Motivation

Countries trade a lot with one another, and the United States is no exception. This fact elicits a number of questions, such as

- How big are international transactions in goods, services, and financial assets for the United States and other countries?

- Does the United States have a trade deficit or a trade surplus with the rest of the world? What about China, Europe, and Latin America?

- Is the United States an external debtor or an external creditor?

- How have the trade balance and the international asset position of the United States and other countries evolved over time?

This chapter addresses these and other related questions.
Overview

The main focus of the present chapter is descriptive. In later chapters, we will ask more positive questions such as

- Why are exports of goods and services larger or smaller than imports of goods and services?
- Why do countries borrow from abroad?
- Can countries borrow forever?
- What determines the size of a country’s external debt?
The International Transactions Accounts

In the United States international transactions are recorded by the Bureau of Economic Analysis (www.bea.gov) in the International Transactions Accounts (ITA), also known as the Balance of Payments.

An important figure produced in the ITA is the Trade Balance, which measures the difference between exports of goods and services and imports of goods and services:

\[
\text{Goods Balance} = \text{Exports of Goods} - \text{Imports of Goods}
\]

\[
\text{Service Balance} = \text{Exports of Services} - \text{Import of Services}
\]

\[
\text{Trade Balance} = \text{Goods Balance} + \text{Service Balance}
\]

Examples of traded goods: textiles, oil, cars, and wheat.
Examples of traded services: education, and medical care, consulting.
The U.S. Trade Balance in 2014

Exports of goods and services: $2.3 trillion
Imports of goods and services: $2.8 trillion
Trade balance = $2.3-$2.8 = -$0.5 trillion

Is $0.5 trillion a big or small number?

Let’s relate it to the size of the U.S. economy. In 2014, GDP was $17.4 trillion. So letting $TB$ denote trade balance, we have

$$\frac{TB_{2014}}{GDP_{2014}} = \frac{-0.5}{17.4} = -0.0289$$

or the 2014 trade deficit was 2.9 percent of GDP. Now is this a small or big number? Shortly, we will see how the accumulation of deficits of this magnitude has turned the United States from creditor of the rest of the world to the largest debtor.
Time Perspective

Is the size of the trade deficit in 2014 typical for the United States? Look at the next two graphs, showing the trade balance since 1960, both in nominal terms and as a fraction of GDP.

The trade balance was practically nil between 1960 and the early 1980s. Since then, trade deficits grew steadily, reaching 6 percent of GDP just before the beginning of the great contraction of 2007-2009. The crisis was associated with an improvement in the trade balance to around 3 percent, which has persisted to the present.
The U.S. Trade Balance Over Time: 1960-2014
(in billions of dollars)

Data Source: BEA, bea.gov, ITA, Table 1.1., (March 19, 2015 release)
The U.S. Trade Balance as a Share of GDP: 1960-2014

(percent of GDP)

Data Source: BEA, bea.gov, ITA, Table 1.1. and NIPA Table 1.1.5, (March 2015 releases)
Who Trades With The United States?

The next figure shows that a large fraction of the U.S. trade deficit is accounted for by its trade with China.

The fraction of the U.S. trade deficit explained by deficits with China has increased steadily from about 10 percent in the 1990s to almost 50 percent by 2015.
The U.S. trade deficit with China is expressed as a fraction of the total U.S. trade deficit. (Only trade in goods, not services.)
The Income Balance

Another item of the Balance of Payments is the **Income Balance**, which measures the difference between incomes received from the rest of the world and incomes paid to the rest of the world. These net income payments are recorded separately for capital and labor. Net income from capital is called **Net Investment Income** and consists of dividends, interest, profits, etc. Net income from labor is called **Net International Payments to Employees** and records earnings of U.S. residents temporarily employed abroad and compensation payments to foreigners temporarily working in the U.S. So we have that

\[
\text{Income Balance} = \text{Net Investment Income} + \text{Net International Payments To Employees}
\]
Net Unilateral Transfers

A third item in the Balance of Payments is Net Unilateral Transfers, which keeps record of the difference between gifts received from the rest of the world and gifts given to the rest of the world. These gifts can involve private agents or governments:

\[
\text{Net Unilateral Transfers} = \text{Private Remittances} + \text{Government Transfers}
\]
The Current Account

The Current Account is the sum of the Trade Balance, the Income Balance, and Net Unilateral Transfers:

\[
\text{Current Account} = \text{Trade Balance} + \text{Income Balance} + \text{Net Unilateral Transfers}
\]

The current account is an important concept because if the current account is negative, all other things equal, the net external debt of the country goes up, and if the current account is positive, the external debt falls.

