(Summary)

Stagnation and Structural Adjustments of
Nonmanufacturing Industries during the 1990s[1] [2]

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(Introduction)

Since the burst of the financial bubble at the beginning of the 1990s, the Japanese economy has seen several signs of recovery only to find them elusive before consolidating its growth.   Among the factors which apparently weakened this recovery process, particularly after 1993, is the stagnation of nonmanufacturing industry.   The operating profits-to-sales ratio of the nonmanufacturing industry, for example, has kept declining and thus shown a stark contrast with the ratio of the manufacturing industry, which improved from 1993 to 1997 (Chart 1).   Moreover, the recovery of the business fixed investment of the nonmanufacturing industry has lagged far behind that of the manufacturing industry since 1993.   This clearly goes against expectations from past experience, which indicate a faster investment recovery in the nonmanufacturing industry than in the manufacturing industry (Chart 2).

The Japanese economy is no exception in experiencing an expansion of the service sector, and the share of the nonmanufacturing industry in the overall economy has now overwhelmed that of the manufacturing industry (Chart 3).   Besides, the nonmanufacturing industry has often underpinned the Japanese economy when it faced unfavorable macroeconomic conditions such as a sharp appreciation of the yen, by leading a recovery of business fixed investment and absorbing excess employment of the manufacturing industry.   Meanwhile, the nonmanufacturing industry still contains

many regulated industries, which lack competition and incentives to improve productivity and thus render prices extremely high compared to those in foreign countries. During the 1990s, deregulation has progressed in the nonmanufacturing industry while the manufacturing industry has intensified its efforts to reduce costs against the background of globalization and the sharp appreciation of the yen. If these environmental changes have some relation with the sluggish performance of the nonmanufacturing industry during the 1990s, the current problems of the nonmanufacturing industry can be understood as being structural rather than cyclical.

The purpose of this paper is to analyze the background of this sluggish performance of the nonmanufacturing industry during the 1990s, mainly using profit indicators. Given the importance of the nonmanufacturing industry in the Japanese economy as well as the seemingly structural nature of its problems, this analysis is also expected to provide some insight regarding the desired state of the Japanese economy for the coming century.[3]

(Summary of the analysis)

1.   A downward deviation of the operating profits ratio from that of the manufacturing industry is observed not only for the overall nonmanufacturing industry but also for many individual nonmanufacturing industries, indicating that this phenomenon is not necessarily due to the poor performance of specific industries (Chart 4). Interestingly, during the 1990s, the quantity of service output has kept increasing despite some deceleration while the quantity of manufacturing production has declined dramatically (Chart 5). This contrast seems to reflect the ongoing trend of service economy's expansion as well as the significant appreciation of the yen during the first half of the 1990s, which is supposed to increase the demand for non-tradable goods through the improvement in the terms of trade. The developments in goods and service prices, however, provide some clues for understanding the weak performance of the nonmanufacturing industry during this period. As Chart 5 indicates, service prices (CSPI), which seem to have had downward rigidity and thus moved independently from goods prices (OPI) before 1988, have shown increasingly similar movements with the

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[3] Due to some data availability problems, in this paper, unless otherwise noted, "the nonmanufacturing industry" refers to the following six industries: wholesale and retail, construction, real estate, transportation and communication, services, and electricity and gas.

OPI since then and consequently followed the downward trend of the OPI. As this trend continued even after the increase in nominal wages accelerated from 1993, this naturally squeezed the profit margin of the nonmanufacturing industry more significantly than that of the manufacturing industry, which depends less on labor inputs (Chart 6). This price development implies that the increasing difficulty for the nonmanufacturing industry to set prices so as to maintain a constant margin over costs might have triggered the downward deviation of its operating profits ratio during the 1990s.

2.   In the past, the nonmanufacturing industry had maintained its profits, which were more or less equivalent to those of the manufacturing industry, by increasing its prices so as to offset its lower productivity growth vis-à-vis manufacturing[4]. For example, the profit expansion of the nonmanufacturing industry since 1970 can be explained mainly by the increase in prices and output, and only very marginally by productivity growth (Chart 7). This illustrates a sharp contrast with the manufacturing industry, where profit expansion heavily depends on the productivity improvement. In addition, the relation between price increases and productivity growth of individual industries shows a clear negative correlation in the past (Chart 8). As stated before, however, the price developments in the nonmanufacturing industry during the 1990s indicate increasing difficulty in maintaining this mechanism. The results of some statistical analysis (principal component analysis) on the operating profits ratios of manufacturing and nonmanufacturing industries, which are subdivided by firm size, provide some support for this argument (Chart 9). The analysis indicates an emergence of the primary principal component[5] with unfamiliar features since 1993, one which exerts an influence in opposite directions on the profits of the manufacturing and nonmanufacturing industries. Furthermore, the movement of this principal component

