Current Account

Macroeconomics I
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Introduction: We now turn to the study of the current account. This involves opening the economy, analyzing the external accounts, and understanding the economic principles behind a country's relationship with the rest of the world.

1. The Balance of Payments

The balance of payments (BoP) is the systematic record of all economic transactions between residents of a country and the rest of the world over a given period. This accounting document summarizes both real flows (goods, services, income) and financial flows (assets and liabilities), allowing us to assess the external position of the economy.

1.1. Components of the Balance of Payments

The BoP is divided into two main accounts:

- **Current Account:** records real transactions (goods, services, income, and unilateral transfers).
- **Financial Account:** records capital flows between residents and non-residents.

The current account includes:

- **Trade Balance**:
  $$\text{TB} = \text{Exports} - \text{Imports}$$
  Broken down as:
  $$\begin{aligned} \text{TB} &= (\text{Exports of Goods} - \text{Imports of Goods}) \\ &\quad + (\text{Exports of Services} - \text{Imports of Services}) \end{aligned}$$

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- **Primary Income (PI):** includes net income from international investment (interest, profits) and compensation to employees.

$$PI = \text{Net Investment Income} + \text{Net Compensation to Employees}$$

- **Secondary Income (SI):** includes net unilateral transfers (remittances, international aid, etc.).

Hence, the current account is defined as:

$$\text{Current Account (CA)} = \text{TB} + \text{PI} + \text{SI}$$

The financial account includes:

$$\begin{aligned}\text{Financial Account (FA)} &= \text{Sales of assets to foreigners} \\ &\quad - \text{Purchases of external assets by residents}\end{aligned}$$

The fundamental identity of the balance of payments is:

$$\text{CA} + \text{FA} = 0 \quad \Leftrightarrow \quad \text{CA} = -\text{FA}$$

This equality shows that every current account imbalance must be financed by an equivalent financial flow. A current account deficit implies that the country is absorbing more than it produces and must borrow or sell assets to the rest of the world.

1.2. Net International Investment Position (NIIP)

The current account is a flow that affects the **Net International Investment Position (NIIP)**, a stock variable that measures the difference between external assets held by residents and domestic assets held by foreigners. Note that this is not the same as the financial account, which records flows; the NIIP records the stock of external assets and liabilities.

$$\text{NIIP} = \text{External Assets} - \text{External Liabilities}$$

If NIIP is positive, the country is a **net creditor**; if negative, it is a **net debtor**. The change in NIIP can be expressed as:

$$\Delta\text{NIIP} = \text{CA} + \text{Valuation Changes}$$

That is, the current account affects NIIP by increasing or decreasing the country's net assets, but NIIP also changes due to asset price movements or exchange rate fluctuations.

1.3. Alternative Definitions of the Current Account

The current account can be expressed in several equivalent ways from an accounting perspective, each offering different economic interpretations:

1. **Savings - Investment**:
$$CA = S - I$$
Where S is total national savings and I is total domestic investment. If a country invests more than it saves, it must finance the difference externally.

2. **Change in Net Foreign Assets (Financial Position)**:
$$CA = \dot{F}$$
The current account reflects the change in net external position: if positive, the country is accumulating foreign assets; if negative, it is incurring external debt.

3. **Output - Absorption**:
$$CA = Y - A = Y - (C + I + G)$$
If absorption (private consumption, investment, and government spending) exceeds national income, the shortfall must be financed with external savings—i.e., a current account deficit.

4. **External Accounting:** This corresponds to the original definition:
$$CA = XN + rF + NUT$$
Where:
    - XN: net exports of goods and services,
    - rF: net income from foreign investments,
    - NUT: net unilateral transfers.

All these definitions highlight the same core idea: a country that spends more than it produces needs external financing. A current account surplus reflects national savings exceeding domestic investment, while a deficit signals a need for foreign financing.

2. Sustainability of the Current Account

A current account deficit means the country is absorbing more than it produces, financing the gap via external debt or asset sales. This may be optimal and desirable under certain conditions, but it raises a crucial question: is such a deficit sustainable over time?

