

# The National Accounts and the Public Sector

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Factors of production help interpret the national accounts. The factors are broadly classified as labor or (real) capital. The factors are rented by the organizations featured in the value-added computation: farms, nonfarm businesses, households, nonprofits, etc.

## Stocks versus Flows

A stock refers to the value of an asset at a point in time, while a flow refers to the total value of transactions during an accounting period.<sup>1</sup> A stock is some entity that is accumulated over time by inflows and/or depleted by outflows. Stocks can only be changed via flows. Flows typically are measured over an entire time interval (e.g., investment expenditures for the year), whereas stocks are measured at a particular point in time (e.g., capital in place on December 31<sup>st</sup>).

Incomes, expenditures, production, labor, and value-added are all flows. For example, “2004 GDP of \$11.7 trillion” means that gross domestic product added up over all of the days of 2004 totaled \$11.7 trillion.

Capital can sometimes be confusing as regards to stocks and flows. The term “capital” sometimes refers to the capital stock, which means (the value of) all of the productive assets in place at a point in time. In this course, “capital” will always have this meaning.<sup>2</sup>

## Factors in the Income Accounts

Rental payments are tracked in the income accounts. In theory, the income accounts have three types of income: labor income, capital income, and pure profits.

$$GDP = wN + (r+\delta)K + (\text{pure profits})$$

where  $N$  and  $K$  denote the amounts of labor and capital used in production in the country, respectively.  $wN$  is the amount of rental income paid to labor, so by definition  $w$  is the amount paid per unit labor used.  $w$  is often interpreted as the labor rental rate, as it would be if all labor were rented at the same rate.<sup>3</sup>

$(r+\delta)K$  is “gross” capital income (a flow). By the same logic,  $(r+\delta)$  is often interpreted as the “gross” capital rental rate. “Gross” refers to gross of capital

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<sup>1</sup> Please do not confuse the economic concept of “stock” with some of the various financial industry definitions. In the U.S. financial industry, “stock” can refer to a claim on a firm’s shareholders equity. In the British financial industry, “stock” can refer to a bond.

<sup>2</sup> “Capital” can also refer to “capital services”, which are the production services provided by an asset over a period of time. For example, a house is a stock, but the services it provides to its occupant over, say, a month, is a flow. Since this course, and almost all of economics, assumes that a capital stock and the productive services it provides are in a fixed proportion, you cannot go wrong with interpreting “capital” to mean the “capital stock.”

<sup>3</sup> Of course, labor rents for various rates (otherwise why go to business school?!). Nevertheless,  $w$  can (with some cautions noted later) often be interpreted as the average labor rental rate in the economy.

depreciation;  $r$  is the net capital rental rate. This is the same “gross” referenced in *GDP*. *NDP* is net domestic product; it does not include capital depreciation:

$$NDP = wN + rK + (\text{pure profits})$$

For the purposes of this course, we ignore the distinction between factors owned by foreigners and those owned by citizens, which is related to the difference between *GDP* and *GNP*.

“Pure profits” are the incomes that accrue to persons over and above what they earn from their contribution of factors of production. In theory, competition would limit pure profits. Later I will argue that pure profits are in fact negligible.

In practice, the income accounts do not conform exactly to their theoretical counterpart above, because a particular organization may supply multiple factors of production, and be entitled to pure profits, but receives a combined paycheck. For example, labor union members may earn some pure profits in addition to rental compensation for their labor supplied, but they receive a single “wage and salary” paycheck. An economist recognizes such a payment as a combined payment. Some of the income claimants in the income accounts are residual claimants, which means that in theory they receive two types of income – rental income as a capital owner and pure profits as owner of the organization. For the residual claimants, the national income accounts report only the sum of profits and the capital rental incomes (in one case, the labor rental incomes too). “Corporate profits” is the residual category for the corporate business sector. “Rental income” is the residual category for the owner-occupied housing sector. These incomes are usually interpreted as the sum of capital rental and pure profits, but not labor income because the residual claimants typically supply little or no labor by comparison with the capital they supply. For example, the vast majority of shareholders in corporations (weighted by the number of shares they own) do not spend their own time and effort helping with the daily operations of the corporation in which they have ownership. Among those who do, many of them are still supplying little time and effort as compared with capital (Bill Gates is an example).

“Proprietors’ income” is the residual category for the noncorporate business sector. In this case, the labor income component of that income cannot be neglected.<sup>4</sup> Usually economists either assume that the factor-components of proprietors’ income are either all labor income, or accrue in the same proportions as nonproprietors’ income (i.e., about 2/3 labor income, 1/3 capital income, and 0 pure profit). For the sake of simplicity, these notes assume the later:

$$wN \approx \text{“compensation of employees”} + \text{“proprietors’ income”}$$

$$rK \approx \text{“rental income”} + \text{“corporate profits”} + \text{“net interest”}$$

$$\text{pure profits} \approx 0$$

It can also be argued that indirect business taxes should be included in  $rK$ . See “Public and Private Sectors” below.

