

Problem Sets 4

Note: Choose five questions out of six and extra credit will be given for extra work done correctly.

1. Purchasing Power Parity and Exchange Rate Forecast

Suppose the current dollar–pound exchange rate is \$1.5 per pound. A U.S. basket that costs \$100 would cost \$120 in the United Kingdom. For the next year, the Federal Reserve is predicted to keep U.S. inflation at 2% and the Bank of England is predicted to keep U.K. inflation at 3%. The speed of convergence to absolute PPP is 15% per year.

- 1) What is the expected U.S. minus U.K. inflation differential for the coming year?
- 2) What is the current U.S. real exchange rate, $q_{\$/\pounds}$, with the U.K.?
- 3) How much is the dollar overvalued/undervalued?
- 4) What do you predict the U.S. real exchange rate with the U.K. will be in one year's time?
- 5) What is the expected rate of real appreciation for the U.S. (versus the U.K.)?
- 6) What is the expected rate of nominal appreciation for the U.S. (versus the U.K.)?
- 7) What do you predict will be the dollar price of one pound a year from now?

2. Consider the relationship between the Japanese yen (¥) and U.S. dollar (\$). Let the exchange rate be defined as \$ per ¥, $E_{\$/¥}$. Apply the money market – foreign exchange market diagrams to answer the following questions. On all graphs, label the initial equilibrium point A.

- 1) Illustrate how a temporary decrease in Japan's money supply affects the money and FX markets. Label your short-run equilibrium point B and your long-run equilibrium point C.
- 2) Refer to the diagram from (1), state how each of the following variables changes in the short run (increase/decrease/no change): U.S. interest rate, Japanese interest rate, spot exchange rate E, expected future exchange rate F, and U.S. price level.
- 3) Refer to the diagram from (1), state how each of the following variables changes in the long run (increase/decrease/no change relative to their initial values at point A): U.S. interest rate, Japanese interest rate, E, F, and U.S. price level.
- 4) Suppose the decrease in Japan's money supply is considered as permanent and monetary policy is credible. Would the exchange rate overshoot in the short run? Apply the money market – foreign exchange market diagram to analyzing the short-run exchange rate equilibrium and long-run adjustments of Japanese price level and exchange rate.
- 5) According to the PPP theory of long run exchange rate determination, what would happen to exchange rate if money supply is decreasing permanently, is it consistent with the mechanism of long-run adjustment in (4)?

3. Exchange Rate and Open Economy: Keynesian DD-AA Model

- 1) Apply the DD-AA model to analyze the effect of 2018 U.S. trade war on U.S. economy. Consider both a temporary and permanent import tariff, respectively.
- 2) During the passage of the U.S. fiscal stimulus bill of February 2009, many members of Congress demanded “buy American” clauses, which would have prevented the government from spending money on imported goods. According to DD-AA model, would U.S. government spending constrained by “buy American” restrictions have had a bigger effect on U.S. output than unconstrained U.S. government spending? Why or why not?
- 3) Suppose U.S. Congress passes a constitutional amendment requiring the government to maintain a balanced budget at all times. Thus, if the government wishes to change government spending, it must always change taxes by the same amount, that is, $\Delta G = \Delta T$. Does the constitutional amendment imply that the government can no longer use fiscal policy to affect employment and output? (Hint: Analyze a “balanced-budget” increase in government spending, one that is accompanied by an equal tax hike.)

4. A simple mathematical version of the DD-AA model can be constructed as follows:

Consumption function: $C=(1-s)Y$, where s is the savings rate, or marginal propensity to save.

Current account function: $CA=aE-mY$, where m is marginal propensity to import.