2.1. External Sustainability Condition

A practical way to assess sustainability is to analyze the dynamics of the external debt-to-GDP ratio. Denote this ratio as $de_t = \frac{DE_t}{Y_t}$, where DE_t is external debt and Y_t is nominal GDP. To derive the sustainability condition, we equate two standard expressions for the current account.

First, the current account reflects the change in net foreign assets:

$$\mathrm{CA}_t = \dot{F}_t = F_{t+1} - F_t$$

Second, the current account can also be written as the sum of the trade balance and net interest income from abroad (excluding secondary income):

$$\mathrm{CA}_t = XN_t + rF_t$$

Combining both identities:

$$F_{t+1} - F_t = XN_t + rF_t$$

Defining external debt as the negative of net foreign assets, $DE_t = -F_t$, we can rewrite the equation in terms of debt dynamics:

$$DE_{t+1} - DE_t = -XN_t + r \cdot DE_t$$

Dividing by Y_t to express as a share of GDP:

$$\frac{DE_{t+1}}{Y_t} - \frac{DE_t}{Y_t} = -\frac{XN_t}{Y_t} + r \cdot \frac{DE_t}{Y_t}$$

Let $de_t = \frac{DE_t}{Y_t}$ and $xn_t = \frac{XN_t}{Y_t}$. Then:

$$\frac{DE_{t+1}}{Y_t} - de_t = -xn_t + r \cdot de_t$$

To incorporate GDP growth, multiply and divide the first term by Y_{t+1}:

$$\frac{Y_{t+1}}{Y_{t+1}} \cdot \frac{DE_{t+1}}{Y_t} = de_{t+1} \cdot (1 + \gamma)$$

where γ is the nominal GDP growth rate. Substituting:

$$de_{t+1}(1 + \gamma) - de_t = -xn_t + r \cdot de_t$$

Rearranging, we obtain the debt-to-GDP ratio dynamic equation:

$$de_{t+1} = \frac{1+r}{1+\gamma} \cdot de_t - \frac{1}{1+\gamma} \cdot xn_t$$

In the long run, sustainability requires that the debt ratio converges to a steady state. Setting $de_{t+1} = de_t = de$, we get the steady-state condition:

$$de = \frac{1}{r-\gamma} \cdot xn$$

or equivalently,

$$xn = (r-\gamma) \cdot de$$

This condition gives a clear guide to sustainability: if the interest rate r exceeds the GDP growth rate γ, then the country must run a positive trade surplus to stabilize its external debt. If instead $r < \gamma$, then running deficits may be sustainable, as the economy grows faster than its debt. However, this is uncommon in practice, especially in emerging markets.

Several key factors influence sustainability:

- A higher debt-to-GDP ratio ($de \uparrow$) increases the required trade surplus.
- A higher interest rate ($r \uparrow$) raises debt service costs, increasing the surplus needed.
- A higher GDP growth rate ($\gamma \uparrow$) reduces the required surplus by expanding repayment capacity.

In short, external debt is sustainable only if the trade balance offsets the gap between financial costs and economic growth. This ensures the debt-to-GDP ratio remains stable and prevents explosive debt paths or excessive reliance on external financing.

3. Real Exchange Rate and Purchasing Power Parity (PPP)

3.1. Nominal and Real Exchange Rate

Let:

- E: nominal exchange rate (price of foreign currency in terms of domestic currency, e.g., soles per dollar)

- P: domestic price level
- P^*: foreign price level

The real exchange rate (RER) is defined as:

$$RER \equiv \varepsilon = \frac{EP^*}{P}$$

This expression measures the relative price of the foreign consumption basket in terms of the domestic basket. An **increase in the RER** implies a real depreciation of the currency: foreign goods become more expensive in relative terms, improving the country's external competitiveness (boosting exports and discouraging imports). A **decrease in the RER** indicates a real appreciation.

3.2. Purchasing Power Parity (PPP)

The theory of **purchasing power parity** states that goods should cost the same across countries when expressed in a common currency. There are two versions:

Absolute PPP

It holds that:

$$E = \frac{P}{P^*} \quad \Rightarrow \quad \varepsilon = 1$$

Under absolute PPP, the real exchange rate is constant and equal to 1. There are no real price differences between countries. The intuition is that if a good is more expensive in one country than in another, arbitrage would allow buying it in the cheaper country and selling it in the expensive one to earn a profit.

