

Section Notes - ECON 101b

September 8 1999

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Today

1. The Flow Diagram of the Economy
2. National Income or Product Accounting for an Open Economy
3. $Y(t)=C(t)+I(t)+G(t)+NX(t)$ as an equilibrium condition
4. The Income - Expenditure Diagram/ The Keynesian Cross
5. An Example of Comparative Statics

The Flow Diagram of the Economy

Circular Flow of Economic Activity

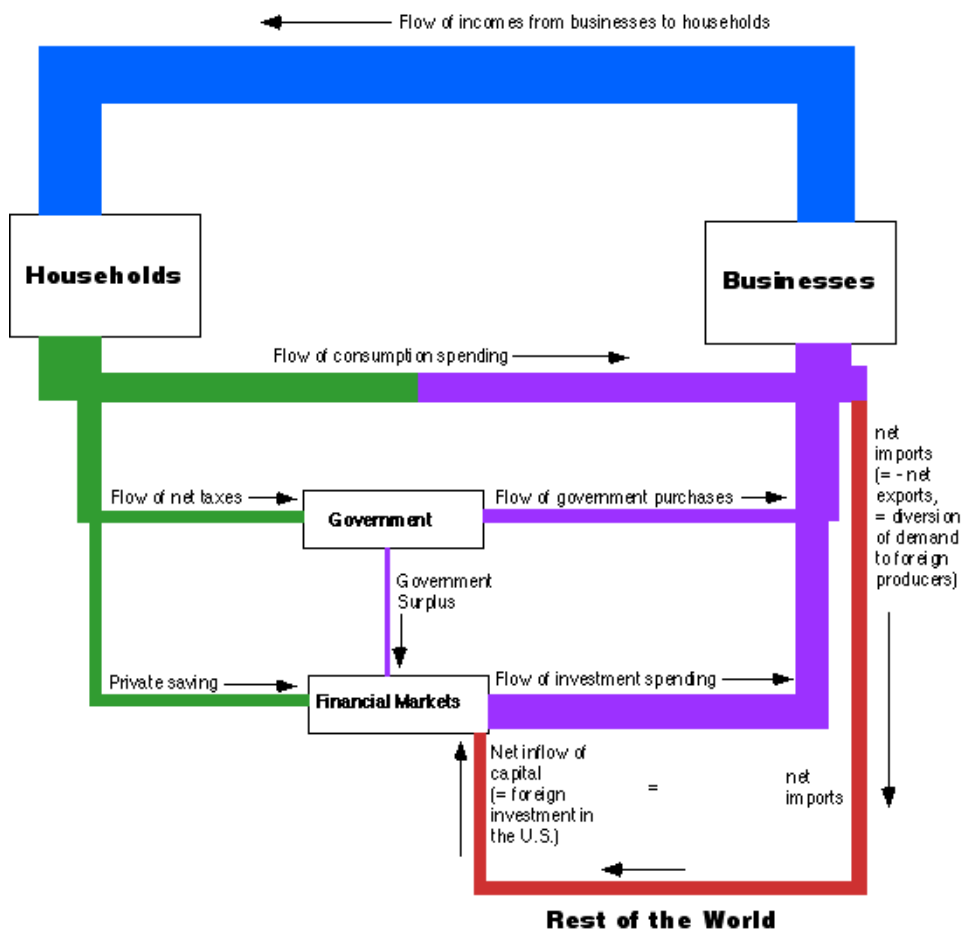


Figure 1

This diagram is useful to convince yourself of the equivalence of the three approaches to measurement of the GDP:

The upper part shows you the value added and income approaches. All forms of value added translate by definition to a form of income for households. Wages, interests, profits and rents all end up being earned by some households.

The lower part shows you the consumption approach. All income is spent on final goods either by households themselves or by the government or by firms doing investment with the savings made by the households and the government.

The Rest of the World diverts and adds some income and expenditure. Households spend part of their income on foreign goods and services. These do not generate domestic value-added. Conversely, foreigners spend part of their income on domestic goods, the production which generates value-added (and thus income.)

