

International Finance: Lecture 6

Exchange Rate and Open-Economy

Biwei Chen

Bchen@binghamton.edu

Department of Economics
Harpur College · Binghamton University

Exchange Rate Models: Roadmap

- ① In the previous lecture on exchange rate determination, it connects the dots between exchange rates, interest rates (IRP), and price levels (PPP) from the asset approach and monetary approach.
- ② In those models, it is assumed that output levels were determined outside of the model. In effect, exchange rates, interest rates, and price levels may also affect output.
- ③ How are output and the exchange rate determined in the short run?
- ④ In this lecture, by combining a model of the output market with models of the foreign exchange and money markets, we will build a model that explains the short-run behavior of all the important macroeconomic variables in an open economy.
- ⑤ The long-run exchange rate model of PPP provides the framework that participants in the asset markets use to form their expectations about future exchange rates.

Exchange Rate and Open-Economy Models

- Long-run models are useful when all prices of inputs and outputs have time to adjust. In the short run, some prices of inputs and outputs may not have time to adjust, due to labor contracts, menu costs, or imperfect information about willingness of customers to pay at different prices.
- This lecture builds on the short-run and long-run models of exchange rates to explain how output is related to exchange rates in the short run.
- Because output changes may push the economy away from full employment, the links among output and other macroeconomic variables, such as the merchandise trade balance and the current account, are of great concern to economic policy makers.
- It shows how macroeconomic policies can affect production, employment, and the current account.

Outline

1 National Output Determination

2 Open-Economy Macro Policies

3 Current Account Adjustments

Keynesian Theory of Macroeconomy ^(w)

Keynesian economics is a theory of total spending in the economy (called aggregate demand) and its effects on output and inflation. Key tenets:

- ① Aggregate demand is influenced by a host of economic decisions, both public and private, and sometimes behaves erratically.
- ② Changes in aggregate demand, whether anticipated or unanticipated, have their greatest short-run effect on real output and employment, not on prices. $Y^* = AS = AD$ in the short run.
- ③ Prices, and especially wages, respond slowly to changes in supply and demand, resulting in periodic shortages and surpluses, especially of labor. The typical level of unemployment is not ideal, partly because unemployment is subject to the caprice of aggregate demand, and partly because prices adjust only gradually.
- ④ Many Keynesians advocate activist stabilization policy to reduce the amplitude of the business cycle.

<https://www.econlib.org/library/Enc/KeynesianEconomics.html>

Open-Economy Aggregate Demand for Real Output

In an open economy, aggregate demand is the total amount of goods and services that domestic and foreign individuals and institutions are willing and able to buy from the region.

$$Y = C + I + G + NX = C(Y - T) + I + G + (EX - IM)$$

- ① Consumption, as affected by disposable income, $Y-T$.
- ② Investment, as determined by interest rate.
- ③ Government spending, as assumed exogenous.
- ④ Net export, as driven by exchange rate and disposable income.

$$NX = TB = EX - IM \approx CA(RE, Y - T) = CA(E * P_F / P_H, Y - T)$$

Net export is net foreign demand for domestic goods and services.

- ① $RE \uparrow \Rightarrow CA \uparrow$ and $RE \downarrow \Rightarrow CA \downarrow$
- ② $Y - T \uparrow \Rightarrow CA \downarrow$ and $Y - T \downarrow \Rightarrow CA \uparrow$

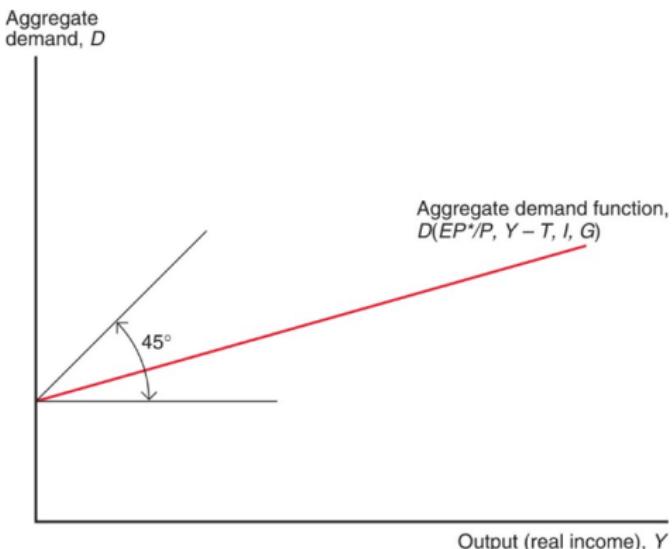
Open-Economy Aggregate Demand for Real Output

$$AD = Y = C + I + G + NX = AD(Y - T, I, G, E * P_F / P_H)$$

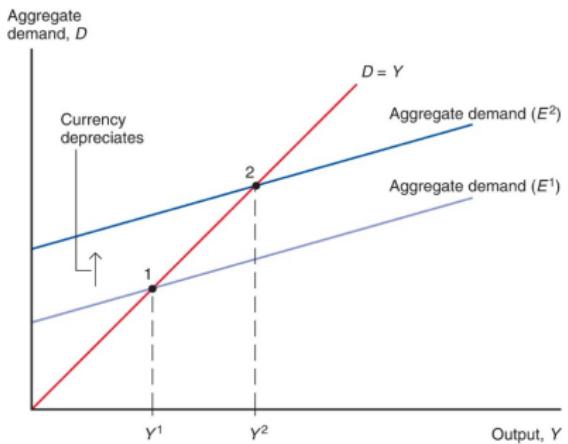
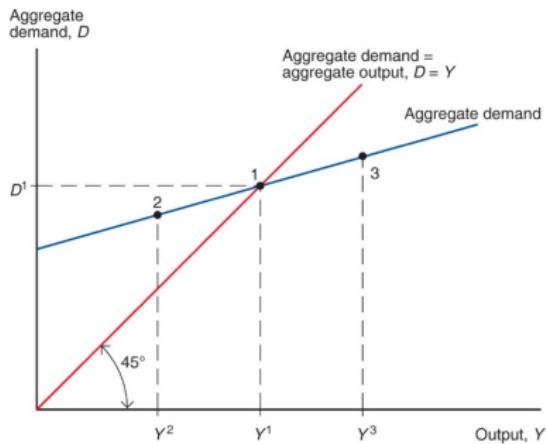
- ① Consumption: $C(Y-T)$
 - ② Capital Investment: I
 - ③ Government Spending: G
 - ④ Net Foreign Expenditure

What is the slope of AD? MPC +

Source: KOM (2018)

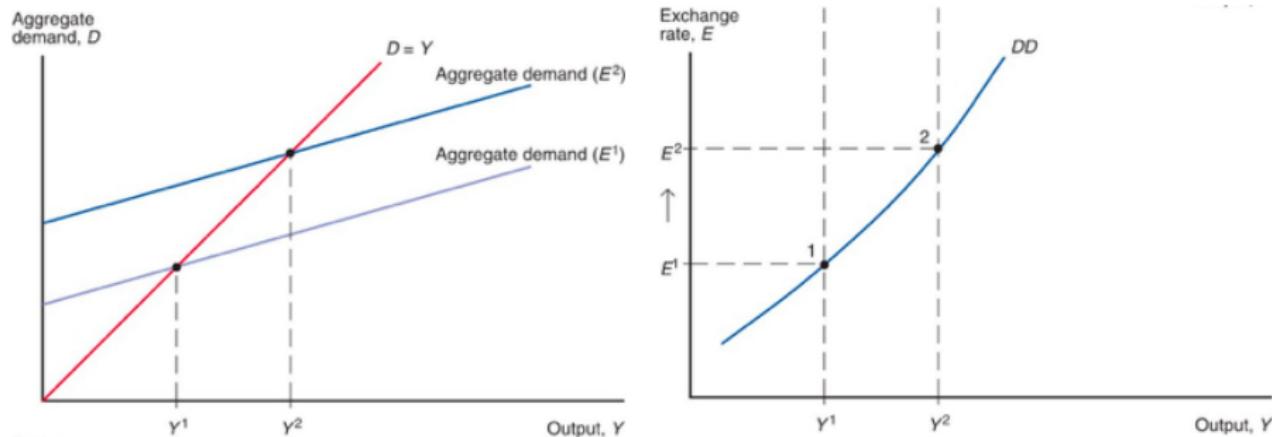


Open-Economy Output Market Equilibrium



Source: KOM (2018). Left: Keynesian cross: $AD = Y$. Right: A currency depreciation raises aggregate demand and national output ($RE \uparrow \Rightarrow Y \uparrow$).

Open-Economy Output Market Equilibrium: Derive DD



Source: KOM (2018). The DD schedule slopes upward because a rise in the exchange rate causes output to rise, all else equal ($E \uparrow \Rightarrow Y \uparrow$).

