The Balance of Payments

International Macroeconomics
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Introduction: A country's interactions with the rest of the world, in terms of trade, income flows, and financial transactions, are systematically recorded in the balance of payments (BoP). In this first section, we review its components, its operation, and the fundamental economic theory behind it.

1.   Components of the BoP

The BoP is divided into two main components: the current account and the financial account. The *current account* summarizes trade in goods and services, net income from abroad, and transfers that do not involve quid pro quo. More formally, we can define the current account as follows:

$$\text{Current Account Balance} = \text{Trade Balance} + \text{Primary Income} + \text{Secondary Income}$$

Where the trade balance records the exports and imports of goods and services:

$$\text{Trade Balance} = (\text{Exports of Goods} - \text{Imports of Goods}) +$$
$$(\text{Exports of Services} - \text{Imports of Services})$$

$$\text{Trade Balance} = \text{Trade Balance of Goods} + \text{Trade Balance of Services}$$

Primary income recovers (i) the net investment income, given by the difference between income receipts on assets owned by domestic residents abroad and income payments on assets owned by foreigners locally; and (ii) the net international compensation to employees, given by the difference between the compensation received by domestic residents temporarily employed abroad (positive) and the compensation of foreign workers temporarily employed locally (negative).

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

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Finally, secondary income includes transfers from abroad, such as remittances or donations.

On the other hand, the *financial account* tracks changes in ownership of financial assets between domestic residents and the rest of the world. When a domestic agent sells an asset to a foreigner, this represents an export of financial capital and enters with a positive sign. Conversely, when an asset is purchased from abroad, it is treated as an import and receives a negative sign.

$$\text{Financial Account Balance} = \text{Sales of domestic assets to foreigners} -$$
$$\text{Purchases of foreign assets by residents}$$

The intuition behind this is simple, the sale of assets to foreigners constitutes an inflow of funds (a credit), while the purchase of foreign assets by domestic agents is an outflow (a debit).

The fundamental identity of the BoP captures the idea that current account imbalances must be mirrored by financial flows. In other words, any country that runs a current account deficit—spending more on imports and transfers than it earns from exports and income—must finance this excess spending by borrowing from abroad or by selling assets to the rest of the world. This leads to a surplus in the financial account, as foreign investors acquire claims on domestic assets.

$$\text{Current Account Balance} = -\text{Financial Account Balance}$$

Intuitively, this identity tells us that no economy can persistently consume more than it produces unless it receives external financing. When the current account is negative, the country must be issuing IOUs to foreigners—either in the form of debt or equity—thereby accumulating liabilities or reducing its net foreign asset position.

In practice, BoP statistics often include a third account: the *capital account*. It captures non-market transfers, such as debt forgiveness and the transfer of goods and financial assets accompanying migrants. However, this account is typically very small in magnitude and, for analytical purposes, can be safely ignored in most macroeconomic models.

2. The Current Account and the Net International Investment Position

One reason the current account balance is of fundamental macroeconomic importance is that it reflects a country's net borrowing needs vis-à-vis the rest of the world. When a country runs a current account deficit, it is consuming or investing more than it produces and must finance this gap by issuing claims to foreigners. Conversely, a surplus indicates that the country is saving more than it invests domestically and is accumulating claims on the rest of the world.

This intertemporal nature of the current account links directly to the country's **net international investment position (NIIP)**, which measures the difference between residents' holdings of foreign assets and foreigners' holdings of domestic assets. In other words, the NIIP represents the country's net foreign wealth. Formally:

$$\text{NIIP} = \text{Domestic Holdings of Foreign Assets} - \text{Foreign Holdings of Domestic Assets}$$

When the NIIP is positive, the country is a net creditor; when it is negative, it is a net debtor—commonly referred to as having *external debt.*

The current account and the NIIP are related through a stock-flow identity: the current account is a flow variable that measures changes in the stock of net foreign assets over time. Each year's current account balance contributes to the evolution of the NIIP, just as saving contributes to changes in a household's net worth.

To clarify, a **flow** measures a quantity over a period of time—like income earned or spending done in a year—while a **stock** refers to the level of a variable at a specific point in time—like the value of accumulated wealth. The current account is a flow: it records net earnings from abroad within a period. The NIIP is a stock: it records the total value of net foreign assets at a given date. Therefore, sustained current account deficits lead to a deterioration of the NIIP over time, increasing the country's external debt. In contrast, sustained surpluses result in a growing net creditor position.

This relationship underscores why persistent imbalances in the current account are not merely accounting curiosities—they reflect underlying changes in a country's financial standing with the rest of the world.