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[4] This price-setting mechanism coincides with the one indicated by the so-called "structural inflation theory". This theory explains that the nonmanufacturing industry has limited room for productivity growth compared to manufacturing due to its heavy dependence on labor inputs. The nonmanufacturing industry, however, offsets this lower productivity growth by increasing its prices (structural inflation), which is supposed to be easier than in manufacturing given the low prices and the high income elasticity of the demand for services.

[5] The primary principal component is the factor which can explain the largest part of variance of data series. For example, if profits of all industries tend to be strongly affected by the capacity utilization, the primary principal component in this case is very likely to be the factor, whose movements are very similar to that of capacity utilization.

is found to be highly correlated with the movement of the GDP deflator (Chart 9).[6] One interpretation of this finding is that the increasing difficulty of the nonmanufacturing industry to maintain a fixed markup ratio over costs led to a decline in structural inflation and subsequently in the GDP deflator.

3.　　　Behind the discontinuation of the conventional price-setting mechanism of the nonmanufacturing industry during the 1990s lie structural changes on the supply side, such as the formation of excess supply capacity and increasing pressures for reducing profit margins owing to deregulation and globalization[7]. The estimated amount of excess employment in the nonmanufacturing industry[8], for example, has increased rapidly following an increase in the manufacturing industry, and maintained almost the same high level as the manufacturing industry since 1994 (Chart 10). Among specific industries, the retail and wholesale, construction, and transportation and communication industries show particularly high levels of excess employment. Furthermore, similar results are obtained from estimates of the supply-demand gap, which takes into account not only labor but also capital input[9]. These estimates indicate that the retail and wholesale, construction, and transportation and commutation industries have experienced huge supply-demand gaps during the 1990s (Chart 11).

There seem to be three factors which can explain why the nonmanufacturing

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[6] As Chart 9 indicates, the first principal components before 1992 tended to influence the profits of the manufacturing and nonmanufacturing industries (except large firms) in the same direction, and these components often showed very similar movements to the capacity utilization of the manufacturing industry.

[7] As stated before, service prices have declined while the quantity of service output has slightly increased during the 1990s. In the framework of demand and supply curves, such a phenomenon can occur only when the supply curve shifts rightward or downward. The creation of excess supply capacity, for example, is supposed to cause a rightward shift of the supply curve, while the increase in pressures for reducing profit margin is supposed to cause a downward shift.

[8] The amount of excess employment is estimated by assuming a rough correspondence with deviations in the labor share of income from its long-term trend (1975-1997).

[9] For this estimation, we first confirm the existence of cointegration between real GDP, labor input, and capital input for each industry during periods when no major innovations occurred. As this is confirmed for all the concerned industries, we then assume the estimated output drawn by this long-run relation and the actual value of labor and capital inputs as the potential supply capacity. Finally, we regard the difference between this estimated supply capacity and actual real GDP as the supply-demand gap.

industry built up such an excess supply capacity during the 1990s: 1) consumption-related industries such as the retail and wholesale industry maintained relatively optimistic expectations of future demand even after the burst of the financial bubble (Chart 12), 2) deregulation in the retail and wholesale industry (the revision of the Large-Scale Retail Store Law in 1992), and the transportation and communication industry (the permission of outright sales of phone equipment in 1994) amplified their optimistic prospects for future demand, and led to aggressive strategy to capture larger market shares in the early stage of deregulation (Chart 13), and 3) because of widespread concerns regarding a shortage of labor supply over the medium term, the nonmanufacturing industry increased employment aggressively regardless of the actual demand conditions[10] (Chart 14).

4.   Restructuring efforts by the manufacturing industry to minimize costs also seem to have changed the price-setting mechanism of the nonmanufacturing industry. Regression analysis on the relative prices of nonmanufacturing vis-à-vis manufacturing indicates clearly that the ratio of selling and administrative expenses to sales (this ratio is used as a proxy variable to represent the degree of cost reduction efforts by the manufacturing industry) affected the relative prices of the nonmanufacturing industry significantly and positively (Chart 15). This analysis also shows that the remarkable deceleration and recent decrease in this expenses ratio of manufacturing surely exerted downward pressure on the increase in the relative prices of nonmanufacturing, particularly since 1993.

