Lesson 02　GDP

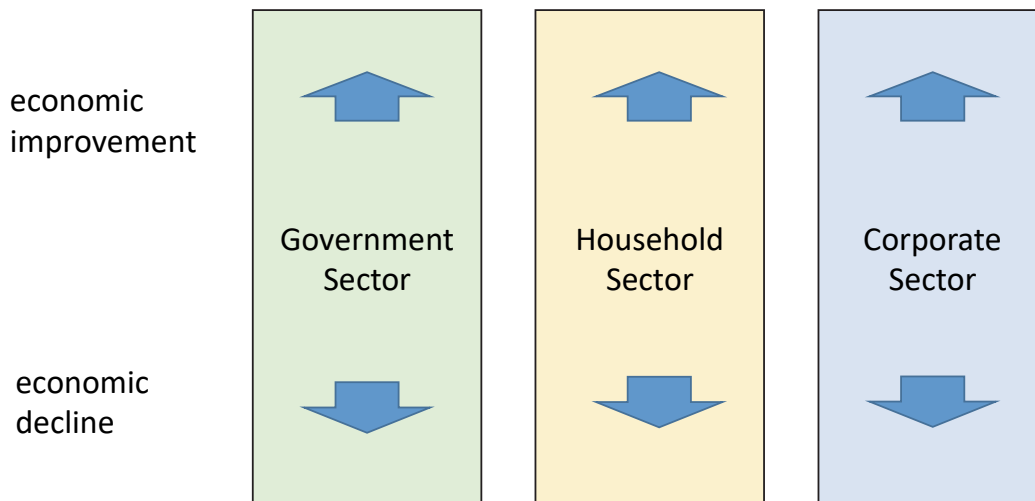## （1）　The three sectors of the economy

When conducting economic analysis, it is common to divide the economy into several economic entities (sectors). In such cases, the major categories are generally

- ☑　Household Sector (Personal Income)
- ☑　Corporate Sector (Corporate Profit)
- ☑　Government Sector (Government balance)

In the common sense, the economic activities of the "government," households and businesses aside, may not ring a bell, but if we consider that we receive various services from the government in exchange for payment of "taxes," we can understand that the "government" is responsible for economic activities. These three economic sectors do not operate separately, but depend on each other to shape Japan's economic activities as a whole.

Figure 4　Relationship between the three sectors in the economy (economic expansion/contraction spiral)

（２） GDP and value added

Various economic indicators are published by many ministries and agencies that are useful for understanding economic trends, but the most important one for analyzing the economic trends of the country as a whole is the GDP (Gross Domestic Product). GDP is a value that shows how much economic production activity took place in a country during a year. It is not, however, the sum of a company's sales, but rather the total "value added" produced in a country during the year. More specifically, it is the sum of what each person produces minus the cost of raw materials purchased for that production.

For example, let us assume an economy consisting of only three parties: "Mr. A, who produces wheat," "Mr. B, who makes flour from that wheat," and "Mr. C, who makes bread from the flour."
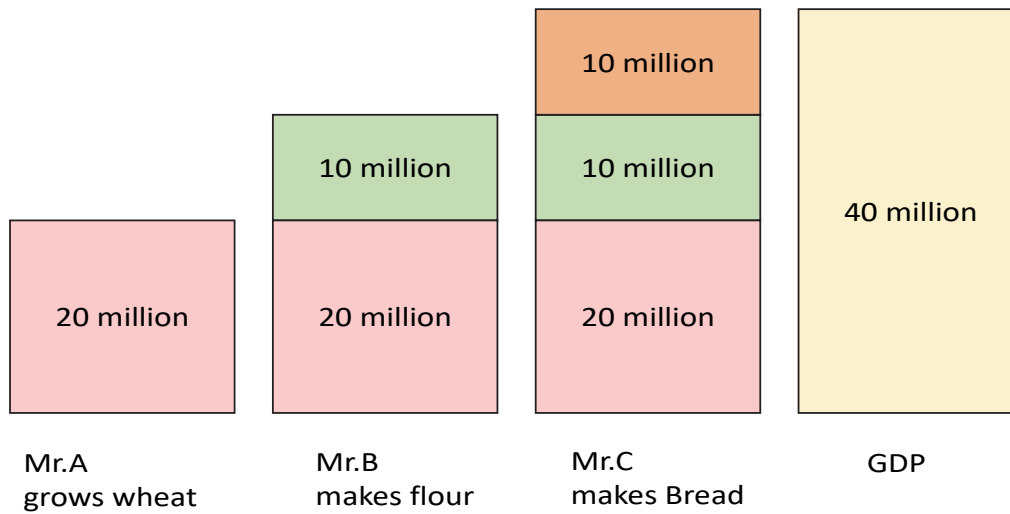
☑ Mr. A sows seeds from the wheat harvested last year, grows wheat, and sells it to Mr. B for 20 million yen.