The following table displays the values of the different components of the Balance of Payments in the United States in 2014.
## The U.S. Balance-of-Payments Accounts in 2014

<table>
<thead>
<tr>
<th>Item</th>
<th>Billions of dollars</th>
<th>Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Account</strong></td>
<td>389.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Trade Balance</td>
<td>508.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Balance on Goods</td>
<td>-741.5</td>
<td>-4.3</td>
</tr>
<tr>
<td>Balance on Services</td>
<td>233.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Income Balance</td>
<td>238.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Net Investment Income</td>
<td>247.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Compensation of Employees</td>
<td>-9.4</td>
<td>-0.1</td>
</tr>
<tr>
<td>Net Unilateral Transfers</td>
<td>-119.2</td>
<td>-0.7</td>
</tr>
<tr>
<td>Private Transfers</td>
<td>-104.9</td>
<td>-0.6</td>
</tr>
<tr>
<td>U.S. Government Transfers</td>
<td>-14.3</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

Source: Bureau of Economic Analysis, [http://www.bea.gov](http://www.bea.gov)
Observations on the U.S. 2014 Balance of Payments

• In 2014, the United States ran a large current account deficit.
• The bulk of the current account deficit is accounted for by a large trade balance deficit. The U.S. imports mostly low-tech manufactured goods (textiles, electronics, etc.) and exports human-capital-intensive services (higher education, R&D, health care, professional consulting). Thus, the United States typically runs a trade deficit in goods and a trade surplus in services.
• Net investment income is positive, which means that investments of U.S. residents in foreign assets paid more in interest, dividends, profits, than the investments of foreign residents in U.S. assets. Net International Payments to Employees was negative but quite small.
• Net Unilateral Transfers were negative, which means that the United States gave more gifts to the rest of the world than it received. These gifts are mostly remittances of immigrants in the U.S. to relatives living abroad.
The Trade Balance and the Current Account Move in Tandem Over Time

We saw in the previous table that for the year 2014, the bulk of the U.S. current account is the trade balance. The following two figures show that this is indeed true pretty much all the time.
The U.S. Current Account and Trade Balances
1960-2014

Data Source: BEA, bea.gov, ITA, Table 1.1., (March 19, 2015 release)
The U.S. Trade Balance and Current Account As Percentages Of GDP: 1960-2014

Source: http://www.bea.gov
The Trade Balance and the Current Account Move in Tandem Across Countries

The following figure shows the current account (vertical axis) and the trade balance (horizontal axis) as percentages of GDP for 102 countries in 2005. Each dot is one country.

The fact that most dots lie close to the 45-degree line indicates that trade balance and the current account comove closely across countries. Countries with large trade balances tend to be countries with large current account balances, and countries with small trade balances tend to have small current account balances.
Trade Balances and Current Account Balances Across Countries in 2005

Data Source: World Development Indicators. Note: TB denotes the trade balance in goods and services and CA denotes the current account balance. There are 102 countries included in the sample. Countries with trade balances or current accounts in excess of ±15 percent of GDP are not shown.
The previous figure also shows that the current account and the trade balance need not both be negative as in the United States. Any sign pattern is possible, as shown in the following table.

**Trade Balance and Current Account as Percentages of GDP in 2005 for Selected Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>TB/GDP</th>
<th>CA/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>5.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>11.7</td>
<td>-3.5</td>
</tr>
<tr>
<td>Philippines</td>
<td>-5.6</td>
<td>1.9</td>
</tr>
<tr>
<td>United States</td>
<td>-3.4</td>
<td>-3.0</td>
</tr>
</tbody>
</table>

CA = TB + Income Balance + Net Unilateral Transfers

Argentina: \[ \frac{TB}{GDP} > \frac{CA}{GDP} > 0 \] because Income Balance < 0. It is a net debtor, so it pays interest to the rest of the world.

Ireland: \[ \frac{TB}{GDP} > 0 > \frac{CA}{GDP} \] because Income Balance is large, -15.2% of GDP!, as large FDI in the 1990s now send profits abroad.

Philippines: \[ \frac{TB}{GDP} < 0 < \frac{CA}{GDP} \] because Personal Remittances, which are part of Net Unilateral Transfers, are 13% of GDP! Philipinos working in the Middle East and elsewhere sending money home.
The World Map of Current Account Balances

If the United States is running a large current account deficit, some other countries must be running current account surpluses. We just saw that this is the case with China. But China does not explain all of the U.S. deficit. So there must be other countries running current account surpluses. Why? Because it must be the case that:

\[ CA^{US} + CA^{ROW} = 0, \]

where \( ROW \) stands for rest of the world.

So who is running big current account surpluses? Look at the map on the next page.
Observations on the Map

The map reflects not the current account of countries in a particular year, but the accumulated current accounts between 1980 and 2012. Clearly, the country with the biggest accumulated current account deficit (bright red) is the United States. The countries that have been financing these deficits (green) are China, Japan, Germany, and oil exporting countries (Russia, members of OPEC, and Norway).