Estimates of the markup function and demand function for each nonmanufacturing industry[11] then shed light on the changes in the margins of individual nonmanufacturing industries (Chart 16). For many nonmanufacturing industries (especially, the retail and wholesale, transportation and communication, and service

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[10] The nonmanufacturing industry's rush for employment is partly because medium and small-sized firms account for a large share of nonmanufacturing and thus have always been in a disadvantageous position to secure a sufficient number of workers in the past.

[11] For estimating these functions, we use relative indicators of individual industries against the overall economy for dependent and independent variables. For example, the quantity of demand of industry A is equal to the real GDP share of industry A. Likewise, the price of the service output of industry A is equal to the ratio of the GDP deflator of industry A to the overall GDP deflator. This device is aimed at avoiding the multicollinearity problem as well as identifying clear features of individual industries. In this analysis, for convenience we assume that firms markup on average costs rather than marginal costs.

industries), the parameter which represents the size of the markup ("b" in Chart 16) declined dramatically after the middle of the 1980s, possibly due to intensified competition during this period. Moreover, deregulation dummy variables for the retail and wholesale, and transportation and communication industries ("c_1" and "c_2" in Chart 16, respectively) are found to be significant and have negative coefficients, indicating that deregulation in these industries has dampened their supply prices.

5.   In conclusion, the above analysis clarifies that the sluggish operating profits ratio of the nonmanufacturing industry since 1993 can mainly be attributed to the following two factors: 1) the manufacturing industry's intensified efforts to reduce costs against the background of heightening world competition and deregulation measures left the nonmanufacturing industry in a more and more difficult position to maintain its conventional markup pricing even when labor costs started to soar,   2) relatively optimistic prospects for future demand and concerns regarding a labor shortage over the medium term encouraged the nonmanufacturing industry to build up excess supply capacity.   This conclusion can lead to an insight into the current fragile Japanese economy, which is still struggling for recovery even long after the burst of the financial bubble, that is: the Japanese economy has been plagued not only by the aftermath of the financial bubble, but also by structural downward pressures on the profit margin of the nonmanufacturing industry, which accounts for almost 70 percent of the Japanese economy.

It should be noted, however, that these structural pressures on the nonmanufacturing industry, which were partly triggered by deregulation measures, cannot be avoided if the Japanese economy is to achieve balanced growth over the long term.   An ever increasing gap in service prices between Japan and foreign countries due to the low productivity of the nonmanufacturing industry will only lead to a further weakening of the manufacturing industry's competitiveness.   In this sense, what the Japanese economy needs now is to expedite the process of deregulation rather than slow it down, and thereby motivate the nonmanufacturing industry to improve its productivity in a more competitive environment and expand its business frontiers.
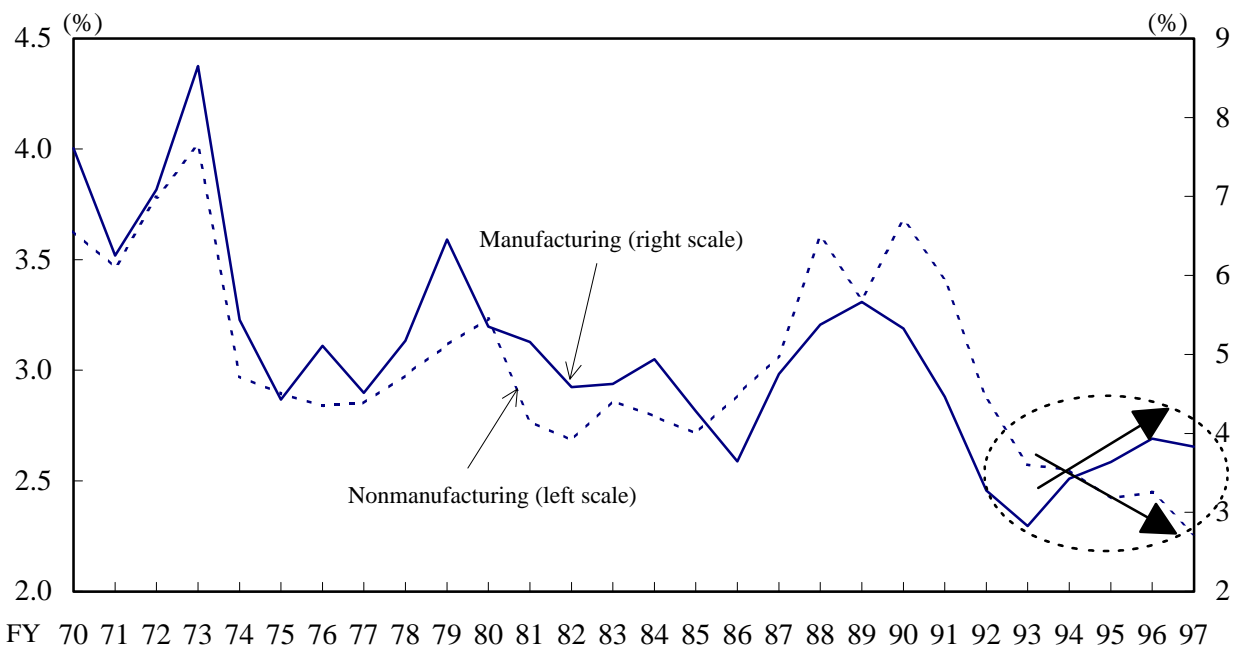
(Chart 1)