☑ Mr. B makes flour from wheat purchased from Mr. A and sells it to Mr. C for 30 million yen.

☑ Mr. C made and sold 40 million yen worth of bread using flour purchased from Mr. B.

Suppose this is the only economic activity in this country during the year. Then the GDP of this country is

✓ Mr. A's value added: 20 million.

✓ Mr. B's value added: 30 million – 20 million = 10 million.

✓ Mr. C's value added: 40 million – 30 million = 10 million.

The total amount of value added is 40 million yen.

Figure 5　Value added and GDP calculation

For example, the sum of the sales of each of A, B, and C,

　　　i.e., 20 million + 30 million + 40 million = 90 million.

is not GDP, because Mr. B's sales of 30 million yen includes the value added created by Mr. A and Mr. C's sales of 40 million yen includes the duplicated value added created by both Mr. A and Mr. B.

　　In addition, in the above example, there is no raw material cost for Mr. A's wheat production, but if, for example, Mr. A had purchased wheat seeds from a foreign country for 5 million yen,

　　Mr. A's value added: 20 million – 5 million = 15 million.

　　and the country's GDP = 35 million.

　　If you purchase goods produced in a foreign country, they are deductible because they are not part of the production activity in this country.

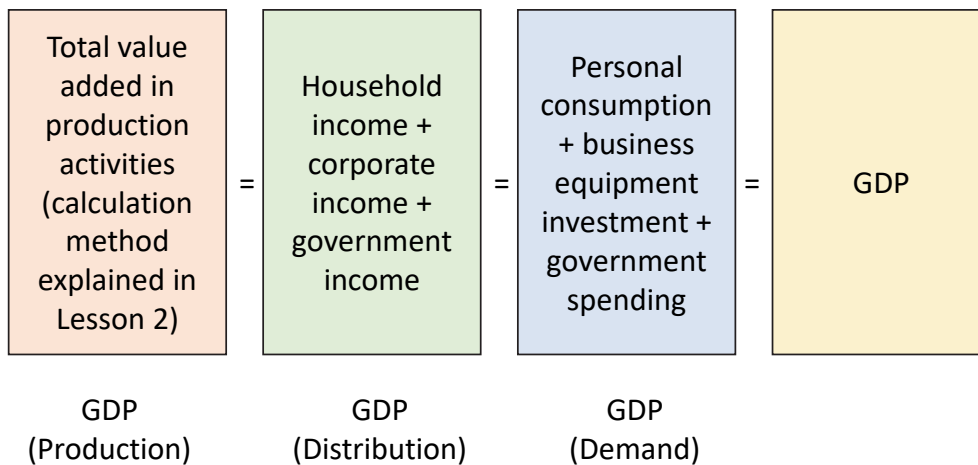# Lesson 03　GDP and the principle of the three-sided equivalence

（１）　The principle of the three-sided equivalence of GDP

　GDP represents a country's "production." The production activity also generates profits, which are "distributed" in some form to companies, households, the government, and so on. In addition, in order for production to take place in the first place, there must be a background of "demand." GDP is analyzed not only in terms of "production" but also in terms of "distribution" and "demand."

　And if we consider that the profits generated by production must surely be distributed to someone, and that there is always demand to back up production, the following equation holds.

GDP (Production) = GDP (Distribution) = GDP (Demand)

Figure 6　Principle of GDP triadic equivalence

Total value added in production activities (calculation method explained in Lesson 2)	=	Household income + corporate income + government income	=	Personal consumption + business equipment investment + government spending	=	GDP
GDP (Production)		GDP (Distribution)		GDP (Demand)		

　This is called the "three-sided equivalence principle" of GDP. In actual corporate activities, it is not correct to say that production and demand are equal, since it is possible that a company may misread demand, produce goods, and store them in a warehouse without selling them. In this case, however, GDP statistics treat the demand as "investment in inventories," and the figures are consistent with GDP from the production side.