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<sup>4</sup> For example, two lawyers may form a law partnership in which each of them supplies 2500 hours per year worth of work time, and an office with furnishings and supplies worth \$500,000. The rental value of the office and supplies might be \$25,000 or \$30,000 per year (this would be a 5 or 6 percent annual rental rate), but the annual value of the time worked by the two partners might be over \$1,000,000 (this corresponds to an hourly time value of \$200).

Some countries have income accounts with just three categories: “compensation of employees”, “gross mixed income” and “gross operating surplus.” We interpret “gross mixed income” as “proprietors’ income” and “gross operating surplus” as the residual (i.e., the categories we interpret above as  $rK$ ).

### **Factors in the Expenditure Accounts**

The expenditure accounts track the uses of the economy’s output. One of the key entries is investment, which is the connection between the expenditure accounts and factors of production because the capital stock is the accumulation of past investment (a flow) net of depreciation (a flow).

Somewhat more complicated notation is needed to keep track of the relation between capital and investment. In particular, capital and investment have time subscripts.  $t$  denotes the time period (hereafter, a “year”).  $I_t$  is the total gross investment during the year. There are a couple of ways to time-subscript the capital stock; we let  $K_t$  denote the stock of capital in place at the end of year  $t$  (equivalently, at the beginning of year  $t+1$ ). We assume that the capital in place at the beginning of year  $t$ , which is  $K_{t-1}$  in our notation, is the capital available for production during the year; the  $K$ ’s appearing the income account formulas above would be subscripted by one year prior to the subscripts used for the flows of labor, pure profits, and production.

The simplest way to relate investment and capital is through an aggregate perpetual inventory formula.<sup>5</sup>

$$K_t = K_{t-1} - \delta K_{t-1} + I_t$$

where  $\delta$  is the fraction of the capital stock that depreciates during the year. In words, the formula says that the capital stock in place at the end of year  $t$  is the capital stock in place at the beginning of the year, minus depreciation during the year, plus gross investment occurring during the year. All of these items are measured in dollars (or whatever is the nation’s currency), even though some of them are stocks and others are flows.

Just like the income and value-added accounts, the expenditure accounts have “gross” and “net” versions, where “gross” refers to gross of depreciation. Gross expenditure is the sum of consumption, net exports, and gross investment. Gross investment is  $I$  in our notation. Net expenditure is the sum of consumption, net exports, and net investment. Net investment is gross investment minus depreciation, or  $(I_t - \delta K_{t-1})$  in our notation.

### **Private and Public Sectors: Principles and Measurement**

In principle, factors of production would be treated the same regardless of whether they were located in the private or public sectors. In this case, the total capital stock would be the sum of private and public capital stocks. Private (public) capital would be augmented by private (public) investment, respectively. In practice, public

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<sup>5</sup> The formula could be (and, in the actual national accounts, is) more complicated in several dimensions: allowing for depreciation rates that vary by asset type, age, and year; allowing for the price of investment goods to vary over time and across assets; etc. We do not consider these complications in our course.

investment is rarely measured separately from public consumption, so the national accounts have a single category “government consumption and gross investment.” The national accounts do distinguish private consumption (“Personal consumption expenditures”) from private investment (“gross private domestic investment”).

Another practical problem is valuing the output of the public sector. The national accounts value public output according to the cost of the factors used by the public sector, even though in principle any organization’s value-added (including public sector organizations) can be more or less than the cost of the factors it uses. The only case in which public sector organizations are treated like private sector organizations in this regard occurs when the former sells its output in a private market. In this case, the organization is called a “government enterprise”; examples include Amtrak and the Post Office.

This method of valuing public sector output can lead to double-counting of value added, to the extent that the public sector provides intermediate inputs to the business sector. Suppose, for example, that businesses need fire protection. If they hire it privately, their expenditures on fire protection would be subtracted (in effect, as a “cost of goods sold”) from their revenues when calculating value-added and profits. If the public sector provides the protection, its costs may or may not be reflected in the business sector’s COGS. If the public sector were financed with an indirect business tax (e.g., an excise or property tax), the national income accounts would look the same because indirect business taxes are subtracted from revenues when calculating profits. However, the value-added and expenditure accounts would not look the same, because (unlike private fire protection services) the public sector output is valued at cost regardless of whether it is an intermediate input. Regardless of whether this double-counting is “correct” or not, indirect business taxes have to be added to national income in order to make them consistent with the value-added and expenditure accounts.

If the public sector were financed with another tax, say a personal or corporate income tax, then the three accounts would be consistent without any adjustment because national income includes corporate and employee income *before* income taxes. The value-added accounts have the potential for double-counting regardless of how government is financed, namely that public sector output is valued at cost regardless of whether it is an intermediate input. Thus, consistency does not justify double-counting – it just explains why indirect (but not direct) taxes have to be added to national income.