Profit to Sales Ratios of Manufacturing and Nonmanufacturing Industries

(1) Current Profit to Sales Ratio
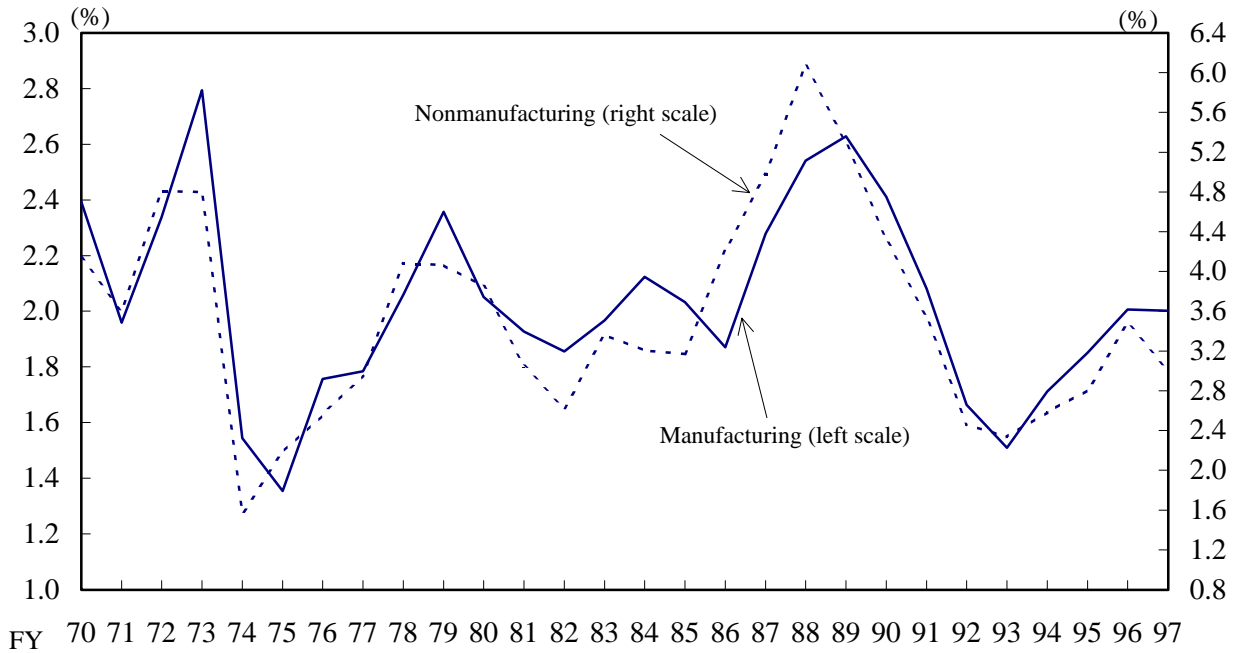

(2) Operating Profit to Sales Ratio

Note: Due to the Wholesale and Retail industry, which is featured by a high turnover, profit to sales ratios of