3.   Valuation Changes and the Net International Investment Position

The current account is not the only channel through which a country's net international investment position (NIIP) evolves over time. Another important source of change comes from variations in the market value of the assets and liabilities that compose the international balance sheet. This gives rise to a broader accounting identity:

$$\Delta\text{NIIP} = \text{Current Account} + \text{Valuation Changes}$$

Here, ΔNIIP represents the change in the net international investment position between two points in time. Recall that the NIIP is defined as the difference between foreign assets held by domestic residents and domestic assets held by foreigners:

$$\text{NIIP} = A - L$$

where A stands for the total value of international assets owned by domestic residents and L represents the value of liabilities to the rest of the world.

Valuation changes arise when the prices of those assets and liabilities fluctuate. For instance, suppose a country holds significant foreign assets denominated in foreign currency. If the domestic currency appreciates, the value of those foreign-currency assets, when expressed in domestic currency, falls—reducing the NIIP. Conversely, if the country holds large equity positions abroad and global stock markets rise, the value of foreign assets increases, boosting the NIIP—even in the absence of a current account surplus.

These examples illustrate that changes in exchange rates and asset prices can lead to large swings in the NIIP. Indeed, such valuation effects have become increasingly important in recent decades. In the case of the United States, for example, valuation changes have played a growing role in explaining movements in the NIIP.

One key reason is the massive growth in gross international positions since the early 2000s. Between 2000 and 2018, the sum of foreign assets and liabilities held by U.S. residents rose from about $80\,\%$ of GDP to nearly $180\,\%$. When gross positions are large relative to the net position, even small changes in asset prices or exchange rates can generate large swings in the NIIP. This happens especially when the composition of assets and liabilities is asymmetric—for example, if a country's liabilities are mostly debt denominated in domestic currency, while its assets are foreign equities or bonds denominated in foreign currencies.

In such a setting, valuation changes can either amplify or offset the effects of current account flows. This introduces an additional layer of complexity in interpreting a country's external financial position—and highlights the importance of looking beyond the current account when assessing external sustainability.

3.1. A Hypothetical NIIP Without Valuation Changes

One useful way to visualize the role of valuation changes in shaping a country's net foreign wealth is to compare the *actual* net international investment position (NIIP) with a *hypothetical* version that excludes valuation effects. This allows us to isolate the contribution of cumulative current account balances to changes in the NIIP.

To construct this hypothetical NIIP, we proceed recursively. First, we choose a start year and set the initial value of the hypothetical NIIP equal to the actual NIIP in that year:

$$\text{Hypothetical NIIP}_{\text{start}} = \text{NIIP}_{\text{start}}$$

In the following year, the hypothetical NIIP evolves solely according to the current account, without accounting for any changes in asset prices or exchange rates. That is:

$$\text{Hypothetical NIIP}_{\text{start}+1} = \text{NIIP}_{\text{start}} + \text{CA}_{\text{start}+1}$$

Continuing this logic, the hypothetical NIIP in year t is equal to the initial NIIP in the start year plus the sum of current account balances from the start year $+1$ through year t:

$$\text{Hypothetical NIIP}_t = \text{NIIP}_{\text{start}} + \sum_{\tau=\text{start}+1}^{t} \text{CA}_\tau$$

This series gives us a counterfactual path for the NIIP—one that would have prevailed in the absence of valuation effects. By comparing this hypothetical series to the actual NIIP, we can measure the cumulative impact of valuation changes over time.

Intuitively, if the actual NIIP becomes increasingly lower than the hypothetical NIIP—that is, the gap between them grows more negative—we can attribute this divergence to unfavorable valuation movements, such as declining asset prices abroad or an appreciation of the domestic currency. Conversely, if the actual NIIP exceeds the hypothetical path, this indicates that valuation gains (e.g., rising foreign equity prices or depreciation of the domestic currency) have improved the country's net foreign wealth beyond what would be explained by current account surpluses alone.

4. Alternative Definitions of the Current Account

The current account, although traditionally introduced through trade and income flows, can be expressed in several equivalent ways. Each alternative highlights a different economic intuition behind external imbalances and allows for different analytical perspectives.

A first and widely used definition expresses the current account as the difference between national savings and domestic investment:

$$\text{CA} = S - I$$

Here, S denotes national savings and I represents total domestic investment. This identity can be expanded further by disaggregating both savings and investment into private and public components:

$$\text{CA} = (S^p + S^g) - (I^p + I^g)$$

where S^p and I^p are private savings and investment, and S^g and I^g refer to the government's fiscal savings and public investment, respectively. This formulation makes clear that whenever domestic investment exceeds domestic savings, the shortfall must be financed by net borrowing from the rest of the world, that is, a current account deficit.

A second way to define the current account is as the change in the net foreign asset position:

$$\text{CA} = \dot{F}$$

where $\dot{F}$ denotes the change in net foreign assets. Under this interpretation, the current account records the net acquisition of claims on the rest of the world. A positive current

account implies that the country is accumulating foreign assets faster than it is incurring liabilities, a net lender. Conversely, a current account deficit implies a decumulation of foreign assets or a buildup of external liabilities.

