price of a puzzle book was \$7.00, and the price of a macchiato was \$4.00.

- 1) Which of the following give the real value of a variable? Check all that apply.
 - A) Taia's wage is \$28.00 per hour in 2012.
 - B) The price of a puzzle book is 1.75 macchiatos in 2012.
 - C) Taia's wage is 7 macchiatos per hour in 2012.
- 2) Which of the following give the nominal value of a variable? Check all that apply.
 - A) Taia's wage is 4 puzzle books per hour in 2012.
 - B) The price of a macchiato is \$4.00 in 2012.
 - C) Taia's wage is \$28.00 per hour in 2012.
- 3) Suppose that the Fed sharply increases the money supply between 2012 and 2017. In 2017, Taia's wage has risen to \$56.00 per hour. The price of a puzzle book is \$14.00 and the price of a macchiato is \$8.00.
 - A) In 2017, what is the relative price of a puzzle book?
 - B) Between 2012 and 2017, what happen to the nominal value of Taia's wage? her real wage?
 - C) Does monetary neutrality apply to Taia's experience? Explain.

2. Velocity and the quantity equation

Consider a simple economy that produces only air fryers. The following table contains information on the economy's money supply, velocity of money, price level, and output. For example, in 2019, the money supply was \$240, the price of an air fryer was \$10.00, and the economy produced 600 air fryers. Fill in the missing values in the following table

Year	Quantity of Money		Price Level		Quantity of Output		Nominal GDP	
	(Dollars)	Velocity of Money	(Dollars)		(Air fryers)		(Dollars)	
2019	240		10.00		600			
2020	252	25			600			

The money supply grew at a rate of _____ from 2019 to 2020. Since air fryer output did not change from 2019 to 2020 and the velocity of money _____, the change in the money supply was reflected _____ in changes in the price level. The inflation rate from 2019 to 2020 was _____.

3. Using money creation to pay for government spending

Consider Katmai, a hypothetical country that produces only salmon burgers. In 2019, a salmon burger is priced at \$7.00. *Complete the first row of the table with the quantity of salmon burgers that can be bought with \$500. Hint:* In this problem, assume it is not possible to buy a fraction of a salmon burger, and always **round down** to the nearest whole salmon burger. For example, if your calculations result in 1.5 salmon burgers, the answer should be 1 salmon burger.

	Price of a Salmon burger	Salmon burgers Bought with \$500
Year	(Dollars)	(Quantity)
2019	7.00	
2020		

Suppose the government of Katmai cannot raise sufficient tax revenue to pay its debts. In order to meet its debt obligations, the government prints money. As a result, the money supply rises by 30% by 2020. Assuming monetary neutrality holds, complete the second row of the table with the new price of a salmon burger and the new quantity of salmon burgers that can be bought with \$500 in 2020. The impact of the government's decision to raise revenue by printing money on the value of money is known as the _____.

4. Inflation-induced tax distortions

Chris receives a portion of his income from his holdings of interest-bearing U.S. government bonds. The bonds offer a real interest rate of 4.5% per year. The nominal interest rate on the bonds adjusts automatically to account for the inflation rate. The government taxes nominal interest income at a rate of 10%. The following table shows two scenarios: a low-inflation scenario and a high-inflation scenario. *Given the real interest rate of 4.5% per year, find the nominal interest rate on Chris's bonds, the after-tax nominal interest rate, and the after-tax real interest rate under each inflation scenario.*

Inflation	Real Interest	Nominal Interest	After-Tax Nominal Interest	After-Tax Real Interest
Rate	Rate	Rate	Rate	Rate
(Percent)	(Percent)	(Percent)	(Percent)	(Percent)
3.0	4.5			
9.5	4.5			

Compared with lower inflation rates, a **higher** inflation rate will _____ the after-tax real interest rate when the government taxes **nominal** interest income. This tends to _____ saving, thereby _____ the quantity of investment in the economy and _____ the economy's long-run growth rate.