nonmanufacturing tend to be far smaller than that of manufacturing. In the above charts scales are adjusted so that the two ratios are easily comparable.
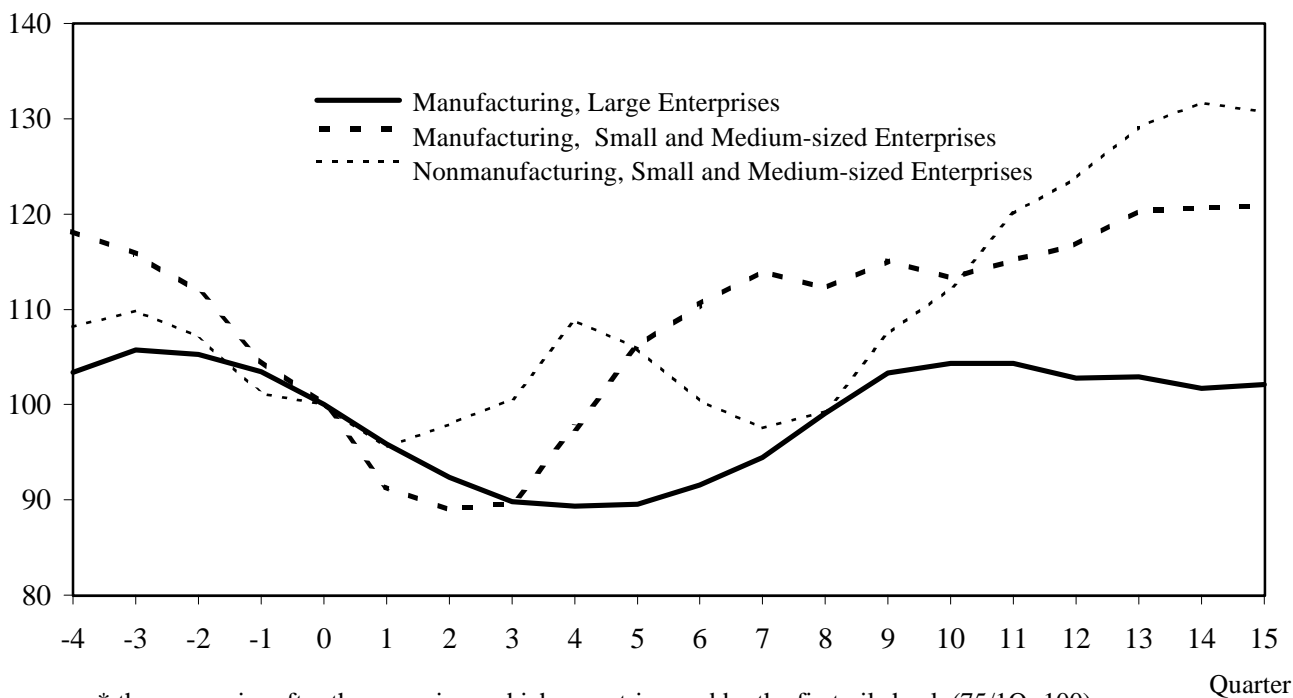
Source: Ministry of Finance, "Quarterly Statistics of Financial Statements of Incorporated Enterprises."

(Chart 2)