DD Curve: Driving Factors

DD: Keynesian AD-AS Equilibrium $AD = C + I + G + NX = AS$

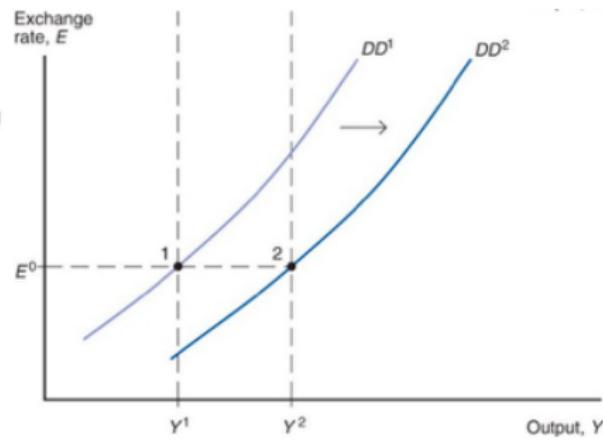
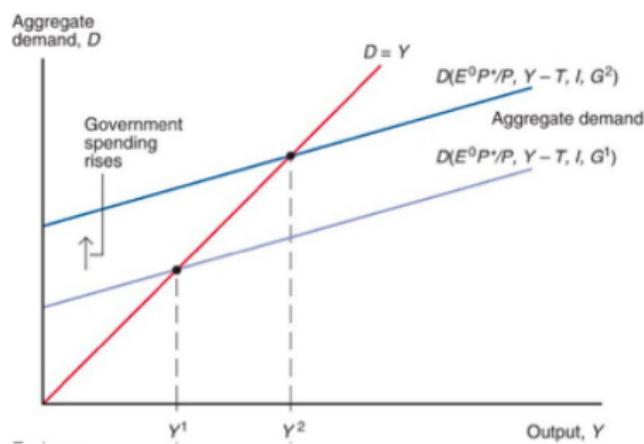
$C = C(Y - T)$ & $NX \approx CA(RE, Y - T) = CA(E * P_F/P_H, Y - T)$

All else equal, changes in the exchange rate cause movements along a DD curve, which follows the law of demand. Other factors than the exchange rate will cause DD curve (domestic output) to shift.

- ① Consumption: $C \uparrow \Rightarrow DD+$
- ② Investment: $I \uparrow \Rightarrow DD+$
- ③ Government spending: $G \uparrow \Rightarrow DD+$
- ④ Taxes: $T \uparrow \Rightarrow DD-$
- ⑤ Relative price: $(P_F/P_H) \uparrow \Rightarrow DD+$
- ⑥ Relative aggregate demand: $(AD_F/AD_H) \uparrow \Rightarrow DD-$

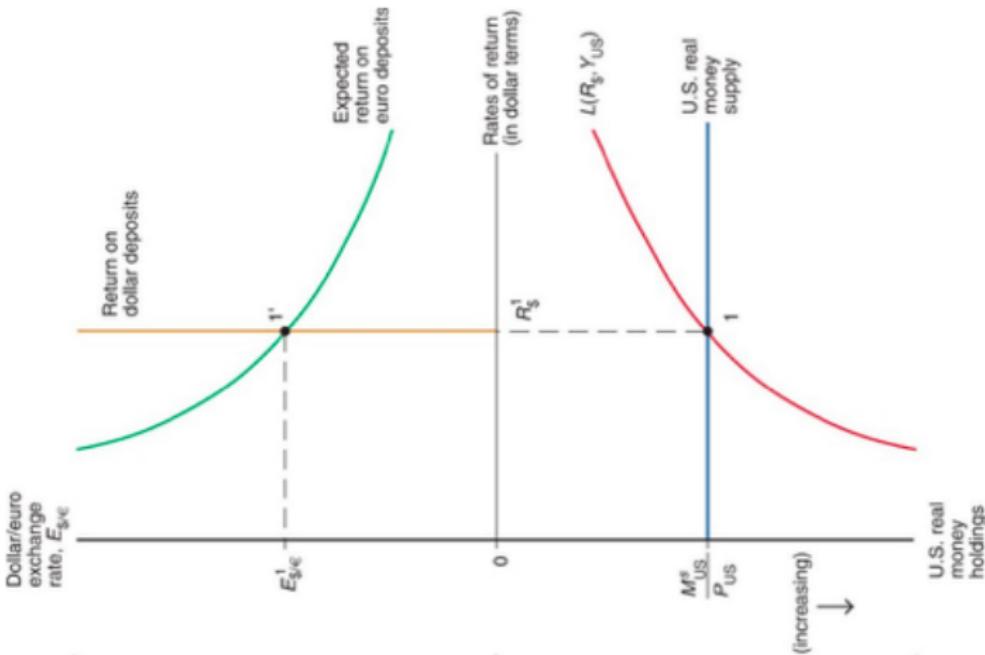
Note: " + " means shifting rightward; " - " means shifting leftward.

Open-Economy Output Market Equilibrium: DD Movement



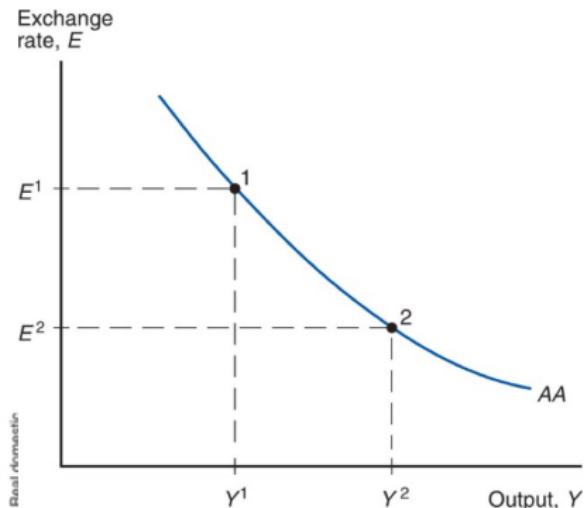
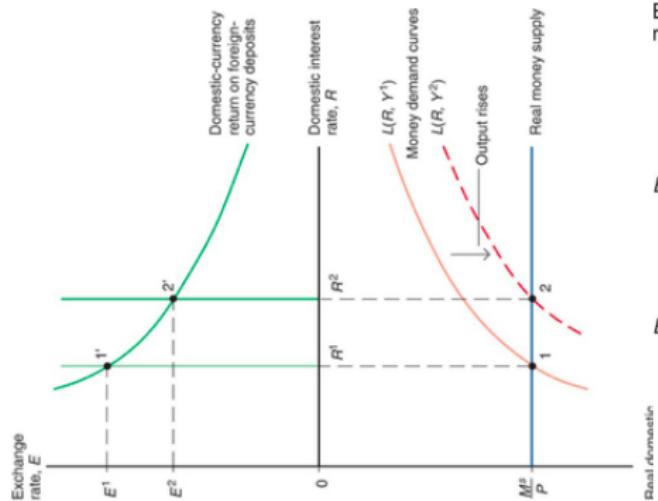
Source: KOM (2018). A rise in government spending raises output at every level of exchange rate, shifting DD to the right ($G \uparrow \Rightarrow Y \uparrow \forall E$).

Open-Economy Money-Asset Market Equilibrium



Source: KOM (2018). Foreign exchange and money market simultaneous equilibrium.

Open-Economy Money-Asset Market Equilibrium: AA



Source: KOM (2018). The asset market equilibrium schedule (AA) slopes downward because a rise in output, all else equal, causes a rise in domestic interest rate and a domestic currency appreciation ($Y \uparrow \Rightarrow R \uparrow \Rightarrow E \downarrow$).

AA Curve: Driving Factors

AA: Money Market Equilibrium $M_s/P = M_d/P = L(R, Y)$

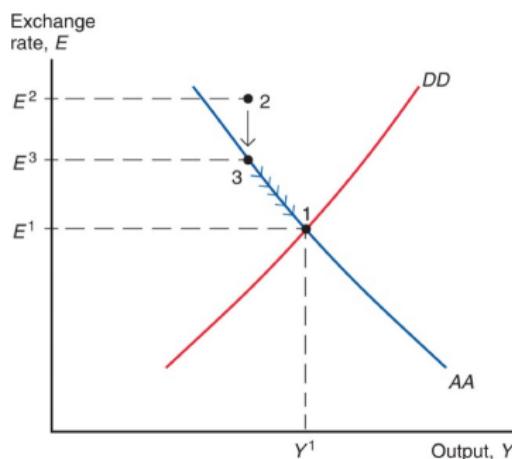
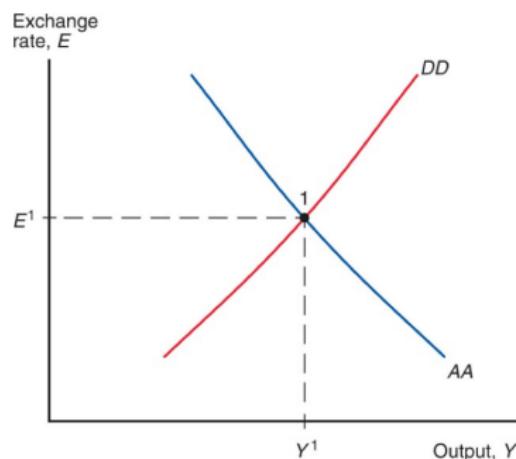
AA: FX Asset Market Equilibrium $R_H \approx R_F + (E^e - E)/E$

The inverse relationship between output and exchange rates needed to keep the foreign exchange markets and the money market in equilibrium is summarized as the AA curve.