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＜GDP calculation formula from the demand side＞

Y(GDP) = C(Consumption) + I(Investment) + G(Government) + X(Export) − M(Import)

・C：Goods and services consumed in the private sector

・I：Goods and services used for production in the private sector
　　(housing investment + capital investment + inventory investment)

・G：Goods and services related to government consumption and public construction
　　(government consumption + government investment)

・X：Goods and services exported

・M：Goods and services imported

（２）　Net Domestic Product (NDP)

　Gross domestic product minus "depreciation" is "Net Domestic Product (NDP)." Depreciation is an annual charge to expense the depreciated portion of an asset that is used continuously over time, such as plant and equipment. When a factory is built to produce a new product, the factory is not a "raw material" and the money spent to build the factory is not recognized as "cost of sales" in corporate accounting. However, in reality, the factory is considered to be gradually becoming "raw material" because the factory equipment becomes old and obsolete through use over time. Therefore, the basic idea behind depreciation is to recognize the money invested to build the factory as "depreciation" expense little by little. In terms of the original meaning of "value added," the value added should be the remainder after deducting not only raw materials but also depreciation from sales.

Net Domestic Product (NDP) = GDP − Depreciation

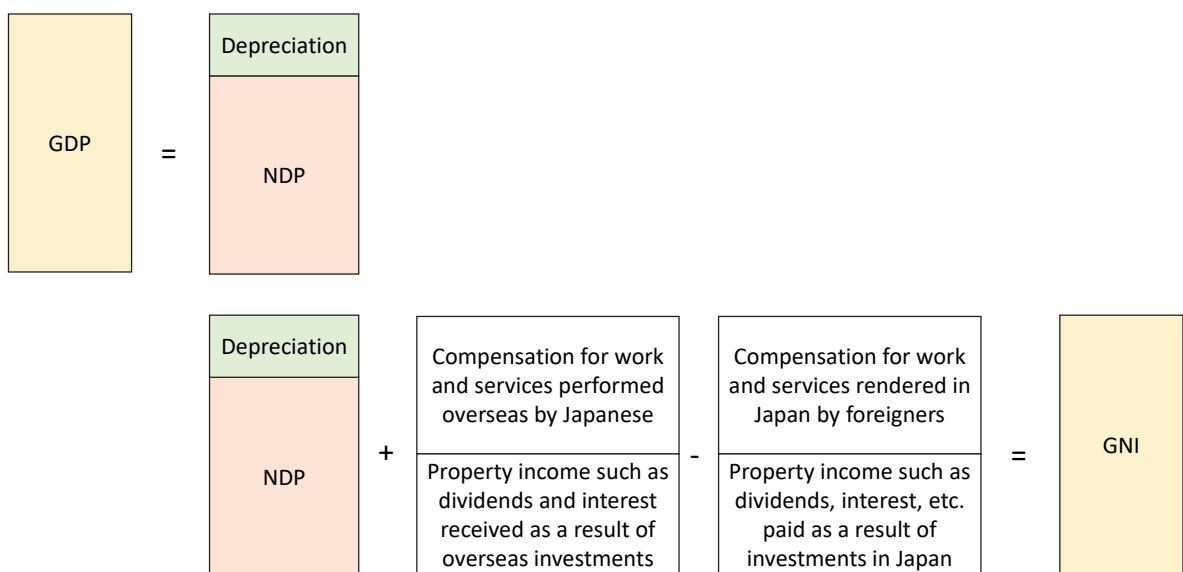## （３）　Gross National Income (GNI)

　Another concept that is very close to GDP is Gross National Product (GNP). While GDP represents "domestic" production activities, GNP represents "national" production activities. In the past, GDP ≒ GNP, and GNP was often used because there was little need to be aware of the difference between "domestic" and "national," but recently GDP, which indicates "domestic" economic activity, is more commonly used. However, the SNA (System of National Accounts), which was established by the United Nations, is used as the standard for calculating GDP. (System of National Accounts, 1993), the concept of GNP has been eliminated, and the concept of Gross National Income (GNI), which is almost the same as GNP, is used. GNI is the Gross Domestic Product (GDP) plus income received by the Japanese from abroad, minus expenditures paid to foreigners in Japan.