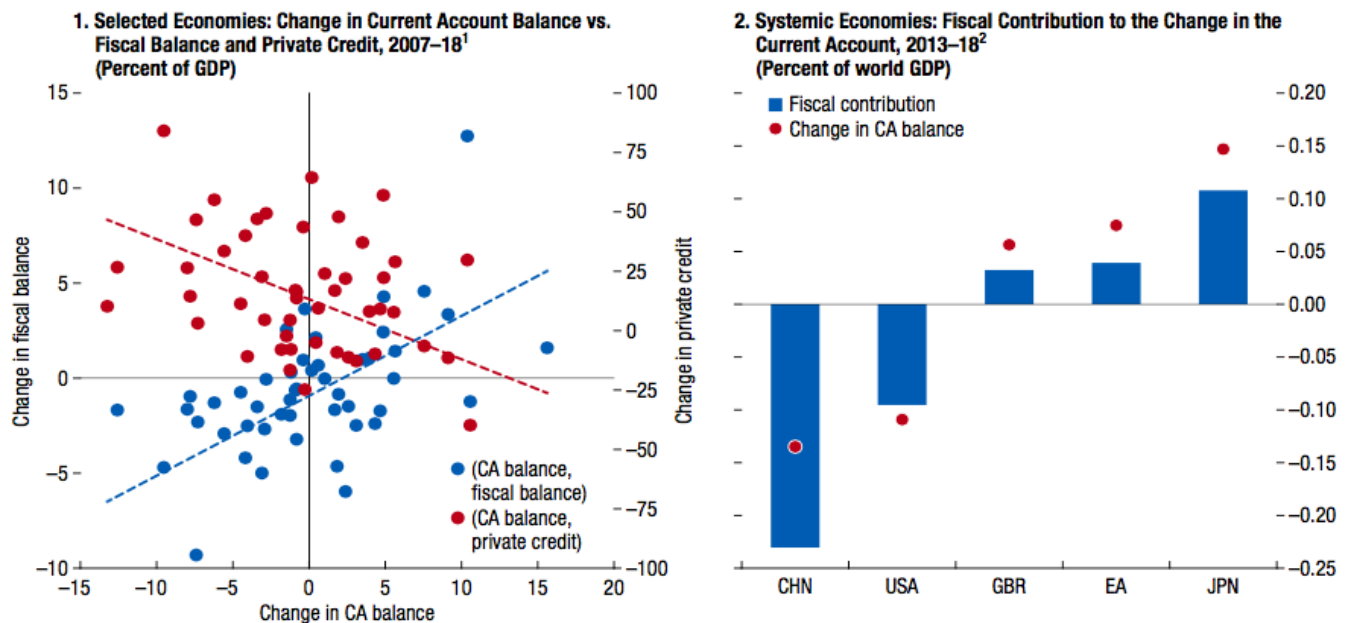
Output market equilibrium: $Y=C+I+G+NX=(1-s)Y+I+G+aE-mY$

Money market equilibrium: $M/P=bY-dR$, where b and d are liquidity preference coefficients.

Suppose that the central bank can hold both the interest rate R and the exchange rate constant, private investment I is also constant, what is the effect of an increase in government spending G on equilibrium output Y ?

5. All else equal, a country’s currency depreciates while its current account worsens. What data might you look at to decide whether you are witnessing a J-curve effect? What other macroeconomic change might bring about a currency depreciation coupled with a deterioration of the current account, even if there is no J-curve effect?

6. According to the 2019 IMF External Sector Report (ESR), the decline and reconfiguration of current account balances over the past decade reflect a combination of macroeconomic policies and terms-of-trade effects. Fiscal policy and credit conditions have been key drivers of current account dynamics since the crisis, such that economies with tight (easy) fiscal policies and credit contractions (expansions) have generally experienced an increase (decline) in their current account balances. The graphs below present some data evidence for the role of fiscal and credit policy driving the current account.



Sources: Bank for International Settlements; IMF, *World Economic Outlook*; World Bank, Global Financial Development Database; and IMF staff calculations.

Note: Data labels use International Organization for Standardization (ISO) country codes. CA = current account; EA = euro area.

¹Panel 1 comprises all 49 economies in the External Balance Assessment (EBA) model.

²The fiscal contribution is calculated by multiplying the coefficient on the fiscal balance from the EBA current account model with the change in the fiscal balance relative to world GDP between 2013–18. Fiscal balance refers to the cyclically adjusted general government balance.

- 1) In the period of 2007 to 2018, for a dataset of 49 economies, why is there a positive correlation between a change in fiscal balance and a change in CA? Why is there a negative correlation between a change in private credit and a change in CA. Apply national income identity to explain.
- 2) Apply the DD-AA-XX model to explain the correlation in the left graph between fiscal balance and current account balance.
- 3) Apply the DD-AA-XX model to explain the correlation in the left graph between private credit and current account balance.
- 4) Summarize the research findings in the right graph on the quantitative relation between fiscal policy and the change in the CA. What data were used to produce the research findings?
- 5) To report the right graph, economists at IMF construct an econometric model and estimate the fiscal contribution to the change in the CA. Can you write down a simple model to estimate such effects? [Hint: in the regression model, the estimated contribution from fiscal policy shall be unbiased by taking into account other major drivers of the CA.]