- ① Money supply: $M_s \uparrow \Rightarrow R \downarrow \Rightarrow E \uparrow \Rightarrow AA+$
- ② Money demand: $M_d \uparrow \Rightarrow R \uparrow \Rightarrow E \downarrow \Rightarrow AA-$
- ③ Home price level: $P \uparrow \Rightarrow R \uparrow \Rightarrow E \downarrow \Rightarrow AA-$
- ④ Foreign interest rate: $R_F \uparrow \Rightarrow E \uparrow \Rightarrow AA+$
- ⑤ Expected exchange rate: $E^e \uparrow \Rightarrow E \uparrow \Rightarrow AA+$

Note: " +" means shifting rightward; " - " means shifting leftward.

Open-Economy DD-AA (Output-Money) Equilibrium



Source: KOM (2018). The short-run equilibrium of the economy occurs at point 1, where the output market (DD curve) and the asset market (AA curve) simultaneously clear. Because asset markets adjust very quickly, the exchange rate jumps immediately from point 2 to point 3 on AA. The economy then moves to point 1 along AA as output rises to meet aggregate demand.

Outline

1 National Output Determination

2 Open-Economy Macro Policies

3 Current Account Adjustments

Macroeconomic Policies and Effects

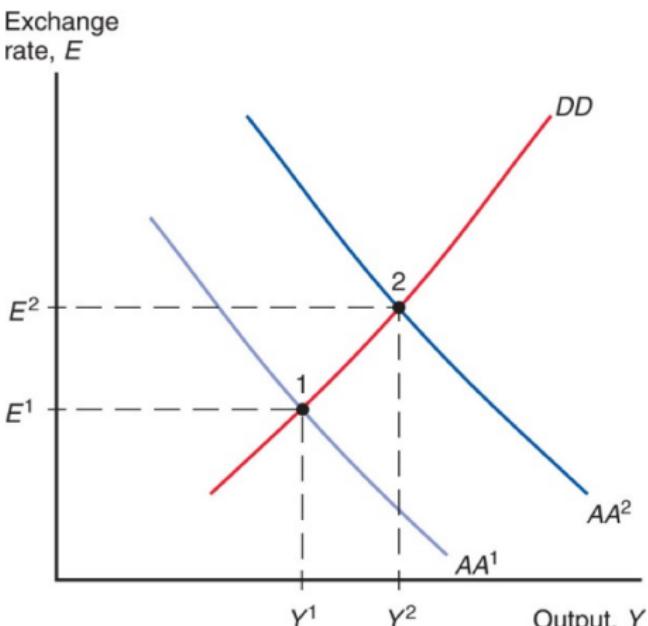
- Monetary policy: the central bank influences the supply of monetary assets. Monetary policy goals: price stability and full employment (dual mandate).
- Fiscal policy: fiscal authorities influence the amount of government purchases and taxes. Fiscal policy goals: full employment, economic growth, and price stability.
- While monetary policy is assumed to affect asset markets first, fiscal policy is assumed to affect aggregate demand and output at the beginning.
- **Temporary** policy changes are expected to be reversed in the near future and thus do not affect expectations about exchange rates in the long run, whereas **permanent** policy changes will.

Temporary Monetary Expansion

The AA-DD model shows:

- ① $M_s \uparrow \Rightarrow R \downarrow$
- ② $R \downarrow \Rightarrow E \uparrow$
- ③ AA shifts right.
- ④ $Y \uparrow$ output rises.

Domestic products relative to foreign products are cheaper, so that aggregate demand and output increase until a new short-run equilibrium is achieved.



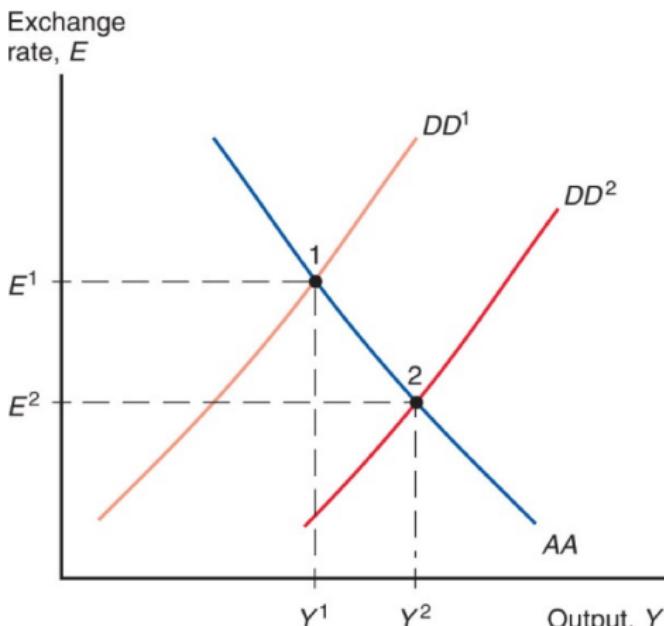
Source: KOM (2018)

Temporary Fiscal Expansion

The AA-DD model shows:

- ① $G \uparrow$ or/and $T \downarrow$
- ② DD shifts right
- ③ $Y \uparrow \Rightarrow M_d/P \uparrow$
- ④ $R \uparrow \Rightarrow E \downarrow$

Higher output increases the demand for real monetary assets, thereby increasing interest rates, causing the domestic currency to appreciate.



Source: KOM (2018)

Policy Responses in the Open Economy

To maintain balance, how should policy-makers respond in each case?

- ① Case I: Deficit in the current account; unacceptably rapid inflation.
($MP - \rightarrow P \downarrow \rightarrow EX \uparrow, IM \downarrow \rightarrow CA \uparrow, FP - \rightarrow Y \downarrow \rightarrow IM \downarrow \rightarrow CA \uparrow$)
- ② Case II: Surplus in the current account but high unemployment.
($MP +$ & $FP +$)
- ③ Case III: Deficit in the current account; unacceptably high unemployment. Expansionary policy to increase employment will worsen the current account deficit. Contractionary policy to reduce the current account deficit will worsen unemployment. The net effect is unclear.
- ④ Case IV: Surplus in the current account; unacceptably rapid inflation (unclear). Expansionary policy to reduce the current account surplus will worsen inflation. Contractionary policy to reduce the inflation rate will widen the current account surplus.

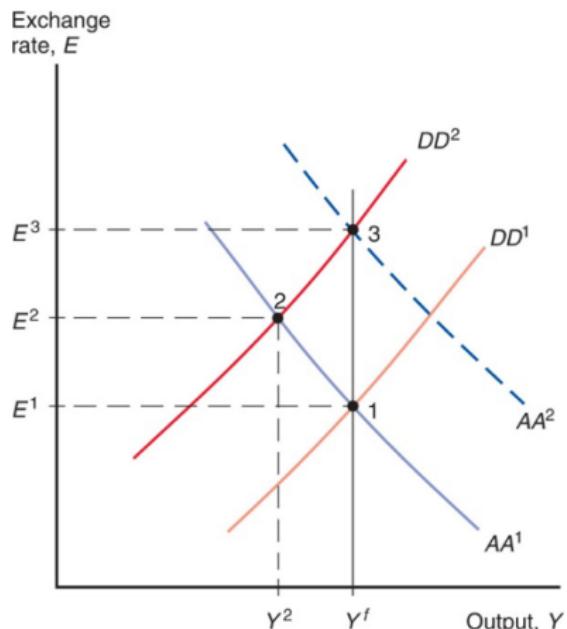
Full Employment Target and Permanent Policy Changes

- When resources are used effectively and sustainably, economists say that production is at its potential or natural level.
- Correspondingly, labor forces are in full employment (neither underemployed or overemployed).
- Policies to maintain full employment may seem easy in theory, but are hard in practice for several reasons:
 - Economic decision-makers may anticipate the effects of policy changes and modify their behavior.
 - Economic data are difficult to measure and subject to errors.
 - Policy changes take time to be implemented and effect.
 - Policies are sometimes influenced by political procedure or bureaucratic interests.
- "Permanent" policy changes are those that are assumed to modify people's expectations about exchange rates in the long run.

Policy Target and Effects after Aggregate Demand Shocks

The model shows policy reactions and effects after a decline in AD:

- ① $AD \downarrow \Rightarrow DD-$
- ② Contraction and Depreciation
 $1 \rightarrow 2 \text{ & } Y \downarrow, E \uparrow$
- ③ Fiscal expansion $\Rightarrow DD+$
 $2 \rightarrow 1 \text{ & } Y \uparrow, E \downarrow$
- ④ Monetary stimulus $\Rightarrow AA+$
 $2 \rightarrow 3 \text{ & } Y \uparrow, E \uparrow$
- ⑤ The two policies differ in their exchange rate effects in achieving full employment.