GNI = GDP

+ (Compensation for work and services performed overseas by Japanese nationals and Japanese companies, Property income such as dividends and interest received as a result of overseas investments)

− (Compensation for work and services rendered in Japan by foreigners and foreign companies, Property income such as dividends, interest, etc. paid as a result of investments in Japan)

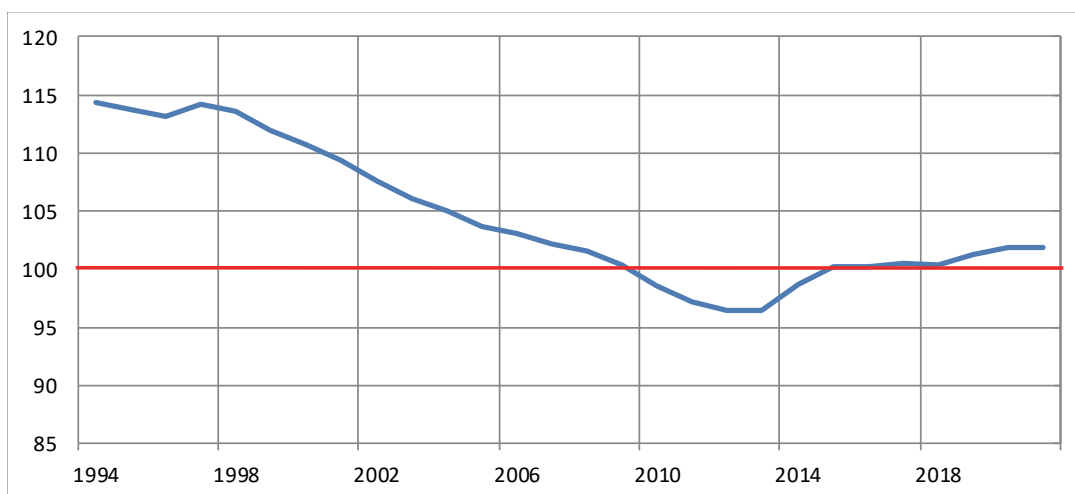**Figure 7**　Types of economic scale concepts

Lesson 04　GDP statistics and GDP deflator

（1）Real GDP and Nominal GDP

　After World War II, until around the time of high growth, we were in a situation where the prices of many things were rising every year. When prices are rising rapidly in this state, it is necessary to consider the impact of prices on the value of money as well. For example, if our salary doubled from 200,000 yen per month last year to 400,000 yen per month this year, but prices in the world also doubled compared to last year, we should consider that our salary is essentially the same whether it was last year or this year. In such a case, the economic analysis will show that our salary for this year is "400,000 yen in nominal terms, 200,000 yen in real terms." "Nominal" refers to the figure "before taking into account the effect of prices," while "real" refers to the figure "after taking into account and adjusting for the effect of prices." Some economic indicators provide two figures: the "nominal" figure before reflecting changes in prices and the "real" figure after reflecting changes in prices.

　GDP also includes nominal GDP and real GDP (GDP recalculated using prices in a certain base year). Although real GDP should be looked at in order to understand more essential economic trends, it is possible to understand the movement of prices and other factors by comparing nominal GDP with real GDP. The value obtained by dividing nominal GDP by real GDP is called the "GDP deflator." The GDP deflator is particularly noteworthy as it shows price movements in the economy as a whole. When "nominal GDP＞real GDP," it indicates that prices are rising. When "Nominal GDP＝Real GDP," the GDP deflator is 100.