A third definition connects the current account to domestic absorption. National income (Y) can either be consumed, invested, or saved. Domestic absorption (A) is defined as total spending by residents on goods and services:

$$A = C + I + G$$

where C is private consumption, I is investment, and G is government spending. Using this, the current account can be expressed as:

$$\text{CA} = Y - A = Y - (C + I + G)$$

In this view, the current account reflects the difference between national output and domestic spending. If a country's expenditure exceeds its income ($A > Y$), it must finance the difference through borrowing from abroad. Since savings is defined as income not consumed by the private or public sector, i.e.,

$$S = Y - (C + G),$$

we can confirm that:

$$\text{CA} = S - I$$

which verifies the equivalence of these definitions.

Lastly, we have already seen the external accountability definition. The current account can also be decomposed into its main components: net exports of goods and services (XN), net investment income (rF), and net unilateral transfers (NUT). That is:

$$\text{CA} = XN + rF + NUT$$

where rF captures the difference between income earned on foreign assets and income paid to foreign investors.

Despite these alternative representations, the core economic intuition remains the same. A country that consumes and invests more than it produces must either borrow from the rest of the world or draw down its stock of foreign assets. All definitions of the current account, whether through savings and investment, foreign asset accumulation, or absorption, lead to consistent predictions regarding the impact of macroeconomic shocks or policy changes on a country's external balance.

5. Current Account Sustainability and Debt Dynamics

While temporary current account deficits are often benign, a country cannot run persistent deficits forever. Doing so would imply an ever-growing accumulation of external debt, eventually exceeding the country's ability to repay. Similarly, a permanent current account surplus would imply infinite wealth accumulation, which is economically unrealistic. Thus, for a country's external position to be sustainable, the net foreign asset position (or equivalently, its external debt) must evolve in line with its ability to service it.

A minimal requirement for sustainability is the *solvency condition*: for debtor countries, the long-run growth rate of debt must not exceed the interest rate. Otherwise, the country would eventually default or require external transfers. This excludes Ponzi schemes—where new borrowing is used to pay existing obligations without generating the income needed to cover them.

A practical way to assess sustainability is to examine the dynamics of the external debt-to-GDP ratio. Let us denote this ratio by $de_t = \frac{DE_t}{Y_t}$, where DE_t represents external debt and Y_t denotes nominal GDP. To derive the condition for stability, we begin by equating two standard expressions for the current account.

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

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

Second, the current account can also be expressed as the sum of the trade balance and net foreign interest income (we exclude secondary income):

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

Combining both identities gives:

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

If we define external debt as the negative of net foreign assets, $DE_t = -F_t$, we can re-express the equation in terms of debt dynamics:

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

Dividing by Y_t to express everything 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 $de_t = \frac{DE_t}{Y_t}$ be the debt-to-GDP ratio and $xn_t = \frac{XN_t}{Y_t}$ the trade balance-to-GDP ratio. Then we have:

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

To incorporate GDP growth, we 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 back:

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

Rearranging, we obtain the law of motion for the debt-to-GDP ratio:

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

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

$$de = \frac{1}{r - \gamma} \cdot xn \tag{2}$$

or, equivalently,

$$xn = (r - \gamma) \cdot de \tag{3}$$

This condition provides clear guidance for sustainability: if the interest rate r exceeds the GDP growth rate γ, then a country must generate a positive trade surplus to stabilize its external debt. If instead $r < \gamma$, it is theoretically possible to sustain deficits, since the economy grows faster than its debt. However, this case is rare in practice, particularly for emerging economies.

Several key factors affect sustainability:

- A higher debt-to-GDP ratio ($de \uparrow$) increases the trade surplus required to stabilize debt.

- A higher interest rate ($r \uparrow$) raises the cost of servicing debt, increasing the required surplus.

- A faster GDP growth rate ($\gamma \uparrow$) reduces the required surplus by expanding the economy's repayment capacity.

In summary, external debt is sustainable only if the trade balance is sufficient to offset the difference between interest costs and economic growth. This ensures that the debt ratio remains bounded and rules out explosive trajectories or dependence on ever-increasing borrowing.

Next Steps. In this first set of lecture notes, we developed a foundational understanding of the balance of payments and its macroeconomic implications. The framework developed here sets the stage for a deeper analysis of the current account as an outcome of forward-looking, optimizing behavior. In the next chapter, we will introduce the *Intertemporal approach to the current account*, which models how consumption and saving decisions by households and governments—subject to borrowing constraints and expectations about future income—drive external imbalances. This will allow us to reinterpret the balance of payments not merely as an accounting identity, but as the outcome of optimal dynamic choices in response to shocks and policy changes.