Recovering Patterns of Business Fixed Investment

(1) Recent Recovery (93/4Q=100)
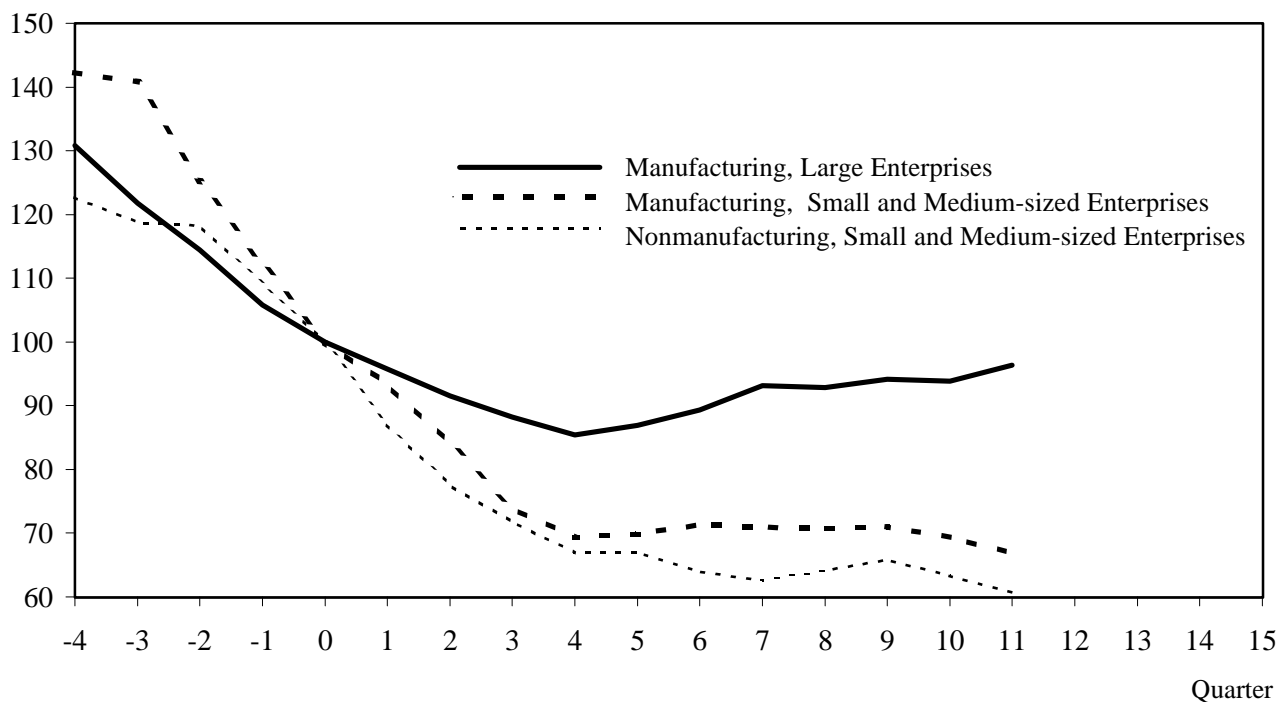
(2) Average of the past 3 recovering periods*

Quarter

* the recoveries after the recessions which were triggered by the first oil shock (75/1Q=100),
the second oil shock (83/1Q=100) and the sharp appreciation of yen (86/4Q=100)

Notes: 1. Seasonally adjusted series for per enterprise values.
    2. Large Enterprises are those that capitalized at one billion yen or more and Small and Medium-sized
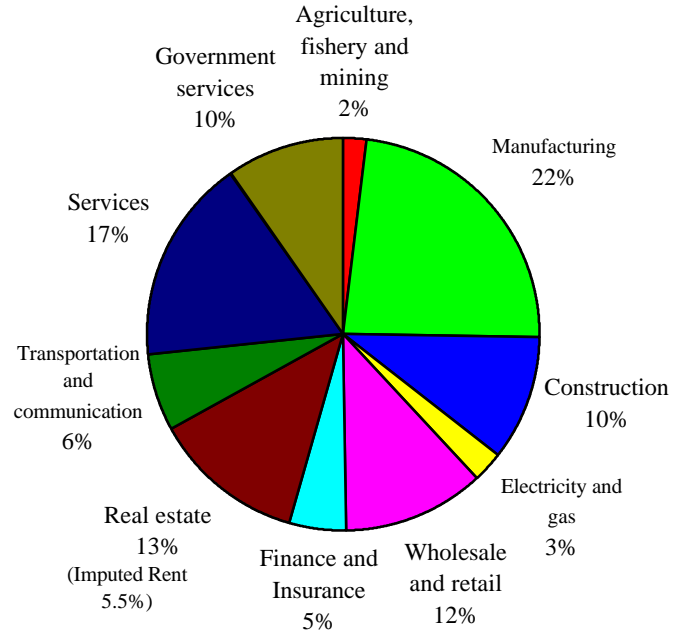   Enterprises are at 100 million yen or less.
Source: Ministry of Finance, "Quarterly Statistics of Financial Statements of Incorporated Enterprises."

(Chart 3)