Figure 8　GDP deflator trends (FY1994-FY2021)

　＊ Fiscal year deflator = nominal GDP / real GDP x 100
　＊ Compiled from Cabinet Office data

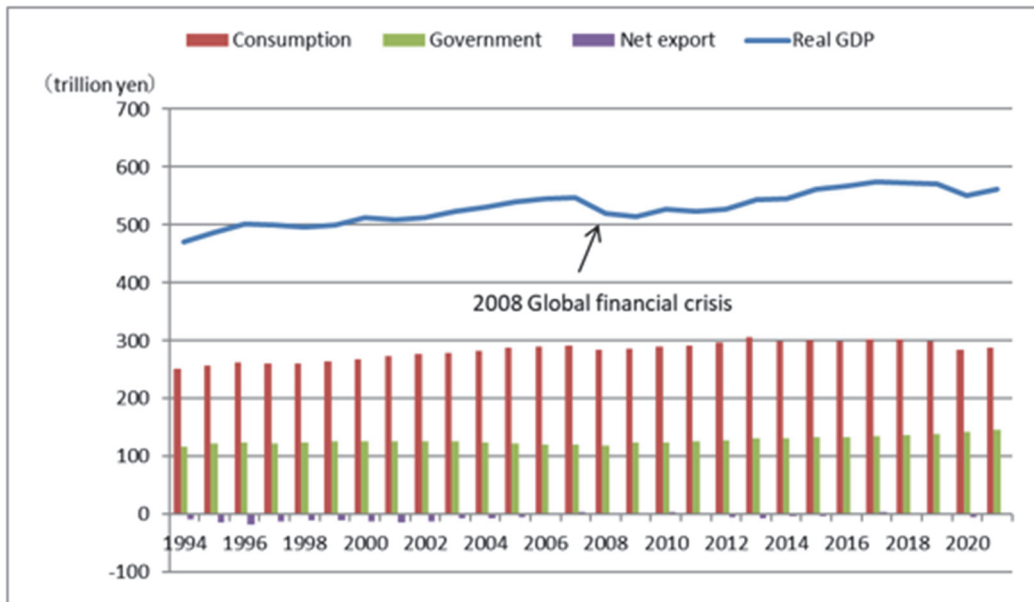**Figure 9**　Real GDP trends (FY1994-FY2021) (Unit: trillion yen)