Overall, the picture is one of unbalanced accumulated trade, with some countries running protracted current account deficits and others running protracted surpluses. If all countries were in balance, the map would look pastel white. Instead, it looks mostly either red or green, reflecting large global imbalances.
The Net International Investment Position

A country’s Net International Investment Position \( (NIIP) \) is the difference between its foreign asset position \( (A) \) and its foreign liability position \( (L) \)

\[
NIIP = A - L
\]

If the NIIP is negative, then the country has an external debt, and if the NIIP is positive, the country is a net creditor of the rest of the world.
Look at the next two figures. They show that the United States was:

– A net creditor of the rest of the world until the late 1980s

– A net external debtor since the late 1980s.

– The NIIP has been falling both in levels and as a fraction of GDP.

• In fact in the 1990s the United States became the largest external debtor in the world.
The U.S. Net International Investment Position (NIIP) 1976-2014
NIIP changes for 2 reasons

\[ \Delta NIIP = CA + \text{valuation changes} \]

- CA: The Current Account

- Valuation Changes: changes in the market value of the country’s foreign asset and liability positions (due to currency appreciations or depreciations, changes in stock prices, etc.)
We already looked at the U.S. current account data. We saw that the current account was in deficit since the early 1980s. These current account deficits should have resulted in a large deterioration of the NIIP.

Next let’s look at: **Valuation Changes**

Recall:

$$NIIP = A - L$$

- $A$ = assets (U.S.-owned foreign assets)
- $L$ = liabilities (foreign-owned U.S. assets)

Suppose German stocks held by U.S. residents loose value. Then $A$ falls and hence the NIIP deteriorates.
The Importance of Valuation Changes I

Recall that the NIIP can change either because of a CA deficit or surplus or because of valuation changes.

Look at the next figure which plots realized valuation changes since 1976. It shows that

- the United States experienced valuation gains much more often than valuation losses, 24 versus 14 times.

- Large valuation changes are a recent phenomenon. Until the year 2003, the typical valuation change was between -1 and +2 percent of GDP. Since 2003, however, we have observed valuations changes as large as ±15 percent of GDP.
For the U.S. more years with valuation gains than losses

Valuation Changes as Share of GDP, 1976-2014

Year Percent of GDP

1980
1990
2000
2010
Why have valuation changes become so large lately? One reason is that Gross Positions Have Exploded in the 2000s.

U.S.-Owned Assets Abroad (A) and Foreign-Owned Assets in the U.S. (L)
The Importance of Valuation Changes II:
Relative to the Current Account
The U.S. $CA$ and Changes in the $NIIP$: 1990-2014
Observations on the figure:

Points above the 45 degree line correspond to years with positive valuation changes and below the 45-degree line to negative valuation changes. 24 observations are above the 45-degree line and 14 below.

If valuation changes were quantitatively unimportant for the determination of the changes in NIIP all observations should lie in a narrow corridor around the 45 degree line. The graph shows that this is not the case. On the contrary, deviations from the 45-degree line are very large. With all of the largest valuation changes (positive or negative) occurring after 2000 (red dots).
How big would the U.S. external debt be today if it had not benefited from large positive valuation changes?

The next figure answers this question. It plots the actual U.S. NIIP and a hypothetical NIIP constructed by removing valuation changes from the actual NIIP.

To construct the hypothetical NIIP for a given year, start with the NIIP of the initial year, $NIIP_{1976}$, and add all of the CA balances from 1977 until the year of interest. For example, for 2014, the hypothetical NIIP is given by

$$\text{hypothetical } NIIP_{2014} = NIIP_{1976} + CA_{1977} + CA_{1978} + \ldots + CA_{2014}$$

If the U.S. hadn’t experienced large positive valuation changes on average, its external debt in 2014 would have been $9.9$ trillion (or 57% of GDP) instead of the actual $6.9$ trillion (or 40% of GDP).
The U.S. NIIP and the Hypothetical NIIP Since 1976 (billions of dollars)
The U.S. NIIP and the Hypothetical NIIP Without Valuation Changes Since 1976 (percent of GDP)
The Importance of Valuation Changes III: The Surprising Pre-Crisis Period: 2002-2007

Accumulated current account deficits: 4 trillion (or 32% of GDP)

Change in the Net International Investment Position: +0.1 trillion.

⇒ In spite of large CA deficits, the U.S. reduced its external debt. How did this happen?

– Large depreciation of the U.S. dollar (20%). Most of the U.S. foreign liabilities are in dollars, whereas most of the U.S. holdings of foreign assets are in foreign currency.


A free lunch?
The Negative-NIIP-Positive-NII Paradox
Suppose you had a negative balance on your credit card. Would you expect to receive interest payments from your credit card company or to have to make payments to your credit card company? Probably the latter.