However, this condition rarely holds in practice due to transport costs, non-tradable goods, trade barriers, and other frictions that prevent free arbitrage.

Relative PPP

This less restrictive version focuses on changes in the real exchange rate, not its level:

$$\frac{\dot{E}}{E} = \pi - \pi^*$$

That is, the rate of nominal depreciation of the exchange rate equals the inflation differential between the domestic country and the rest of the world. If this equation holds, the real exchange rate does not vary—meaning there is neither appreciation nor depreciation. In other words, real price differences between countries remain constant over time.

4. Intertemporal Theory of the Current Account

The intertemporal theory of the current account is based on a neoclassical model where agents maximize utility over time, deciding between present and future consumption. In an open economy, this decision directly affects trade and financial flows.

4.1. The Representative Household's Problem

We consider a representative household that lives for two periods and receives exogenous endowments of goods: Q_1 in the first period and Q_2 in the second. The household can consume, save, or borrow using a one-period bond that pays an exogenous real interest rate r, assuming a small open economy.

In the first period:

$$C_1 + B_1 - B_0 = r_0 B_0 + Q_1$$

In the second period:

$$C_2 + B_2 - B_1 = r_1 B_1 + Q_2$$

Since the household dies at the end of the second period, it cannot leave unpaid debt or unused assets. This terminal condition is expressed as:

$$B_2 = 0$$

Combining the constraints and using the condition $B_2 = 0$, we obtain the intertemporal budget constraint:

$$C_1 + \frac{C_2}{1 + r_1} = (1 + r_0)B_0 + Q_1 + \frac{Q_2}{1 + r_1}$$

The household chooses C_1 and C_2 to maximize utility:

$$\max_{C_1, C_2} \quad U(C_1) + \beta U(C_2)$$

Subject to the intertemporal budget constraint. The first-order condition yields the Euler equation:

$$U'(C_1) = (1 + r_1)\beta U'(C_2)$$

Assuming a logarithmic utility function $U(C) = \ln(C)$, we get:

$$\frac{1}{C_1} = (1+r_1)\beta \cdot \frac{1}{C_2} \quad \Rightarrow \quad C_2 = (1+r_1)\beta C_1$$

Substituting into the budget constraint:

$$C_1 + \frac{(1+r_1)\beta C_1}{1+r_1} = (1+r_0)B_0 + Q_1 + \frac{Q_2}{1+r_1} \Rightarrow C_1(1+\beta) = (1+r_0)B_0 + Q_1 + \frac{Q_2}{1+r_1}$$

So:

$$C_1^* = \frac{(1+r_0)B_0 + Q_1 + \frac{Q_2}{1+r_1}}{1+\beta}, \quad C_2^* = \beta(1+r_1)C_1^*$$

And the optimal bond holdings at the end of period 1:

$$B_1^* = (1+r_0)B_0 + Q_1 - C_1^*$$

4.2. Trade Balance and Current Account

We now introduce the open economy concepts into our neoclassical model. In this open economy, the trade balance is simply the difference between output and consumption:

$$TB_1^* = Q_1 - C_1^*, \quad TB_2^* = Q_2 - C_2^*$$

The current account in each period is:

$$CA_1^* = r_0 B_0 + TB_1^* \quad CA_2^* = r_1 B_1^* + TB_2^*$$

4.3. Shock Analysis

This model allows us to study how the current account responds to various shocks.

Temporary income shock ($\Delta Q_1 > 0$, $\Delta Q_2 = 0$)

- $C_1^* \uparrow$, but less than ΔQ_1 due to consumption smoothing.
- $B_1^* \uparrow$, part of the income increase is saved.
- $TB_1^* \uparrow$, $CA_1^* \uparrow$

Conclusion: Trade and current account surplus, reflecting savings from a temporary shock.

Permanent income shock ($\Delta Q_1 = \Delta Q_2 = \Delta Q$)

- $C_1^* \uparrow$, $C_2^* \uparrow$, proportional to the increase in income.
- $B_1^* \approx$ constant $\rightarrow TB_1^* \approx$ constant $\rightarrow CA_1^* \approx$ constant

Conclusion: The current account remains largely unaffected.