FY	Real GDP Amount	Real GDP Growth	Final consumption expenditure Amount	Final consumption expenditure Growth	Final consumption expenditure Contribution	Private residence Amount	Facilities Amount	Facilities Contribution	Increase in inventory Amount	Total public needs Amount	Total public needs Growth	Total public needs Contribution	Final govt spending Amount	Fixed Capital Amount	Increase in public inventory Amount	Net export Amount	Export Amount	Export Growth	Import Amount	Import Growth
1994/4-3.	448	-	251	-	56.0%	32	67	15.0%	-1	119	-	26.7%	73	46	1	-9	39	-	48.0	-
1995/4-3.	462	3.2%	257	2.4%	55.6%	31	73	15.7%	1	125	4.6%	27.0%	76	49	0	-15	40	4.1%	55.0	14.6%
1996/4-3.	476	2.9%	263	2.4%	55.3%	34	77	16.2%	2	126	0.6%	26.4%	77	48	0	-17	43	6.5%	60.0	9.1%
1997/4-3.	475	-0.1%	260	-1.1%	54.7%	29	79	16.6%	3	123	-1.7%	26.0%	78	45	0	-12	47	9.0%	58.8	-2.0%
1998/4-3.	471	-1.0%	261	0.3%	55.5%	26	76	16.1%	0	126	1.7%	26.7%	80	46	0	-10	45	-3.8%	55.0	-6.6%
1999/4-3.	473	0.6%	264	1.4%	55.9%	27	75	15.8%	-3	128	2.2%	27.1%	83	46	0	-11	48	6.1%	58.6	6.6%
2000/4-3.	486	2.6%	268	1.4%	55.3%	27	79	16.3%	1	128	-0.2%	26.4%	86	42	0	-12	52	9.7%	64.7	10.3%
2001/4-3.	482	-0.7%	273	1.9%	56.7%	25	76	15.8%	-1	128	-0.3%	26.5%	88	40	0	-14	48	-7.6%	62.6	-3.2%
2002/4-3.	487	0.9%	277	1.2%	56.9%	25	74	15.2%	-1	127	-0.3%	26.1%	89	38	0	-11	54	12.2%	65.6	4.8%
2003/4-3.	496	1.9%	279	0.7%	56.2%	25	76	15.4%	1	126	-0.9%	25.4%	91	35	0	-7	60	10.0%	67.2	2.4%
2004/4-3.	504	1.7%	282	1.2%	56.0%	26	79	15.7%	2	124	-1.4%	24.6%	92	33	0	-7	67	11.8%	73.3	9.0%
2005/4-3.	515	2.2%	287	1.8%	55.8%	26	85	16.6%	1	122	-1.8%	23.7%	92	30	0	-5	73	9.4%	77.7	6.0%
2006/4-3.	522	1.3%	289	0.6%	55.4%	26	87	16.7%	1	121	-1.1%	23.1%	93	28	0	-1	79	8.7%	80.5	3.6%
2007/4-3.	527	1.1%	291	0.7%	55.2%	22	87	16.4%	2	121	0.4%	23.0%	94	27	0	4	87	9.5%	82.5	2.5%
2008/4-3.	508	-3.6%	285	-2.1%	56.0%	22	82	16.0%	2	119	-1.5%	23.5%	93	26	0	-1	78	-10.2%	79.0	-4.3%
2009/4-3.	496	-2.4%	287	0.7%	57.8%	17	72	14.6%	-5	124	4.1%	25.0%	96	28	0	0	71	-9.0%	70.6	-10.5%
2010/4-3.	512	3.3%	290	1.3%	56.7%	18	74	14.4%	1	124	0.1%	24.2%	98	26	0	5	84	17.9%	79.2	12.2%
2011/4-3.	515	0.5%	292	0.6%	56.8%	19	77	14.9%	2	126	1.1%	24.4%	100	26	0	-1	83	-1.4%	83.3	5.2%
2012/4-3.	518	0.6%	297	1.7%	57.4%	20	78	15.0%	0	127	1.3%	24.5%	101	26	0	-5	82	-1.4%	86.4	3.8%
2013/4-3.	532	2.7%	306	2.9%	57.5%	22	82	15.4%	-1	131	3.2%	24.7%	103	28	0	-7	85	4.4%	92.5	7.0%
2014/4-3.	530	-0.4%	298	-2.6%	56.2%	20	84	15.9%	0	131	0.2%	24.8%	104	27	0	-3	93	8.9%	96.1	3.9%
2015/4-3.	539	1.7%	300	0.7%	55.6%	20	87	16.1%	1	133	1.4%	24.7%	106	27	0	-3	94	1.1%	96.5	0.4%
2016/4-3.	543	0.8%	299	-0.3%	55.0%	21	88	16.2%	0	134	0.6%	24.7%	107	27	0	1	97	3.4%	96.1	-0.5%
2017/4-3.	553	1.8%	302	1.0%	54.6%	21	90	16.3%	2	135	0.6%	24.4%	107	27	0	3	103	6.3%	99.7	3.8%
2018/4-3.	555	0.2%	302	0.1%	54.5%	20	92	16.5%	2	136	0.9%	24.6%	109	28	0	2	105	2.0%	102.7	3.0%
2019/4-3.	550	-0.8%	300	-0.9%	54.5%	20	91	16.5%	1	139	2.1%	25.3%	111	28	0	1	103	-2.3%	103.0	0.2%
2020/4-3.	527	-4.1%	284	-5.1%	53.9%	19	85	16.2%	-1	143	3.1%	27.2%	114	29	0	-4	92	-10.0%	96.5	-6.3%
2021/4-3.	541	2.5%	289	1.5%	53.4%	19	87	16.1%	1	145	1.4%	26.9%	118	28	0	0	104	12.3%	103.3	7.1%

* Growth　: Growth rate of the previous year

* Contribution　: GDP Contribution rate

（２）　Ratio of personal consumption to real GDP

　　Figure 10 shows real GDP and its breakdown. It should be noted that private final consumption expenditures account for more than 50% of the total. This is the reason why it is often said that "a recovery in private consumption is important for economic recovery." The growth rate of real GDP is called the "economic growth rate."

Figure 10 Real GDP trends (FY1994-FY2021)

* Compiled from Cabinet Office data

（３） Real GDP and private final consumption expenditure growth

Check out the significant drop in consumer spending during the Lehman and Corona shock. The economy and personal consumption are thus closely related.

Figure 11 Real GDP and private demand growth vs. previous year (FY1994-FY2021)

* Compiled from Cabinet Office data

Related Sites

・Cabinet Office: National Accounts (GDP Statistics) https://www.esri.cao.go.jp/jp/sna/menu.html