National Income / Product Accounting for an Open Economy

We derived the national income identity for a closed economy by assuming that all output was consumed or invested by the country's citizens or purchased by its government:

$$Y(t) = C(t) + I(t) + G(t) \quad (1)$$

Since foreign residents of an open economy may spend some of their income on imports (M), that is goods produced abroad, only the portion of their spending that is not devoted to imports is part of domestic Gross Domestic Product. Similarly, the goods and services sold to foreigners make up a country's exports (X). Exports are the amount foreign residents' purchases add to the national product of the domestic economy. Thus:

$$Y(t) = C(t) + I(t) + G(t) + X(t) - M(t) \quad (2)$$

or

$$Y(t) = C(t) + I(t) + G(t) + NX(t) \quad (3)$$

i.e. the domestic product of an open economy is equal to the sum of domestic and foreign expenditure on the goods and services produced by domestic factors of production.

A country's foreign trade is exactly balanced only rarely. The difference between exports of goods and services and imports of goods and services is known in International Economics as the *current account (balance)*:

$$CA(t) = X(t) - M(t) = NX(t) \quad (4)$$

We can rewrite (3) as:

$$Y(t) = C(t) + I(t) + G(t) + CA(t) \quad (5)$$

In other terms,

$$Y(t) - C(t) - I(t) - G(t) = CA(t) \quad (6)$$

Now, you can see that when a country imports more than it exports, it is buying more from foreigners than it is selling to them. So,

$$CA(t) = NX(t) < 0 \Leftrightarrow Y(t) < C(t) + I(t) + G(t) \quad (7)$$

i.e. this country is producing less than it is spending. Obviously, this is only possible if the domestic country is borrowing the difference from foreigners. (6) can also be rewritten as:

$$Y(t) - C(t) - T(t) - I(t) + T(t) - G(t) = CA(t) = NX(t) \quad (8)$$

$$S_p(t) - I(t) + S_g(t) = NX(t) \quad (9)$$

$$S(t) - I(t) = NX(t) \quad (10)$$

$$S(t) = I(t) + NX(t) \quad (11)$$

(11) shows that an open economy can save either by building up its capital stock or by running a current account surplus, i.e. by acquiring foreign wealth. Because one country's savings can be borrowed by a second country to increase the second country's stock of capital, a country's current account surplus is often referred to as its *net foreign investment*.

In addition to national income accounts, government statisticians also keep *balance of payments accounts*, a detailed record of the composition of the current account balance and of the many transactions that finance it. The *capital account* of the balance of payments records all international purchases or sales of assets. An asset is any one of the forms in which wealth can be held, such as money, stocks, factories, government debt, land, or say, rare postage stamps. Again, because there is nothing such as a free lunch at least at the aggregate level, a current account surplus must be reflected in a capital account deficit and vice versa:

$$\begin{aligned} \text{Current Account } (t) + \text{Capital Account } (t) &= \\ 0 \Leftrightarrow \text{NX } (t) = \text{NFI } (t) = -\text{Capital Account } (t) \end{aligned} \quad (12)$$

So, a current account surplus means that the domestic country is investing abroad or acquiring foreign assets more than the rest of the world is acquiring its assets, thus the capital account is in deficit.

$$Y(t) = C(t) + I(t) + G(t) + NX(t)$$

as an equilibrium condition

Now, what if

$$Y(t) > C(t) + I(t) + G(t) + NX(t) = E(t) \quad (13)$$

Then the economy is producing more than it is spending. Obviously then what must be going on is that businesses are building up inventories. Conversely if

$$Y(t) < C(t) + I(t) + G(t) + NX(t) \quad (14)$$

the economy is producing less than it is spending. Obviously then what must be going on is that businesses are running down these inventories. Since businesses don't want to build up or run down their inventories for long, economists take

$$Y(t) = C(t) + I(t) + G(t) + NX(t) = E(t) \quad (15)$$

as their *equilibrium condition*.

The Income - Expenditure Diagram / The Keynesian Cross

Now let's define the following *behavioral equation*:

$$C(t) = c_0 + cY(t) \quad (16)$$

assume for the time being that the other components of expenditure are not a function of income. We can rewrite (15) as

$$E(t) = c_0 + cY(t) + I(t) + G(t) + NX(t) \quad (17)$$

Using our *equilibrium condition* (15) we can rewrite (17) as:

$$Y(t) = c_0 + cY(t) + I(t) + G(t) + NX(t) \Leftrightarrow Y(t) = \frac{c_0 + I(t) + G(t) + NX(t)}{1 - c} \quad (18)$$