Share of the Nonmanufacturing Industry in the Japanese Economy
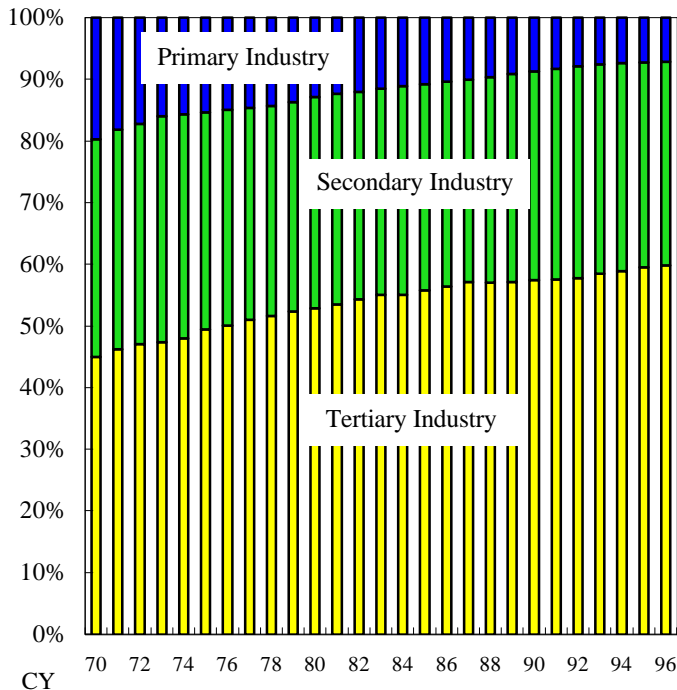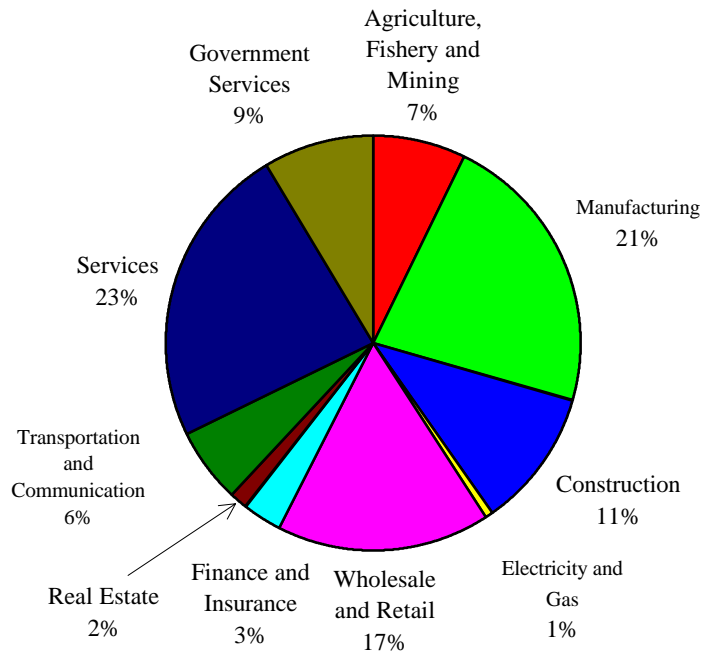
(1) Value Added
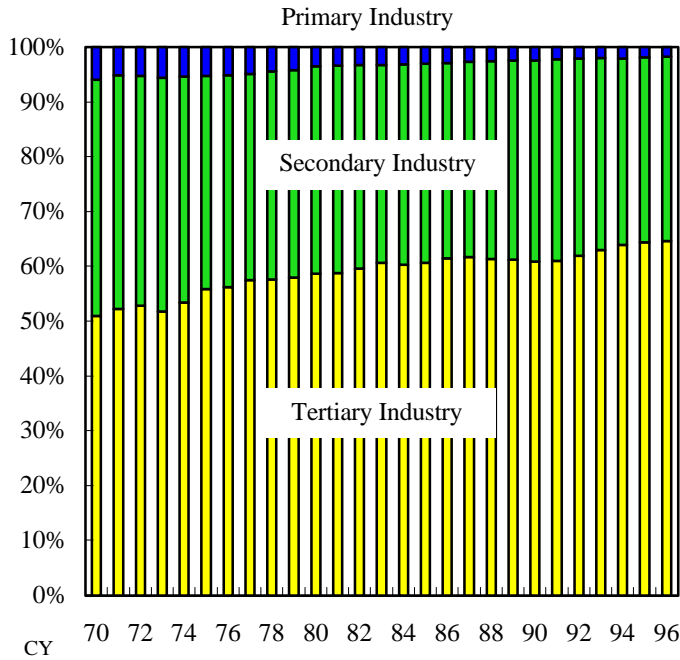
Ratio to Nominal GDP by Industry(1996)

(2) Employed Persons

Employed Persons by Industry (1996)

Note: Classification is based on "Standard Industrial Classification for Japan" as follows:

    Primary Industry: Agriculture, Forestry, and Fishery

    Secondary Industry: Mining, Construction, and Manufacturing

    Tertiary Industry: Electricity, Gas and Water Supply, Transportation and Communication, Wholesale and Retail,