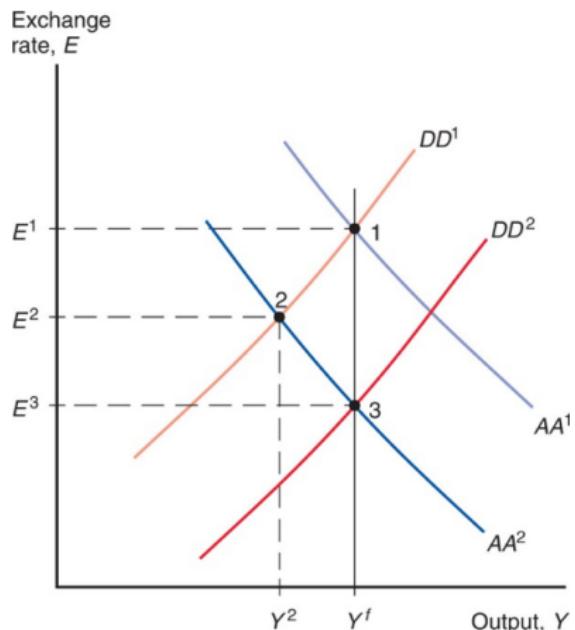


Source: KOM (2018)

Policy Target and Effects after Money Demand Shocks

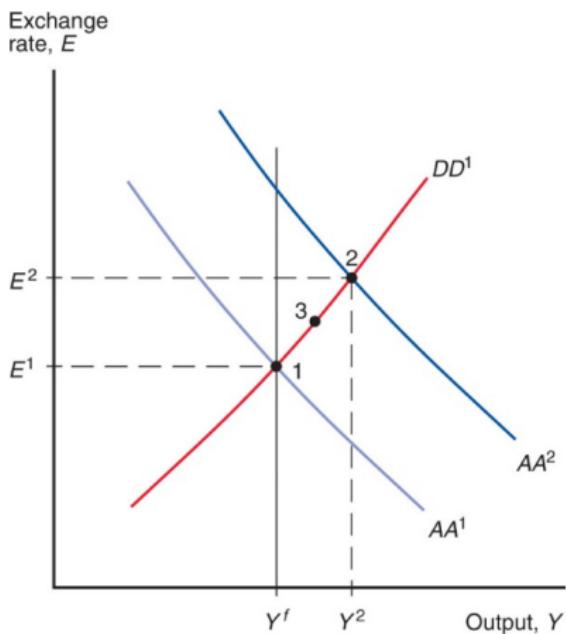
The model shows policy reactions and effects after a rise in M_d .

- ① $M_d \uparrow \Rightarrow AA-$ (Why?)
- ② Contraction and Appreciation
 $1 \rightarrow 2 \text{ & } Y \downarrow, E \downarrow$
- ③ Monetary stimulus $\Rightarrow AA+$
 $2 \rightarrow 1 \text{ & } Y \uparrow, E \uparrow$
- ④ Fiscal expansion $\Rightarrow DD+$
 $2 \rightarrow 3 \text{ & } Y \uparrow, E \downarrow$
- ⑤ The two policies differ in their exchange rate effects in achieving full employment.



Source: KOM (2018)

Monetary Policy and Permanent Effect: Short-Run

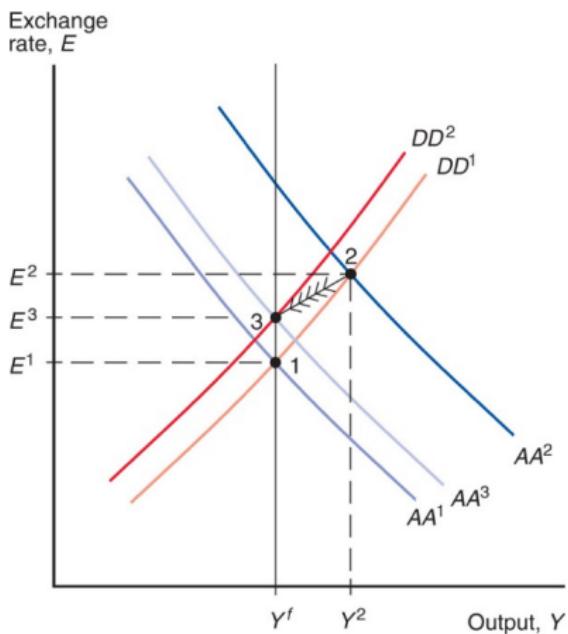


A permanent increase in the money supply along with its trigger on currency depreciation expectation, which shifts AA right and moves the economy from point 1 to 2, has stronger effects on the exchange rate and output than an equal temporary increase, which moves the economy only to point 3. Exchange rate overshoots in the short run.

$$M_s \& E^e \Rightarrow AA++.$$

Source: KOM (2018).

Monetary Policy and Permanent Effect: Long-Run



After a permanent money supply increase, employment and output rise above the natural level, a steadily increasing price and wage level will shift the DD and AA schedules to the left until a new long-run equilibrium is reached at point 3. Both output and exchange rate will adjust to their long-run levels. ($P \uparrow \Rightarrow AA - \& DD -$).

Source: KOM (2018).

Fiscal Policy and Permanent Effect

- A permanent increase in government purchases or reduction in taxes increases aggregate demand and triggers a stronger domestic currency expectation in the short run due to increased aggregate demand, thereby reducing the expected rate of return on foreign currency deposits and making the domestic currency appreciate.
- The first effect increases aggregate demand of domestic products, the second effect decreases aggregate demand of domestic products due to a more expensive currency.
- If the change in fiscal policy is expected to be permanent, the first and second effects exactly offset each other, so that output remains at its potential or natural (or long run) level.
- An increase in government fiscal stimulus can completely crowd out net exports, due to the effect of the appreciated domestic currency.

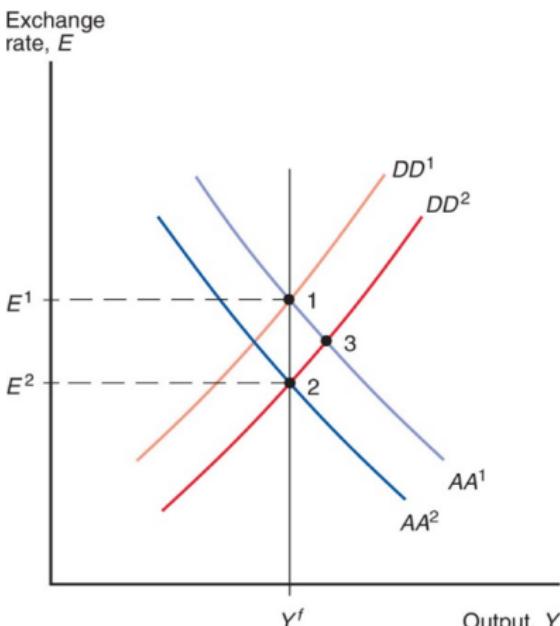
Fiscal Policy and Permanent Effect

The model shows permanent effects after a fiscal stimulus:

- ① $G \uparrow$ or/and $T \downarrow$
- ② $AD \uparrow \Rightarrow DD + (1 \rightarrow 3)$
- ③ $AD \uparrow \uparrow \Rightarrow E^e \downarrow$
- ④ $E^e \downarrow \Rightarrow AA - (3 \rightarrow 2)$
- ⑤ $Y_1 \uparrow \rightarrow Y_3 \downarrow \rightarrow Y_2 = Y_{LR}$
- ⑥ $E_1 \downarrow \rightarrow E_3 \downarrow \rightarrow E_2 \ll E_1$

Permanent effect of a fiscal stimulus in the long run:

$$E \downarrow \downarrow \text{ & } Y \uparrow \downarrow \rightarrow Y_{LR}$$

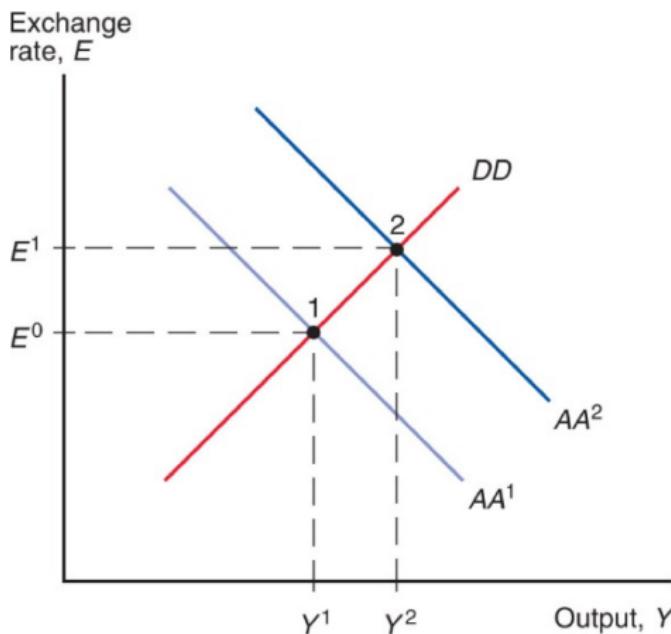


Source: KOM (2018).

Exchange Rate Policy: Devaluation and Revaluation (w)

- Depreciation and appreciation refer to changes in the value of a currency due to market changes.
- In contrast, devaluation and revaluation refer to changes in a fixed exchange rate caused by the central bank. With devaluation, a unit of domestic currency is made less valuable, so that more units must be exchanged for 1 unit of foreign currency. With revaluation, a unit of domestic currency is made more valuable, so that fewer units need to be exchanged for 1 unit of foreign currency.
- For devaluation to occur, the central bank buys foreign assets, so that domestic monetary assets increase and domestic interest rates fall, causing a fall in the rate return on domestic currency deposits.
- After the devaluation, domestic products become less expensive relative to foreign products, so aggregate demand and output increase. Official international reserve assets increase.

