ECON 1550   Problem Set 2

Spring 2026   **Due:** February 11, 2026 at 11:59pm ET

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Submission:	Canvas or Gradescope

Instructions

- When submitting to Gradescope, indicate the page where each question is answered to avoid a 5-point deduction.

- Full credit is given for correct answers. If multiple steps are needed, you must show them to get full credit.

- Points are shown for each part. Partial credit is given for partially correct answers; show your work to maximize it.

- Late submissions receive a score of zero.

- If you have technical problems submitting, email your work to the Head TA before the deadline.

- Collaboration with classmates is encouraged; use of generative AI is permitted but discouraged.

- You must write, understand, and submit your solutions individually. Copying other students' or AI-generated answers, even fragments, is not allowed.

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1. **Chapter 2: National Income Accounting and the Balance of Payments (45 points)**

   (a) [20 points] Please answer Question 2 from Chapter 2 of the textbook, reproduced here for convenience:

   "Equation (2-2) tells us[1] that to reduce a current account deficit, a country must increase its private saving, reduce domestic investment, or cut its government budget deficit. Nowadays, some people recommend restrictions on imports from China (and other countries) to reduce the American current account deficit. How would higher U.S. barriers to imports affect its private saving, domestic investment, and government deficit? Do you

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   [1]Equation (2-2) is

   $$S^p = I + CA - S^g = I + CA - (T - G) = I + CA + (G - T),$$

   where S^p is private savings, I is investment, CA is the current account, S^g is government savings, T are taxes and G is government spending.

agree that import restrictions would necessarily reduce a U.S. current account deficit?"

(b) [25 points] Question 10 from Chapter 2 of the textbook states:

"If you go to the BEA website for "U.S. International Transactions", table 1.1, you will find that in 2015, U.S. income receipts on its foreign assets were \$ 775.85 billion (line 6), while the country's payments on liabilities to foreigners were \$ 582.47 billion (line 14). Yet we saw in this chapter that the United States is a substantial net debtor to foreigners. How, then, is it possible that the United States received more foreign asset income than it paid out?"

In this question, we work through an updated version. There have been some interesting developments since 2015!

Go to FRED (Federal Reserve Economic Data) at https://fred.stlouisfed.org and plot the series "Balance on primary income" with series ID IEABCPI. Then answer the following:

1. Give one concrete example that would contribute to the time series positively (make the balance on primary income larger) and one that would contribute negatively (make it smaller).

2. List all quarters in which the balance on primary income is positive.

3. The United States is a substantial net debtor to foreigners. How, then, is it possible that the United States received more foreign asset income than it paid out?

4. Go to the BEA website at https://www.bea.gov/itable/ and find Table 1.1 U.S. International Transactions. For the year 2024, report the values of primary income receipts (line 6) and primary income payments (line 14). Compute the annual balance on primary income by subtracting payments from receipts. Compare this annual balance to the sum of the four quarterly values from the FRED series for 2024. Do they match? Are they expected to match? <u>Hint</u>: Finding the numbers should take, at most, 5 minutes. The need to poke around a bit (rather than giving you the exact link) is built into this problem intentionally so that you gain some familiarity with international account statistics.

5. If you had taken this course in 2023, the textbook's 2015 framing would still have applied, with over two decades of positive values for the time series. The magnitude of the 2024-Q3 value (a deficit of \$21 billion) is particularly noteworthy. Do some research and try to pinpoint the causes behind this large deficit.

Keep it short and concrete. This question will be graded on effort rather than correctness.

2. **Review of Intermediate Macro: Labor Market and Phillips Curve (55 points)**

Consider the following model of the labor market:

Labor force	L
Employment	N
Wage setting	$W = P^e(1 - u)$
Price setting	$P = (1 + \mu)W(1 + \tau)$
Production function	$Y = N$

In the equations above, W is the nominal wage, P^e is the expected price level, u is the unemployment rate, P is the price level, μ is the markup, τ is a labor tax, and Y is output.

The labor tax τ is paid by firms that hire workers. If firms hire workers for a nominal wage W, they must pay τW to the government.

In the short run, the exogenous variables are L, μ, τ, P^e, and Y, while the endogenous variables are N, W, u, P.

In the medium run, the exogenous variables are L, P, μ, and τ, while the endogenous variables are N, W, u, P^e, and Y. In the medium run, the expected price level P^e is determined by $P^e = P$.

(a) [5 points] Write an equation for the unemployment rate, u, in terms of the labor force L and employment N. Is this equation an identity, a behavioral equation, or an equilibrium condition?

(b) [5 points] Solve the model in the short run.

Hint: Recall that "solving the model" means to write all endogenous variables in terms of exogenous variables only.

(c) [5 points] Solve the model in the medium run.

(d) [5 points] How do u, P, P^e, and Y respond to an increase in the labor tax τ in the short run? Give economic intuition for your answer.

(e) [5 points] How do u, P, P^e, and Y respond to an increase in the labor tax τ in the medium run? Give economic intuition for your answer.

(f) [5 points] We now introduce subscripts to keep track of the value of variables at different points in time. For a variable x, we denote its value at time t by x_t. For example, P_t is the price level at time t. We assume all variables can change over time (so we add time subscripts to all variables).

Inflation and expected inflation are defined by:

$$\pi_t \equiv \frac{P_t - P_{t-1}}{P_{t-1}}$$

$$\pi_t^e \equiv \frac{P_t^e - P_{t-1}}{P_{t-1}}$$

The non-linear Phillips Curve. Using your answers from parts (a) and (b), give an expression for inflation π_t only as a function of π_t^e, μ_t, u_t, and τ_t.

(g) [5 points] Show that the expression you found in part (f) can be written as:

$$\frac{1 + \pi_t}{1 + \pi_t^e} = \frac{1 - u_t}{1 - u_t^n}$$

where u_t^n is the medium-run unemployment rate that you found in part (c), also called the natural rate of unemployment.

(h) [5 points] The Phillips Curve. Show that when π_t, π_t^e, u_t, and u_t^n are small enough, a good approximation to the expression given in part (g) is:

$$\pi_t = \pi_t^e - (u_t - u_t^n)$$

Hint: Use that when x and y are small enough,

$$\frac{1 + x}{1 + y} \approx 1 + x - y$$

is a good approximation.

(i) [5 points] From now on, assume that the labor force is always $L = 1$.

Show that the Phillips Curve from part (h) can also be written as:

$$\pi_t = \pi_t^e - (Y_t - Y_t^n)$$

where Y_t^n is the medium-run level of output that you found in part (c), also called the natural level of output or potential output.

(j) [5 points] Assume the economy is initially at its medium-run equilibrium with $P = 1$. Then, the government increases labor taxes from τ to τ^{new} (with $\tau < \tau^{new}$). Immediately after the increase in τ, the economy jumps to its short-run equilibrium. Keep assuming that $L = 1$ at all times. The variables μ, P^e, and Y that are exogenous in the short inherit their value from the initial medium-run equilibrium.

Is inflation π_t in the short-run equilibrium positive, negative, or zero? Give intuition for why.

Hint: Use your previous answers.

(k) [5 points] Find expected inflation π_t^e in the short-run equilibrium. Is expected inflation positive, negative, or zero? Give intuition for why.

Hint: Use the Phillips Curve.