If we set $c=0.5$ e.g., that is consumption increases by half of any increase in income, we can draw the following diagram:

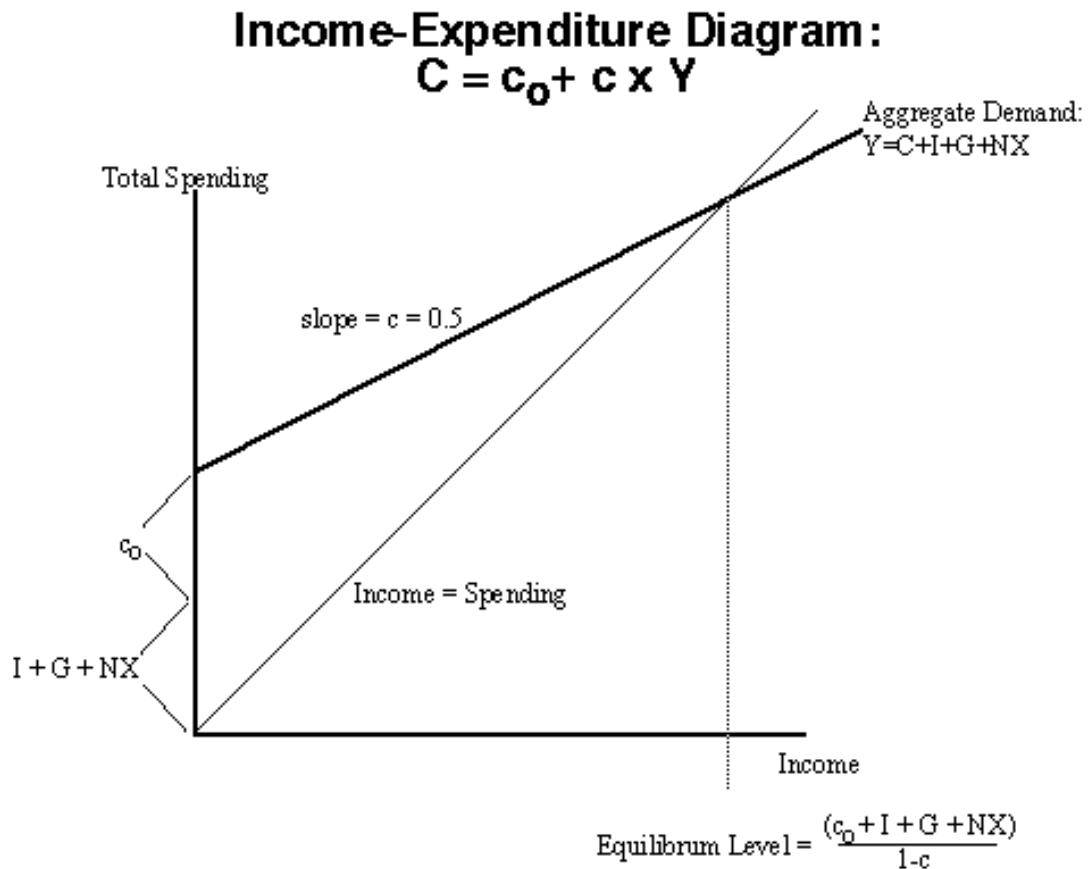


Figure 2

Below the equilibrium level,

$$Y(t) < E(t)$$

So businesses are running down their inventories and will react by increasing production (and thus income) until the equilibrium level of production and income is reached.

Above the equilibrium level,

$$Y(t) > E(t)$$

So businesses are building up their inventories and will react by decreasing production (and thus income) until the equilibrium level of production and income is reached.

An Example of Comparative Statics

In the context of this (over-) simplified model of the economy, we can now investigate the effect of an increase in consumer confidence in the economy. Assume that this rise in confidence basically increases the level of autonomous consumption c_0 . What is the resulting change in equilibrium income?

By total differentiation,

$$\Delta Y(t) = \frac{\Delta c_0 + \Delta I(t) + \Delta G(t) + \Delta NX(t)}{1 - c} \quad (19)$$

thus in our case

$$\Delta Y(t) = \frac{\Delta c_0}{1 - c} \quad (20)$$

Notice that since $c < 1$, the resulting change in income is larger than the initial increase in consumption Δc_0 . This is known as the multiplier effect.

Exercise: can you represent this comparative statics investigation graphically?