Exchange Rate Policy: Devaluation Effects



Devaluation and revaluation refer to changes in a fixed exchange rate caused by the central bank. When a currency is devalued from E_0 to E_1 , the economy's equilibrium moves from point 1 to point 2 as both output and the money supply expand.

Source: KOM (2018).

Exchange Rate Policy Effects

- In addition to monetary and fiscal policies, another instrument is a change in the exchange rate.
- In a fixed-but-adjustable-rate system, this can be interpreted as a change in the official parity rate. In a more flexible exchange rate system this can be interpreted as government intervention to influence the foreign exchange market.
- A country with unemployment and a current account deficit could devalue (depreciate) its currency in order to alleviate the current account problem as well as to provide economic stimulus from enhanced exports and reduced imports.
- A country with inflation and a current account surplus could revalue (appreciate) its currency to remove the surplus as well as to dampen the inflation.

Outline

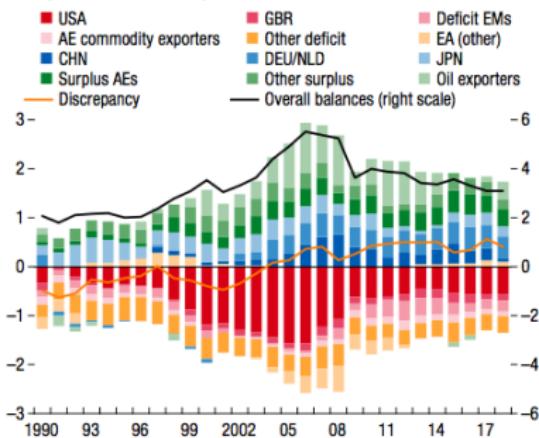
1 National Output Determination

2 Open-Economy Macro Policies

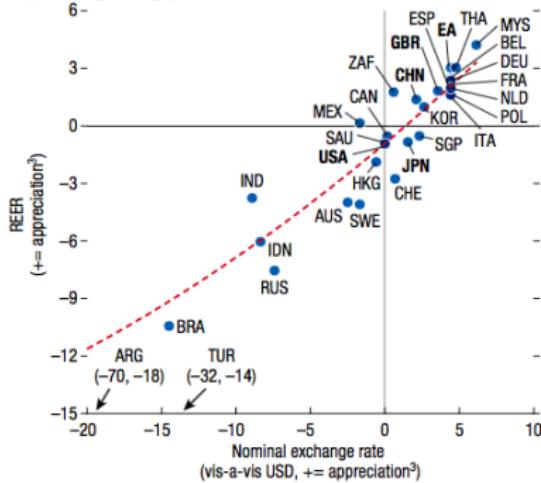
3 Current Account Adjustments

Current Account and Exchange Rates

1. Current Account Balances, 1990–2018¹
(Percent of world GDP)



2. Nominal and Real Effective Exchange Rate, 2018²
(Percentage change)



Sources: IMF, Information Notice System; IMF, *International Financial Statistics*; IMF, *World Economic Outlook*; and IMF staff calculations.

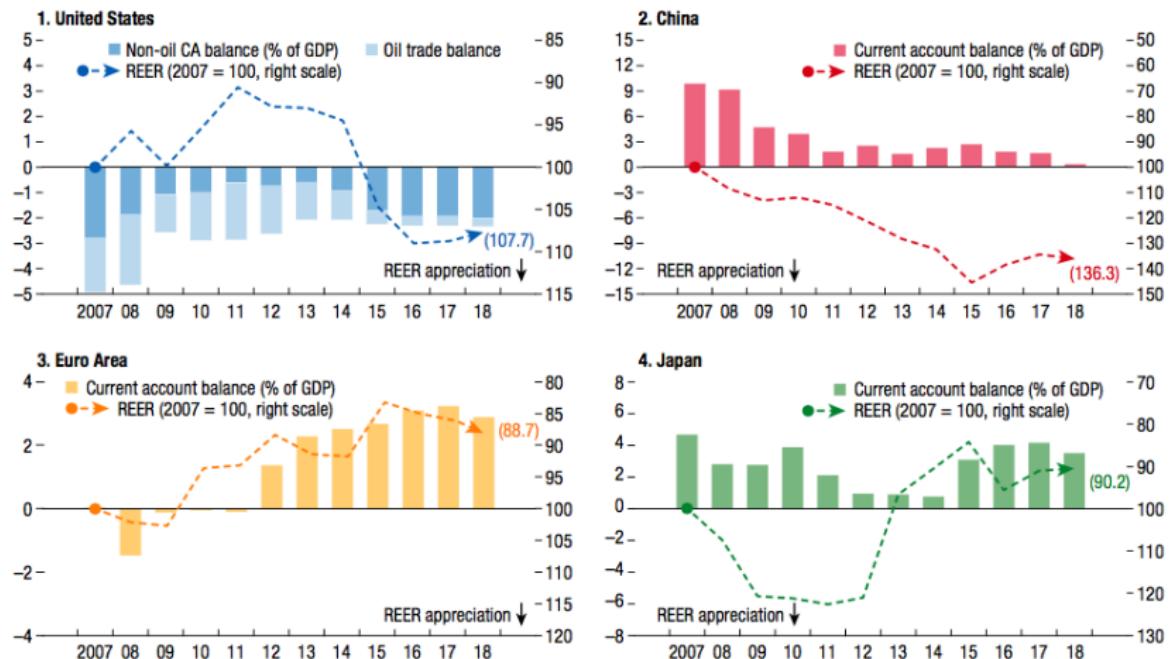
Note: Date labels in the figure use International Organization for Standardization (ISO) country codes. AEs = advanced economies; EA = euro area; EMs = emerging markets; REER = real effective exchange rate.

¹Overall balance is the absolute sum of global surpluses and deficits. AE commodity exporters comprise Australia, Canada, and New Zealand; Deficit EMs comprise Brazil, India, Indonesia, Mexico, South Africa, and Turkey; Oil exporters comprise WEO definition plus Norway; Surplus AEs comprise Hong Kong SAR, Korea, Singapore, Sweden, Switzerland, and Taiwan Province of China. Other deficit (surplus) comprise all other economies running current account deficits (surpluses).

²2018 average relative to 2017 average.

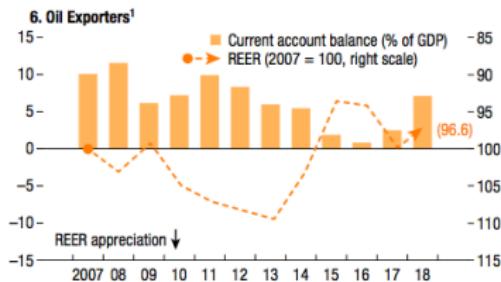
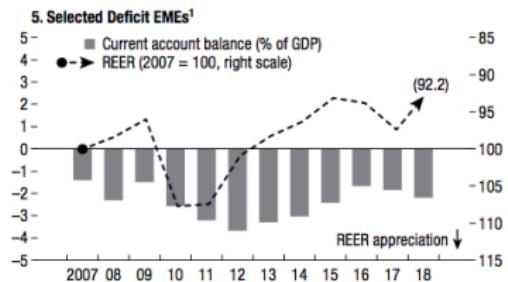
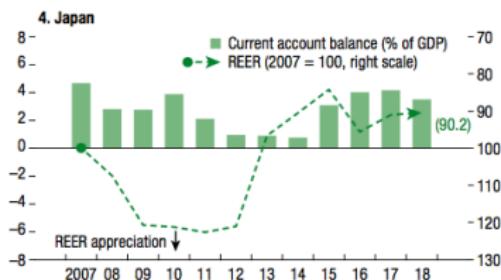
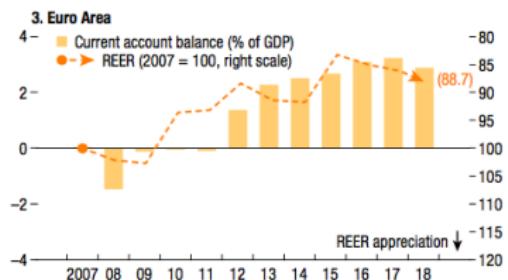
³Values larger than zero represent appreciation of the exchange rate.

