

Table 1. Classification of Income Taxes, Consumption Taxes, and Property Taxes

	Income Taxes		Consumption Taxes		Property Taxes		Other
	Individual Income Taxes	Corporate Income Taxes	Specific Consumption Taxes	General Consumption Taxes	Asset Holding Taxes	Asset Transfer Taxes	
Prefectural Taxes	prefectural inhabitant tax, enterprise tax	prefectural inhabitant tax, enterprise tax, mineral products tax	prefectural tobacco tax, local entertainment tax, food and drink consumption tax, entertainment, food, and beverage tax, golf course use tax, special local consumption tax, light-oil delivery tax, accommodation tax	local consumption tax	vehicle tax, mining area tax, prefectural fixed asset tax	real estate acquisition tax, automobile acquisition tax, hunting license tax, hunting tax	taxes for non-statutory purposes, taxes due to former laws
Municipal Taxes	municipal inhabitant tax	municipal inhabitant tax	municipal tobacco tax, electric and gas tax, timber transaction tax, bath tax	-	fixed asset tax, city planning tax, special landholding tax, light vehicle tax, business office tax	-	taxes for non-statutory purposes, taxes due to former laws

Table 2. Sources of Statistics Used

Tax Variables	
Tax Burden Ratio	Ministry of Internal Affairs and Communications (Ministry of Home Affairs), <i>Annual Report of Local Finances</i> .
Classification of Tax Revenues by Sources (Income Taxes, Consumption Taxes, Property Taxes)	Ministry of Internal Affairs and Communications, <i>Local Tax Bureau, Reference Data on Local Taxes</i> .
Direct- Indirect Taxes Ratio	Cabinet Office, <i>Prefectural Economic Calculations</i> . ( <a href="http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html">http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html</a> )
Non-tax Variables	
Economic Growth Rate	Cabinet Office, <i>Prefectural Economic Calculations</i> . ( <a href="http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html">http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html</a> )  Cabinet Office, <i>National Economic Calculations, Confirmed Data</i> . ( <a href="http://www.esri.cao.go.jp/jp/sna/data/data_list/kakuhou/files/files_kakuhou.html">http://www.esri.cao.go.jp/jp/sna/data/data_list/kakuhou/files/files_kakuhou.html</a> )
Physical Capital Human Capital Population	Ministry of Internal Affairs and Communications (Ministry of Home Affairs), <i>Annual Report of Local Finances</i> .  Ministry of Internal Affairs and Communications, Bureau of Statistics, <i>Labor Force Survey: Long-Term Time Series Data</i> . ( <a href="http://www.stat.go.jp/data/roudou/longtime/03roudou.htm">http://www.stat.go.jp/data/roudou/longtime/03roudou.htm</a> )  Tokyo Metropolitan Area, <i>Tokyo Statistical Yearbook</i> . ( <a href="http://www.toukei.metro.tokyo.jp/tnenkan/tn-index.htm">http://www.toukei.metro.tokyo.jp/tnenkan/tn-index.htm</a> )  Cabinet Office, <i>Prefectural Economic Calculations</i> . ( <a href="http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html">http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html</a> )

Table 3. Descriptive Statistics

	Sample Size	Mean	Median	Maximum	Minimum	Standard Deviation
Real Economic Growth Rate Per Capita of Labor Force Population (gr1)	51	3.72	3.48	14.17	-5.85	4.57
Rate of Change of Physical Capital Investment Rate (gcf)	51	-0.52	-0.26	13.16	-13.55	5.15
Rate of Change of Human Capital Investment Rate (Gross Education Expenditures: hc)	51	0.11	-0.71	29.94	-10.12	5.90
Rate of Change of Human Capital Investment Rate (Elementary/Secondary Education Expenditures: hc1)	51	-0.92	-2.52	24.35	-12.59	6.80
Growth Rate of Labor Force Population (lfgrowth)	51	-0.06	-0.08	1.39	-1.85	0.69
Tax Burden Ratio (taxburden)	51	9.73	9.39	14.09	6.57	2.34
Direct-Indirect Taxes Ratio (dtoitaxratio)	51	9.15	7.63	27.32	2.49	7.13
Income Taxes (itaxes)	51	61.55	64.03	75.28	43.99	8.30
Individual Income Taxes (iitaxes)	51	23.32	23.92	28.19	15.23	3.16
Corporate Income Taxes (citaxes)	51	38.22	40.50	53.19	20.10	7.83
Consumption Taxes (ctaxes)	51	11.31	11.57	28.57	3.50	7.89
Specific Consumption Taxes (sctaxes)	51	11.31	11.11	18.75	3.50	4.27
General Consumption Taxes (gctaxes)	51	3.02	0.00	12.95	0.00	5.11
Property Taxes (ptaxes)	51	24.05	23.51	34.60	18.70	3.76
Recurrent Real Estate Taxes (ptaxes1)	51	15.26	14.89	22.87	10.76	3.20
Asset Holding Taxes (ahtaxes)	51	21.38	20.82	30.17	16.97	3.46
Asset Transfer Taxes (attaxes)	51	2.66	2.66	4.59	1.38	0.75
Consumption Taxes & Property Taxes (cptaxes)	51	38.36	35.87	56.00	23.96	8.35

