Macro Theory III.
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Addendum: National Income and Product Accounts

See notes on National Income and Product Accounts.

Comment 1:

Inventory Investment is the end of period value of inventories minus the beginning of period value. **Inventory stocks** are over 20 percent of annual GDP. A question is how to treat this stock. One option is to treat it as another form of capital and add it to the capital stock. This is what is done in the Growth Facts Exercise. The rationale for this approach is that businesses have inventories in order to economize on other inputs. A problem with this approach is that a substantial part of inventories consist of goods in process. There are half built office buildings. When the builder is paid for value put in place, the amount paid is investment in structures. The cost to the builder of constructing this unit is a negative inventory investment. The payment minus the cost is added to profits of the builder. Thus, both product and income increase by amount paid minus cost.

This leads to the second approach. Inventories are **goods in process**. There are stages of production. Partially constructed goods are goods in process. They don't provide capital services until they are completed. Kydland and I in "*Time to Build and Aggregate Fluctuations*" introduce this feature.

Clearly both elements are relevant for modeling the inventory investment statistic reported by the BEA. Kydland and I estimate that both elements are roughly equally important in this regard.

Comment 2:

An increasingly important sector is financial intermediation. The profit and loss statement of this sector is very different than that of other sector. The major source of revenue is the difference in interest payments received from borrowers and interest payments made from by lenders. To put it another way, net interest payments are a big negative number for this sector.

In dealing with this issue, there are two traditions. There is the U.S. NIPA tradition and the U.N. NIPA tradition. Recently there have been moves to a third approach, which is between the two and from the perspective of economic theory is more sensible.

The profit and loss statement of a financial intermediary is as follows:

Revenue = Net Interest + Fees

Value Added = Revenue – Use of Intermediate Goods

Profits = Value Added – Depreciation – Wages, Salaries and Other Compensations – Bad Debt
    – Property and Excise Taxes

Question: What is output of this sector?

The value of the output is revenue. If we had a price of the output, the quantity could be determined as *value = price × quantity*. Until recently the NIPA approach was to make up a price and use it to get real quantities. One approach used in the past assumed that output of banks is proportional to the number of employees. Needless to say with this approach, labor productivity was constant. Another approach used in the past was to assume output was proportional to real cash balances. Sentiment is building to move to a system that counts the number of transactions, which is an improvement for the banking sector.

The U.S. system assumes that the borrowers purchase banking services equal to the difference in the rate at which the bank lends and borrows times the amount the individual lends the bank. If the borrower is a household (or non-profit corporation), these imputed banking services are added to consumption. An equal amount of net interest income is imputed and added to net interest. This insures that income equals product.

The U.N. system assumes that the lender purchases the implicit banking services. If the lender is a business, as almost always is the case, these services are intermediate goods and are not part of final product. If they are consumption loan (not home mortgage loan) by a household, banking services are imputed and counted as part of consumption.

The new system is to have some market interest rate, say a short-term interest rate on government debt. If the lender to the intermediary is earning less than this rate, the difference in interest income is purchase of banking services. Again, if the lender is a household, these banking services are final goods and services and there must be imputed net interest income of

households. If the lender is a business, these services are intermediate good and there is no imputed net interest income. Now consider the borrower. If a borrower pays more than this short-term interest rate, the borrowers purchase of banking services is $L (i - i^*)$, where L is the amount borrowed, i is the interest rate on the loan and i^* is the short-term government interest rate.

This has important consequences for social security. If reported productivity growth is greater, the social security system in the United States is in much better shape. With current definitions, productivity growth in the financial intermediary sector is low relative to other sectors where there are much better measures of output.

Comment 3:

I discussed the banking sector. This sector's product is less than half the financial intermediation sector with total product equal to nearly 10 percent of GDP and value added equal to nearly 6 percent.