Current Account and Real Exchange Rate 2007-2018



Source: IMF ESR (2019)

Current Account and Real Exchange Rate 2007-2018



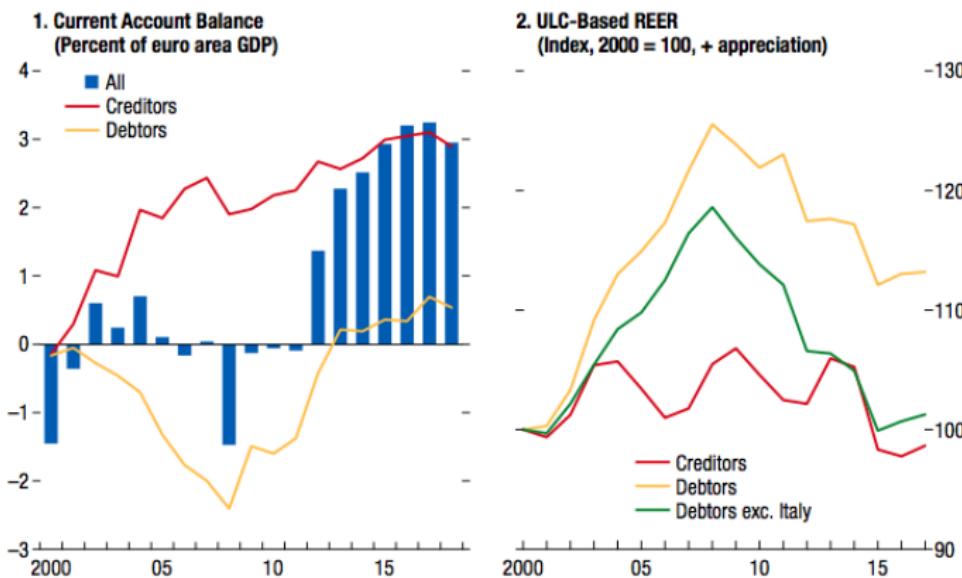
Sources: IMF, Information Notice System; and IMF, *World Economic Outlook*.

Note: CA = current account; EMEs = emerging market economies; REER = real effective exchange rate.

Numbers in parentheses report REER (2007 = 100) in 2018. Darker bars represent the non-oil CA balance (percent of GDP), which subtracts the oil trade balance from the current account balance; lighter bars represent the oil trade balance.

¹GDP-weighted average of economies. Selected deficit EMEs comprise Brazil, India, Indonesia, Mexico, South Africa, and Turkey. Oil exporters comprise Malaysia, Norway, Russia, and Saudi Arabia.

Euro Area: Current Account and REER 2000-2018



Sources: IMF, *World Economic Outlook*; and IMF staff estimations.

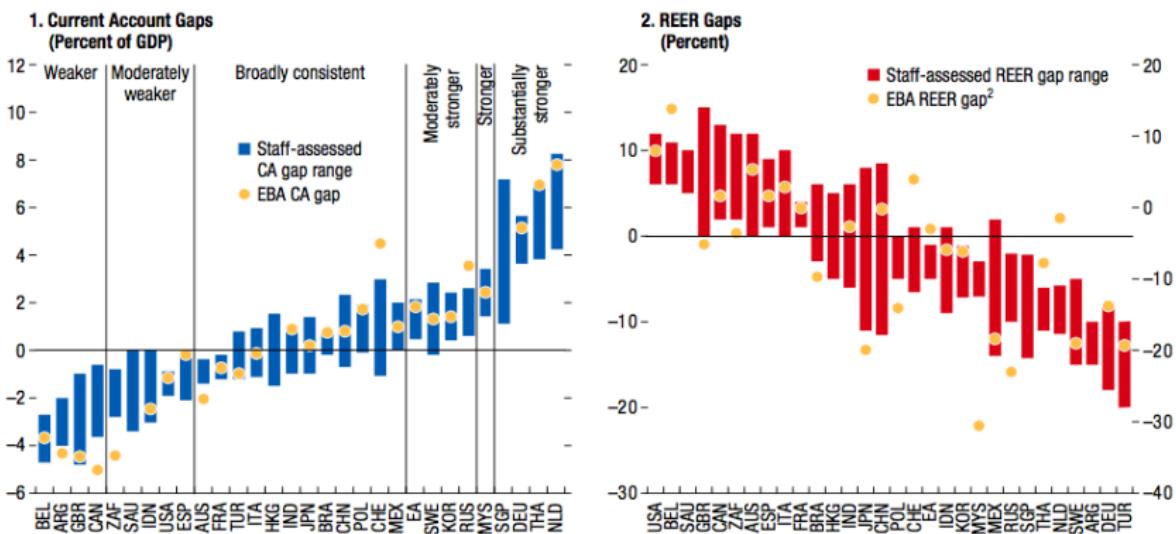
Note: REER = real effective exchange rate; ULC = unit labor cost.

¹Creditor countries include Austria, Belgium, Finland, Germany, and the Netherlands. Debtor countries include Greece, France, Ireland, Italy, Portugal, and Spain.

Current Account (External) Balance: Determinants

- In the open-economy aggregate demand analysis, current account is a function of real exchange rate and disposable incomes.
- $RE_{H/F} = E_{H/F} \times P_F/P_H$. All else equal, a real exchange rate appreciation will worsen its current account; and vice versa.
- Since real exchange rate is the price of a foreign basket in terms of home baskets, a rise in the RE indicates home basket depreciation; a fall in RE means home basket appreciation, relative to the foreign basket. $RE_{H/F} \uparrow \Rightarrow CA \uparrow$ and $RE_{H/F} \downarrow \Rightarrow CA \downarrow$.
- All else equal, a rise in domestic disposable income will cause a fall in current account balance; and vice versa.
- Macroeconomic policies affecting real exchange rate, aggregate demand, and equilibrium national output will change current account balance.

Current Account and REER Gap 2018



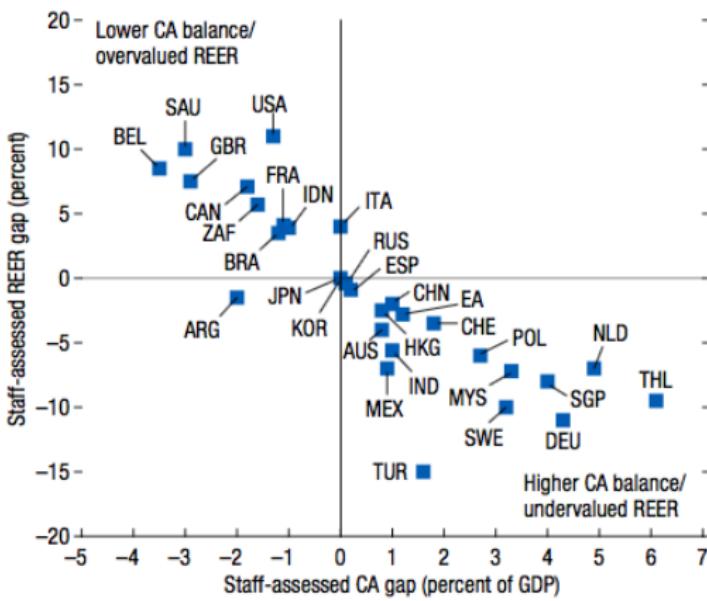
Sources: IMF External Balance Assessment (EBA) estimates and staff assessments.

Note: CA = current account; REER = real effective exchange rate. Data labels in the figure use International Organization for Standardization (ISO) country codes.

¹Sorted by the midpoint of the IMF staff-assessed gap. Hong Kong SAR, Saudi Arabia, and Singapore are not in the EBA model.

²EBA REER gap is defined as the average gap from the REER-index, REER-level and REER-implied approach (applying estimated elasticities).

Current Account and REER Gap 2019

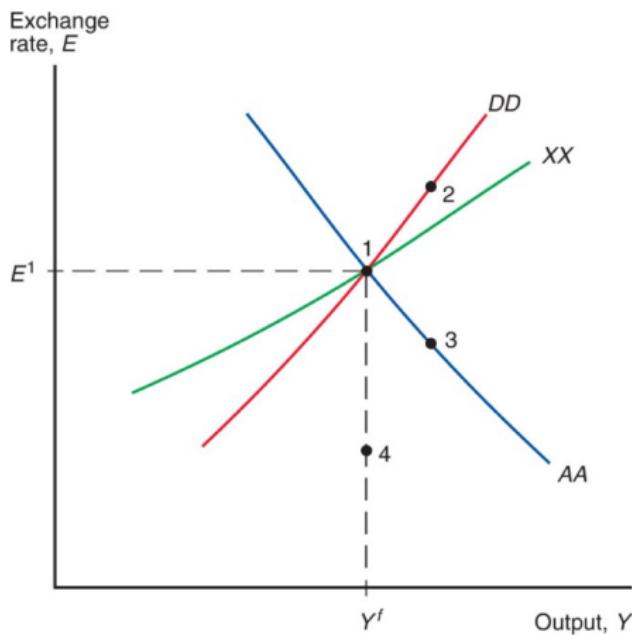


Source: IMF ESR (2020). Countries with estimated excess CA surpluses (deficits) generally also had an undervalued (overvalued) REER, according to IMF staff estimates.

Macroeconomic Policies and the Current Account

- To analyze the effect of monetary and fiscal policies on the current account, it is necessary to derive the XX curve to represent the combinations of output and exchange rates at which the current account is at its desired level.
- As income from production increases, imports increase and the current account decreases when other factors remain constant.
- To keep the current account at its desired level, the domestic currency must depreciate as income from production increases: the XX curve should slope upward.
- Along the curve XX, the current account is constant at the level $CA = \overline{CA}$. Changes in monetary and fiscal policies, therefore, can change current account balance.

Open-Economy and Current Account: Derive XX



XX shows combinations of E - Y at which the current account balance would be equal to some desired level, say $CA(EP^*/P, Y - T) = \overline{CA}$.