A practical problem remains even if we could be assured that output were equal to the cost of the factors it uses, because of the problems with measuring government capital and the services that capital delivers. In most cases, government capital is not measured at all, and the “cost of the factors” just refers to the compensation of government employees. Even when government capital is measured, its income is imputed as only that amount needed to pay for its depreciation.

By definition, flows – of which income, value-added, and expenditure are examples – refer to an interval of time. The national accounts report flows for a calendar year (that is, the time interval beginning January 1 and ending December 31), or for a quarter. Government budgets are reported for fiscal years. The federal government fiscal year spans October 1 through September 30. State government fiscal years vary (e.g., New York’s fiscal year begins April 1, and begins July 1 for many other states).<sup>6</sup>

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<sup>6</sup> <http://www.washingtonpost.com/wp-dyn/content/article/2010/06/30/AR2010063005355.html>

## **The National Accounts, the Government Budget, and Government's Control over Resources**

We have already seen that the same GDP can be calculated in three ways – value-added, income, and expenditure. The government entries in each account are not the same, and none of them are equal to government spending.

The value-added account is organized according to the types of organizations doing the production, so the public sector entry in the value-added account is the sum of value-added by public organizations. This includes the value-added of public schools, public hospitals, the military, etc.

Public sector value-added is different from government spending for a number of reasons. Public sector value-added is less than government spending to the extent that the government disburses revenues to the private sectors. For example, suppose the government's only spending were on hospitals. Some of its hospital spending went to fund public hospitals, and the rest went to reimbursing patients for the medical bills they incurred at private hospitals. Then public sector value-added would be the value-added of the public hospitals, but government spending would be the sum of the spending by the public hospitals and the government spending on medical reimbursements.

The income accounts accumulate income to the factors of production, gross of direct taxes. For example, "compensation of employees" includes not only the pay that employees take home, but also the taxes that are withheld from their paychecks and taxes that employers pay on their behalf. The income entries do not include transfer payments to individuals.

The public sector has explicit entries in the income accounts only to reconcile them with the value-added and expenditure accounts. Indirect taxes (see above) is one of the reconciling entries. The government enterprise surplus is another, because government enterprises can create more (less) value than income to the extent that their value added exceeds what they pay employees (and the value of their capital's depreciation). Note that the government enterprise surplus is not the same as the government budget surplus, because the former includes only the parts of the government that are considered enterprise (that is, they sell their output in the marketplace).

The reconciling entries are distinct from government spending, and in some ways are opposite to it: indirect taxes and government enterprise surplus are sources of revenue for the government, not types of disbursements.

As noted above, the expenditure accounts distinguish various uses of the nation's output, regardless of who decides on that output and what they produced to earn their income. One of the distinctions is whether the use occurs in the private sector – its uses consist of personal consumption expenditures and gross private domestic investment – or in the public sector. The public sector entry – government consumption and investment – is sometimes called government purchases. Government purchases include the salaries paid to government employees such as soldiers or public school teachers and merchandise purchased by the government from private sector purchases such as military equipment or school equipment made by private contractors. Thus, the government purchases shown in the expenditure account are typically larger than the government value-added shown in the value-added account.

Government spending is the sum of government purchases and government transfer payments. Government transfer payments are not entered in any of the national accounts: they appear according to the recipient's spending of those funds. If the recipient of, say, a social security payment spends his funds on consumption items produced by private enterprises, then his transfer payments are associated with consumption in the expenditure account and business value-added in the value-added account. It would be double counting to include the transfer payments explicitly – because then they would count once when received and another when spent.

From the government budget perspective, transfer payments are funded with either indirect taxes, direct taxes, or government borrowing. Indirect taxes were discussed above. The other two are already included in the income entries in the sense that incomes are calculated without making any subtractions for funds the earner may give to the government in the form of direct taxes or purchases of government bonds.

The government controls resources by specifying its purchases – what it wants to buy – and by attaching conditions to those who receive its transfers.<sup>7</sup> But it can also command resources off-budget by attaching conditions to tax breaks, and by issuing regulations. If a nation, say, switched from offering medical care at public hospitals to requiring employers to reimburse private hospitals for medical care provided to their current and former employees, that would have little (if any) effect on its command of the economy's resources, but it would reduce government payroll, government value-added, government purchases, and government spending.

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<sup>7</sup> For example, the government can offer a subsidy to a farmer for not plowing his field, or to an elderly person who quits his job.

## **Summary**

These notes discuss the economic interpretation of the national accounts, with special emphasis on the public sector. The factors of production are broadly classified as labor or capital. Value added, income, and expenditure all relate to the factors of production. Government appears in the value-added account because it is one of the institutions that produces. The expenditure accounts show how much capital is accumulated rather than consumed, and government appears in those accounts because both consumption and investment can be directed by the government rather than private persons or businesses. The income accounts feature the rental incomes enjoyed by those owning production factors; government appears there to reconcile those incomes with value-added and national expenditure.