Table 4. Unit Root Tests

Variable	Constant Term		Constant Term + Trend Term	
	ADF Test	PP Test	ADF Test	PP Test
Real Economic Growth Rate Per Capita of Labor Force Population (gr1)	-3.784(0)***	-3.736(3)***	-5.111(0)***	-5.165(1)***
Rate of Change of Physical Capital Investment Rate (gfcf)	-5.320(0)***	-5.320(0)***	-5.255(0)***	-5.255(0)***
Rate of Change of Human Capital Investment Rate (Gross Education Expenditures: hc)	-3.145(1)**	-5.122(3)***	-5.002(0)***	-5.034(2)***
Rate of Change of Human Capital Investment Rate (Elementary/Secondary Education Expenditures: hc1)	-5.380(0)***	-5.490(4)***	-5.321(0)***	-5.436(4)***
Growth Rate of Labor Force Population (lfpgrowth)	-6.696(1)***	-7.906(4)***	-6.879(1)***	-8.432(7)***
Tax Burden Ratio (taxburden)	-0.589(0) -7.842(0)***	-0.314(6) -8.045(5)***	-3.299(0)* -7.773(0)***	-3.325(1)* -7.972(5)***
Direct·Indirect Taxes Ratio (dtoitaxratio)	-1.522(0) -6.217(0)***	-1.743(3) -6.217(1)***	-1.447(0) -6.242(0)***	-1.569(2) -6.242(0)***
Income Taxes (itaxes)	-1.759(1) -4.917(1)***	-1.014(1) -3.875(7)***	-2.540(1) -4.929(0)***	-1.701(0) -3.820(7)**
Individual Income Taxes (iitaxes)	-3.789(0)***	-3.172(2)** -6.415(1)***	-3.744(2)** -3.591(1)**	-3.096(2) -6.400(0)***
Corporate Income Taxes (citaxes)	-0.700(0)* -5.316(0)***	-0.970(1) -5.149(5)***	-2.324(1) -5.287(0)***	-1.862(1) -5.060(6)***
Consumption Taxes (ctaxes)	-0.612(1) -5.612(0)***	-1.180(1) -4.751(5)***	-2.048(1) -4.957(0)***	-1.479(0) -4.746(6)***
Specific Consumption Taxes (sctaxes)	-2.155(1) -6.233(0)***	-1.710(1) -6.235(1)***	-1.875(1) -5.756(0)***	-1.676(1) -5.657(5)***
General Consumption Taxes (gctaxes)	-0.977(1) -4.608(0)***	-0.196(0) -4.394(6)***	-2.266(1) -4.623(0)***	-1.531(0) -4.294(4)***
Property Taxes (ptaxes)	-3.251(2)** -4.937(0)***	-2.025(3) -4.893(1)***	-3.530(2)** -4.888(0)***	-2.440(3) -4.811(1)***
Recurrent Real Estate Taxes (ptaxes1)	-2.852(2)** -4.584(0)***	-1.752(3) -4.503(1)***	-3.963(2)** -4.156(0)***	-2.615(3) -4.439(1)***
Asset Holding Taxes (ahtaxes)	-3.199(2)** -4.940(0)***	-1.548(3) -4.878(1)***	-3.895(2)** -4.877(0)***	-2.583(4) -6.074(3)***
Asset Transfer Taxes (attaxes)	-2.350(1) -6.505(0)***	-2.146(5) -7.166(19)***	-2.567(1) -6.578(0)***	-2.079(9) -13.735(48)***
Consumption Taxes & Property Taxes (cptaxes)	-0.121(1) -6.481(0)***	-0.168(2) -6.468(2)***	-1.556(0) -6.735(1)***	-1.573(0) -6.735(0)***

Note: · \* indicates significance level. \*\*\*: 1%; \*\*: 5%; \*: 10%.

· Lag order is enclosed in parentheses.

· In each cell, the first line shows the case of no difference; the second line shows the case of a difference in the first step.