The curve slopes upward because, all else equal, a rise in output encourages spending on imports and thus worsens the current account if it is not accompanied by an E depreciation.

Since the actual level of CA can differ from \overline{CA} , the economy's short-run equilibrium does not have to be on the XX curve. Source: KOM (2018).

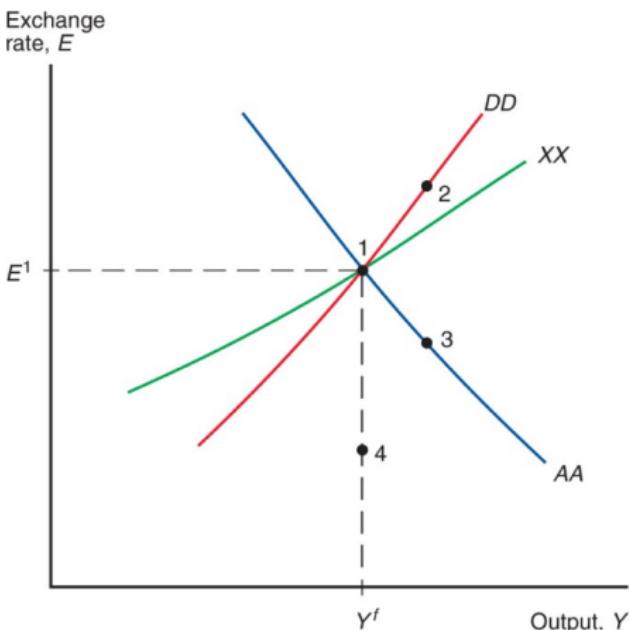
Open-Economy and Current Account: Derive XX

- The slope of the XX curve is smaller than DD. The reason is seen by asking how the current account changes as we move up along the DD curve from point 1, where all three curves intersect.
- Initially, $CA = \overline{CA}$, as we increase Y in moving up along DD, the domestic demand for domestic output rises by less than the rise in output itself ($Y \uparrow \Rightarrow C \uparrow \& S \uparrow \& IM \uparrow$).
- Along DD, however, total aggregate demand has to equal supply. To prevent an excess supply of home output, E therefore must rise sharply enough along DD to make export demand rise faster than import demand. In other words, net foreign demand—the current account—must rise sufficiently along DD as output rises to take up the slack left by domestic saving.
- To the right of point 1, DD is above the XX curve, where $CA > \overline{CA}$; to the left of point 1, DD lies below XX (where $CA < \overline{CA}$).

Macroeconomic Policy Effects on Current Account

The DD-AA-XX figure shows:

- ① Along the curve XX, the current account is constant at the level $CA = \overline{CA}$.
- ② Monetary expansion moves the economy to point 2 and thus raises the current account balance.
- ③ Temporary fiscal expansion moves the economy to point 3, while permanent fiscal expansion moves it to point 4; in either case, the CA balance falls.

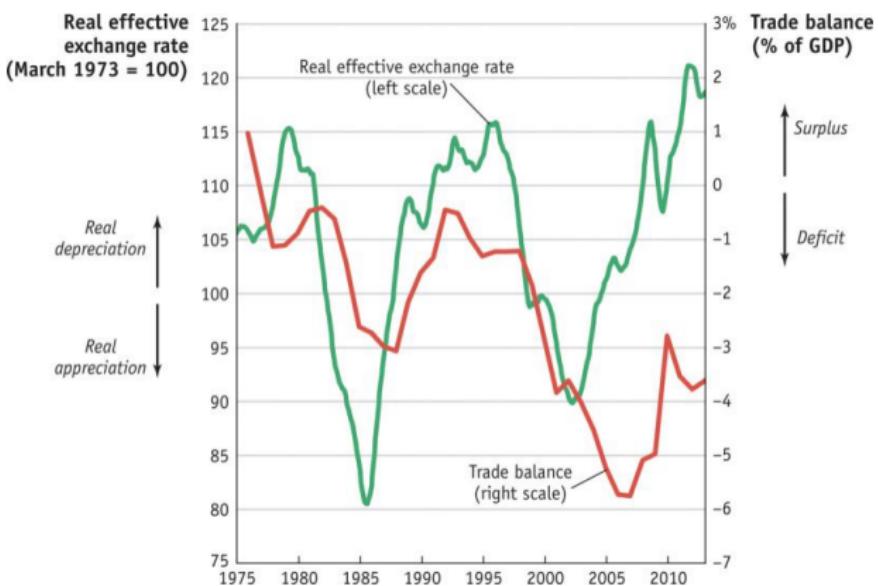


Source: KOM (2018).

Macroeconomic Policy Effects on Current Account

- An increase in the money supply shifts the economy to a position like point 2, expanding output and depreciating the currency. Since point 2 lies above XX, the current account has improved as a result of the policy action. Monetary expansion causes the current account balance to increase in the short run.
- A temporary fiscal expansion shifts DD to the right and moves the economy to point 3. Because the currency appreciates and income rises, there is a deterioration in the current account.
- A permanent fiscal expansion has the additional effect of shifting AA leftward, producing an equilibrium at point 4.
- Like point 3, point 4 is below XX, so once again the current account worsens, and by more than in the temporary case. Expansionary fiscal policy reduces the current account balance.

U.S. Trade Balance and the Real Exchange Rate: 1975-2012

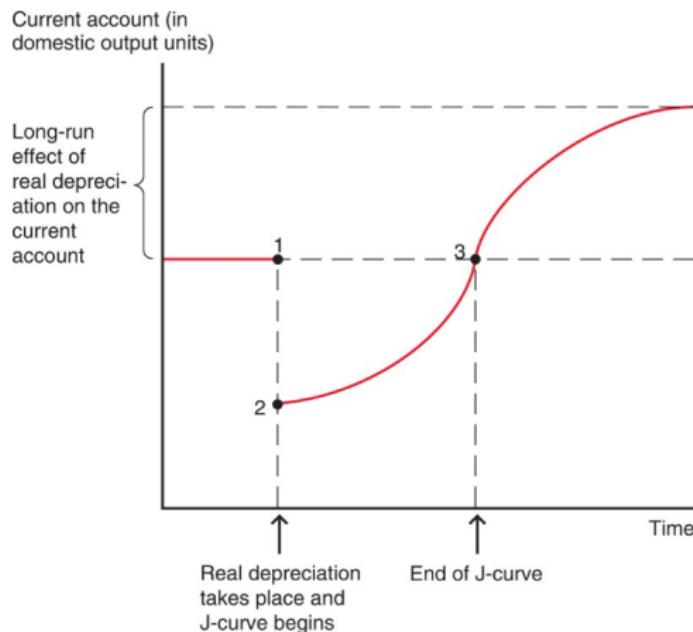


Source: FT (2017). Does the real exchange rate affect the trade balance in the way we have assumed? Not perfectly correlated and with a lag (2002-2007).

Current Account Adjustment Dynamics

- A key assumption behind the DD-AA-XX model is that, *ceteris paribus*, a real depreciation of the home currency immediately improves the current account while a real appreciation causes the current account immediately to worsen.
- In reality, however, the current account adjusts only gradually to exchange rate changes, due to trade flow elasticity effect (import and export quantities and prices) in the short-run.
- Very often, a country's current account is observed to worsen immediately after a real currency depreciation and begins to improve only some months later.
- **The J-curve:** If the current account initially worsens after a depreciation, its time path has an initial segment reminiscent of a J and therefore is called the J-curve. Empirical evidence indicates for most industrial countries a J-curve lasting from six months to a year.

Current Account Adjustment: The J-curve Effect



The J-curve describes the time lag of the CA adjustment to ER.

- ① Real currency depreciation
- ② Sharp CA deteriorate 1 → 2
- ③ Gradual CA adjustment 2 → 3

In the first few months after the depreciation, export and import volumes may reflect buying decisions that were made on the basis of the old real exchange rate: The primary effect of a currency depreciation is to raise the value of the pre-contracted imports.

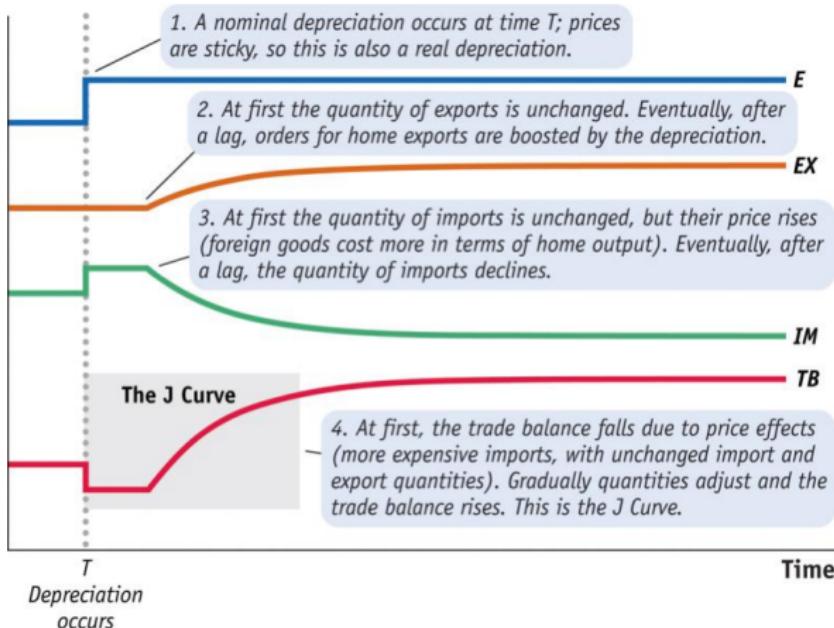
Source: KOM (2018).