Increase in the international interest rate ($\uparrow r_1$)

- $C_1^* \downarrow$, $C_2^* \uparrow$, assuming intertemporal substitution (IES) ¿1.
- $B_1^* \uparrow$, $TB_1^* \uparrow$, $CA_1^* \uparrow$

Conclusion: Consumption is postponed, improving the current account today.

Anticipated shock in Q_2

The household learns in $t = 1$ that it will receive more income in $t = 2$.

- $C_1^* \uparrow$, $C_2^* \uparrow$, due to expectations.
- $B_1^* \downarrow$, borrowing to bring forward consumption from future income.
- $TB_1^* \downarrow$, $CA_1^* \downarrow$

Conclusion: The shock affects the current account before the income actually changes, due to anticipation and intertemporal optimization.

This model shows how external imbalances (current account deficits or surpluses) reflect optimal saving and consumption decisions in response to income changes, interest rates, and future expectations. It also highlights how the foundations developed in earlier chapters allow us to perform this type of analysis more fluently and precisely.

5. Terms of Trade

In open economies, the relative prices of exports and imports are fundamental to understanding external dynamics. The **terms of trade** (ToT) capture this price relationship and have macroeconomic implications similar to an endowment shock.

5.1. Definition

Let P^X be the price of a country's exports, and P^M the price of its imports. The **terms of trade** are defined as:

$$TT = \frac{P^X}{P^M}$$

An increase (improvement) in TT means the country can obtain more imported goods for each unit of exported good.

5.2. Two-good model: endowment and consumption

Let's return to our intertemporal model, now distinguishing between two types of goods. The domestic economy receives an endowment of exportable goods, which are not consumed directly but sold abroad to generate income. This income is then used to purchase imported goods, which are the ones actually consumed. We have:

- Household endowment: Q_1, Q_2, expressed in export goods.
- Household consumption: C_1, C_2, expressed in import goods.

In this context, the value of the endowment in terms of the consumption good (imported) is:

$$\text{Income in } t = 1: \quad TT_1 \cdot Q_1, \qquad \text{Income in } t = 2: \quad TT_2 \cdot Q_2$$

The budget constraints become:

$$\begin{aligned} C_1 + B_1 - B_0 &= TT_1 Q_1 + r_0 B_0 \\ C_2 + B_2 - B_1 &= TT_2 Q_2 + r_1 B_1 \end{aligned}$$

With the terminal condition $B_2 = 0$, combining both yields the intertemporal constraint:

$$C_1 + \frac{C_2}{1 + r_1} = (1 + r_0)B_0 + TT_1 Q_1 + \frac{TT_2 Q_2}{1 + r_1}$$

5.3. ToT shocks

Note that $TT_1 Q_1 + \frac{TT_2 Q_2}{1+r_1}$ is the present value of the endowment, measured in units of the imported (consumption) good. From the consumer's perspective, an improvement in the terms of trade is equivalent to an increase in endowment.

Thus, an improvement in TT_1 (keeping TT_2, Q_1, and Q_2 constant) is equivalent to a **temporary positive income shock**. An improvement in both TT_1 and TT_2 is equivalent to a **permanent positive shock**. The conclusions are therefore parallel to the previous analysis:

- If $TT_1 \uparrow$ temporarily:
  - Present and future income increase $\rightarrow C_1^* \uparrow$, $C_2^* \uparrow$
  - Part of the shock is saved $\rightarrow TB_1^* \uparrow$, $CA_1^* \uparrow$
- If $TT_1 \uparrow$ and $TT_2 \uparrow$ permanently:
  - Permanent income rises $\rightarrow C_1^*, C_2^* \uparrow$ proportionally to income
  - No need for saving/dissaving $\rightarrow TB_1^*$ and CA_1^* remain unchanged

In short, an improvement in the terms of trade is equivalent to an increase in endowment, as it raises the present value of available resources. This analogy allows us to incorporate relative prices into the intertemporal analysis, highlighting once again the importance of distinguishing between temporary and permanent shocks when interpreting current account changes.