Well, that is not what happens with the United States. Look at the next figure. Even though the U.S. is the largest external debtor in the world, it receives investment income from the rest of the world.

At the end of 2014, the U.S. net international investment position stood at $-7.0 trillion, and its net investment income was $+0.25 trillion.

How can this paradoxical situation happen? Here are two suggested explanations: Dark Matter and Return Differentials. After the next figure, we will spell them out.
Positive Net Investment Income And Negative NIIP: A Paradox?

Data Source: BEA, bea.gov, ITA, Table 1.1., (December 17, 2015 release)
What is plotted?

Blue line: Net Investment Income (NII), which are income receipts on U.S. owned assets abroad minus income payments on foreign-owned assets in the United States. [left scale, $bn]

Red line: Net International Investment Position (NIIP), which represents net foreign wealth of the United States. [right scale, $bn]


Data Source: Bureau of Economic Analysis. NIIP: Table 1. International Investment Position of the United States at the End of the Period. NII: U.S. International Transactions Accounts Data, Table 1. U.S. International Transactions, Lines 13 and 30;
Explaining the NII-NIIP Paradox: (I) Dark Matter

The Dark Matter hypothesis maintains that in reality the U.S. net international investment position is positive, but that the Bureau of Economic Analysis fails to account for all of it.

Assuming this theory is valid, how much dark matter is there in the NIIP? Let’s make a simple calculation. First some notation:

\[ T_{\text{NIIP}} = \text{the ‘true’ net international investment position.} \]

\[ \text{NIIP} = \text{The observed net international investment position, }$-7\text{ trillion in 2014.} \]

\[ \text{NII} = \text{Net investment income, }$0.25\text{ trillion in 2014.} \]
Net investment income is the return on the True Net International Investment Position. So, letting $r$ denote the interest rate, we have

$$NII = r TNIIP$$

Let’s take a value of of $r$ of 5% per year. Then solving for $TNIIP$ we have

$$TNIIP = NII/r = 0.25/0.05 = 5 \text{ trillion dollars}$$

Dark matter is simply the difference between the true and the recorded NIIPs, or

$$\text{Dark Matter} = TNIIP - NIIP = 5 - (-7.0) = 12 \text{ trillion dollars!}$$
So, according to the dark-matter theory, the U.S. doesn’t owe $7 trillion to the rest of the world. On the contrary, the rest of the world owes $5 trillion to the United States.

Well, 12 trillion dollars of dark matter simply seems too big a number to go unnoticed by the BEA (and the IRS!).
Explaining the NII-NIIP Paradox(II): Return Differential

This second explanation is motivated by the observation that the gross international asset position of the U.S. is mostly composed of risky but high-return assets, such as foreign stocks, whereas its gross international liability position is composed of safer low-return assets, such as U.S. T-bills.

Let $A$ continue to denote the U.S. international asset position and $L$ its international liability position. Then $NIIP = A - L$. Let $r^A$ be the return on $A$, and $r^L$ the return on $L$.

The question is how large does the interest rate differential on assets and liabilities, $r^A - r^L$, have to be to explain the paradox.

Start by noting that the NII must equal the difference between investment income and investment payments, that is,

$$NII = r^A A - r^L L.$$
Now let’s put some numbers. In 2014, the U.S. gross international asset position was $25 trillion, and its gross international liability position was $32 trillion. In addition, the average real rate of return on U.S. T-bills, which we will use as a proxy for $r^L$, was very low, 0.13% per year. (Data from the FRB.) Finally, as we mentioned earlier, NII was $25 billion (or 0.25 trillion). Thus, we set $A = 25$, $L = 32$, $NII = 0.25$, and $r^L = 0.0013$.

We wish to find the value of $r^A$ that solves the paradox. To this end, solve the above equation for $r^A$

$$r^A = \frac{NII + r^LL}{A} = \frac{0.25 + 0.0013 \times 32}{25} = 0.0117.$$  

That is, $r^A = 1.17\%$, or an interest rate differential between the U.S. foreign assets and liabilities of $r^A - r^L = 1.04\%$ per year. This doesn’t look like an exorbitant premium.
Why is it that a small interest rate differential suffices to explain the NII-NIIP paradox?

Take a look at the next figure (which we had already seen earlier in the lecture). It shows that gross asset and liability positions have exploded in past 30 years. They have roughly doubled every decade.

Hence just a small rate of return differentials can lead to a positive NII even though the NIIP is negative.
Gross Positions Have Exploded
U.S.-Owned Assets Abroad (A) and Foreign-Owned Assets in the U.S. (L)

- U.S.-owned assets abroad
- Foreign-owned assets in the United States

Percent of U.S. GDP

Year