Current Account Adjustment: Mechanism

- When prices are sticky and there is a nominal and real depreciation of the home currency, it may take time for the trade balance to improve. In fact, the initial impact may be toward more deficit.
- If firms and households place orders in advance, then import and export quantities may react sluggishly to changes in the relative price of home and foreign goods. Hence, just after the depreciation, the value of home exports, EX, will be unchanged.
- However, home imports now cost more due to the depreciation (inelastic import demand). Thus, the value of imports would actually rise after a depreciation, causing the trade balance to fall. Only after some time would exports rise and imports fall, allowing the trade balance to rise relative to its pre-depreciation level.

$$TB = EX - IM = P_H Q_H(\$) - P_F Q_F(\text{€}) = \overline{P_H Q_H}(\$) - E_{H/F}(\uparrow) \overline{P_F Q_F}(\$)$$

Current Account Adjustment: The J-curve Effect



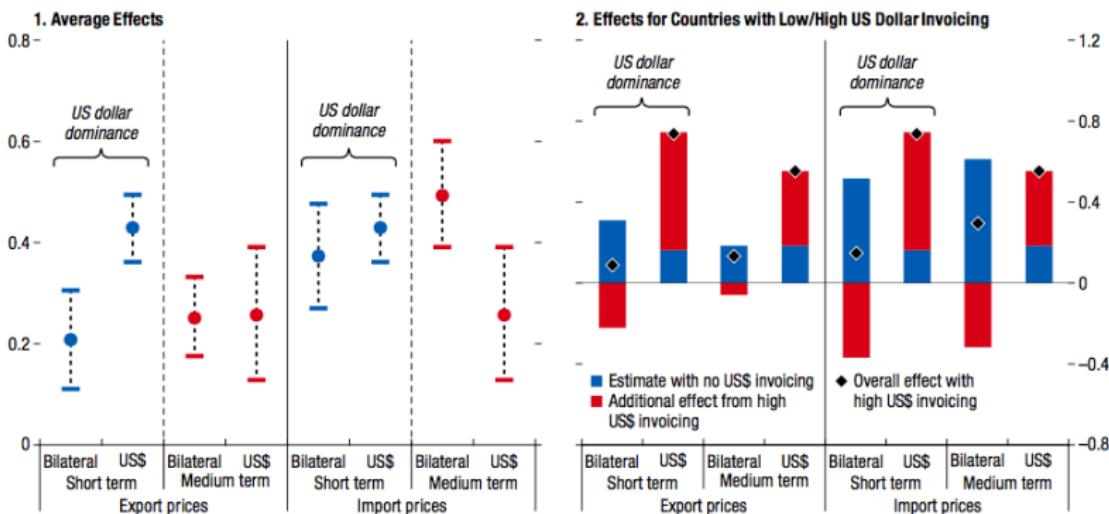
Source: FT (2017). Barriers to Expenditure Switching: Exchange Rate Pass-Through and the J Curve.

Monetary Policy and J-curve Effects on Exchange Rate

- The existence of a significant J-curve effect forces us to modify some of our earlier conclusions, at least for the short run of a year or less.
- Monetary expansion, for example, can depress output initially by depreciating the home currency. In this case, it may take some time before an increase in the money supply results in an improved current account and therefore in higher aggregate demand.
- If expansionary monetary policy actually depresses output in the short run, the domestic interest rate will need to fall further than it normally would to clear the home money market.
- Correspondingly, the exchange rate will overshoot more sharply to create the larger expected domestic currency appreciation required for foreign exchange market equilibrium.
- By introducing an additional source of overshooting, J-curve effects amplify the volatility of exchange rates.

Trade Dollarization and Pass-Through

Figure 2.2. Exchange Rate Pass-Through from Bilateral and US Dollar Exchange Rates¹
(Weighted regressions)

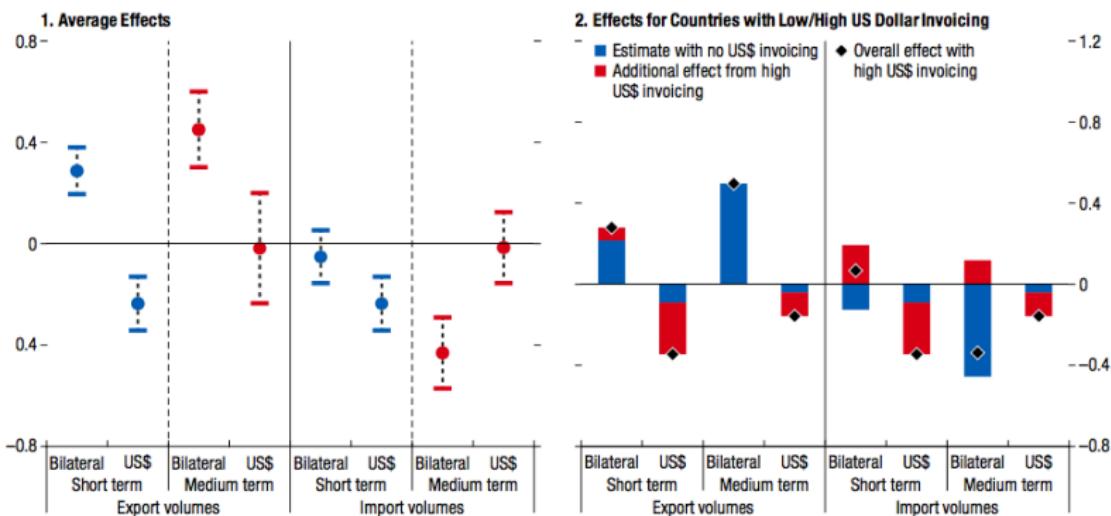


Sources: IMF staff estimates based on data sets from Gopinath and others (2018) and Boz and others (forthcoming).

¹An increase in either exchange rate implies a depreciation of the domestic currency of the exporter, for export prices (trade prices in the exporter's currency), and a depreciation of the domestic currency of the importer for import prices (trade prices in the importer's currency). Panel 1 reports point estimates and 95 percent confidence bands. See Online Annex 2.1 for details on methodology and country sample.

Trade Elasticities to Exchange Rates

Figure 2.3. Estimated Trade Volume Elasticities to Bilateral and US Dollar Exchange Rates¹
(Weighted regressions)



Sources: IMF staff estimates based on data sets from Gopinath and others (2018) and Boz and others (forthcoming).

¹An increase in either exchange rate implies a depreciation of the domestic currency of the exporter, for export volumes, and a depreciation of the domestic currency of the importer, for import volumes. Panel 1 reports point estimates and 95 percent confidence bands. See Online Annex 2.1 for details on methodology and country sample.

Price Elasticity and Current Account Adjustment

- If home-country demand is elastic, a depreciation will improve the current account balance.
- The increased price of imports reduces total expenditures on imports and the reduced price of exports to foreigners causes an increase in their expenditures.
- If home-country demand is inelastic, a depreciation will have an ambiguous effect on the current account balance.
- The increased price of imports will increase total expenditures on imports, possibly offsetting the foreign country's increased expenditures on exports.
- Short-run elasticities of supply and demand tend to be smaller in absolute value than long-run elasticities.

Exchange Rate Market Stability: Marshall-Lerner Condition

The Marshall-Lerner Condition: $\frac{EX}{IM} |\eta_{EX}| + |\eta_{IM}| > 1$

Under which the foreign exchange market will be stable.

- EX : expenditures on exports
- IM : expenditures on imports
- η_{EX} : price elasticity for home exports
- η_{IM} : price elasticity for imports

Consumers and supplies don't adjust immediately to relative price changes. Empirical studies suggest these demand elasticities may be low. However, the general consensus is that these elasticities are large enough that the foreign exchange market is stable.

Price Elasticity and the J-Curve Effect

- When the Marshall-Lerner condition holds, changes in the exchange rate bring about appropriate switches in expenditures between domestic and foreign goods.
- A home currency depreciation leads to a substitution of domestic goods for imports. A home currency depreciation causes foreigners to switch to home country exports.
- If the short-run elasticities are low, the market for foreign exchange may be unstable.
- A depreciation may initially lead to a further depreciation, since demand for the foreign currency outstrips supply. Therefore the current account deficit worsens.
- Eventually, the current account deficit shrinks and a new equilibrium is attained.

References

- [1] Krugman, Obstfeld and Melitz (2018), International Economics - Theory and Policy. 11e. Pearson.
- [2] Feenstra and Taylor (2017), International Economics. 4e. Worth.
- [3] Alan S. Blinder, Keynesian Economics. Online Library of Economics and Liberty - Encyclopedia. (w)
- [4] IMF External Sector Report 2019-2020.