**Table 5. Cointegration Tests**

Estimating Equation	Variable	Lag Order of VARM	Cointegration Number (5% Significance)
1	gr1, gfcf, hc, lfpgrowth, c	1	—
2	gr1, gfcf, hc1, lfpgrowth, c	1	—
3	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(dtoitaxratio), c	4	3
4	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(dtoitaxratio), c	4	2
5	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(itaxes), c	4	2
6	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(itaxes), c	1	4
7	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(iitaxes), d(citaxes), c	4	4
8	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(iitaxes), d(citaxes), c	4	3
9	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(ctaxes), c	4	3
10	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(ctaxes), c	4	2
11	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(sctaxes), d(gctaxes), c	4	4
12	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(sctaxes), d(gctaxes), c	4	4
13	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(ptaxes), c	4	3
14	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(ptaxes), c	4	2
15	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(ptaxes1), c	4	2
16	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(ptaxes1), c	4	2
17	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(ahtaxes), d(attaxes), c	4	4
18	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(ahtaxes), d(attaxes), c	4	4
19	gr1, gfcf, hc, lfpgrowth, d(taxburden), d(cptaxes), c	4	3
20	gr1, gfcf, hc1, lfpgrowth, d(taxburden), d(cptaxes), c	4	3

Note: Cointegration number is based on the Akaike Information Criteria (AIC).

**Table 6. Jarque–Bera Tests**

Estimating Equation	Test Statistic	p-value
1	182.34	0.00
2	29.56	0.00
3	25.48	0.01
4	31.30	0.00
5	42.00	0.00
6	33.85	0.00
7	9.60	0.79*
8	14.28	0.42*
9	9.27	0.67*
10	43.17	0.00
11	15.31	0.35*
12	11.75	0.62*
13	24.52	0.00
14	8.90	0.71*
15	23.86	0.02
16	13.85	0.31*
17	100.11	0.00
18	37.65	0.00
19	10.52	0.57*
20	20.24	0.06*

Note: \* denotes cases whose error terms follow a normal distribution.

Figure 1. Tax Burden Ratio (%)

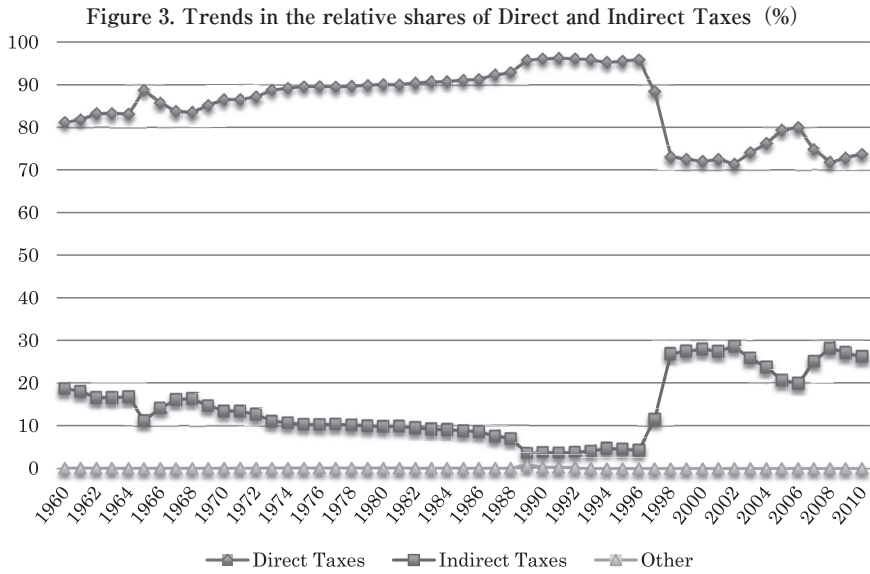


Source: See Table 2.

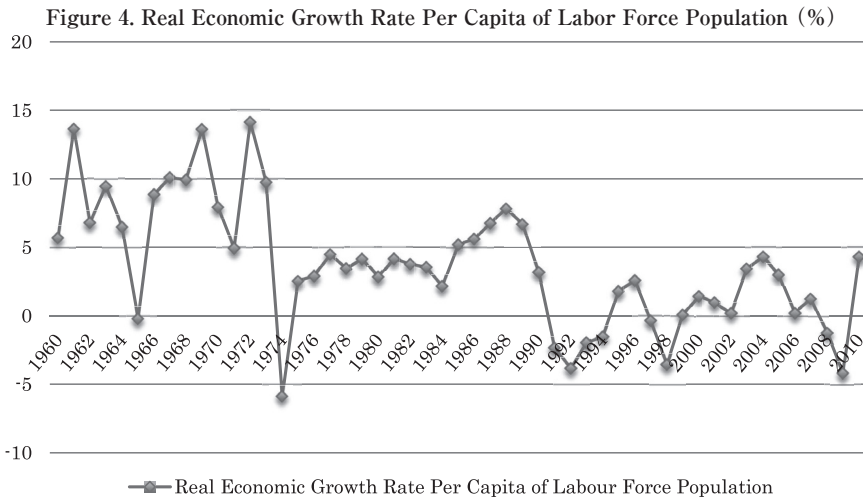
Figure 2. Trends in Income Taxes, Consumption Taxes, and Property Taxes (%)



Source: See Table 2.



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