                      Eating and Drinking Services, Finance and Insurance, Real Estate, Services, and Government Services

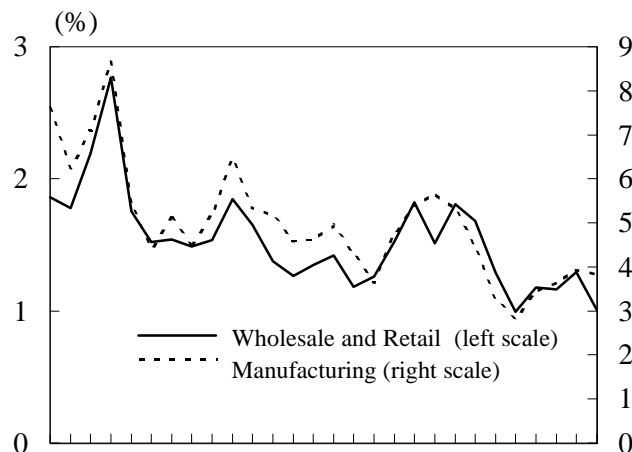Source: Economic Planning Agency, "Annual Report on National Accounts."

(Chart 4)

Operating Profit to Sales Ratios of Individual Nonmanufacturing Industries

(1) Services

(%)
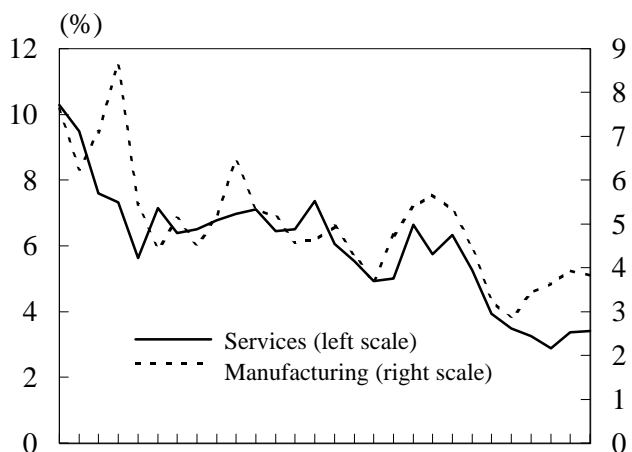
FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

(2) Wholesale and Retail

(%)

FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

(3) Transportation & Communication

(%)
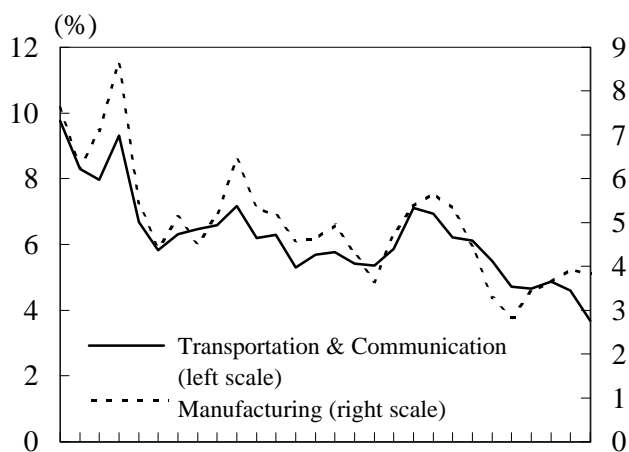
FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

(4) Construction

(%)
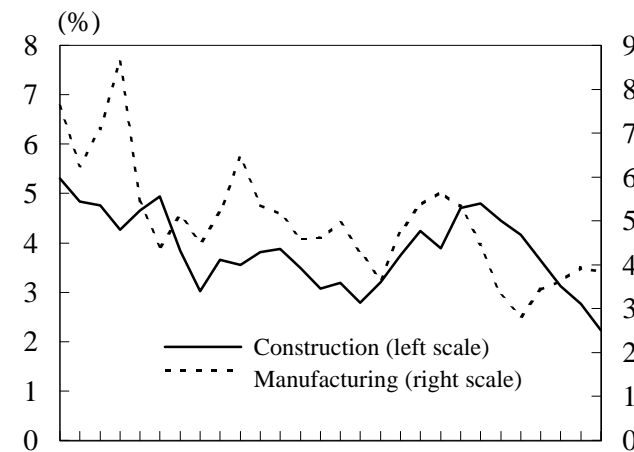
FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

(5) Real Estate

(%)
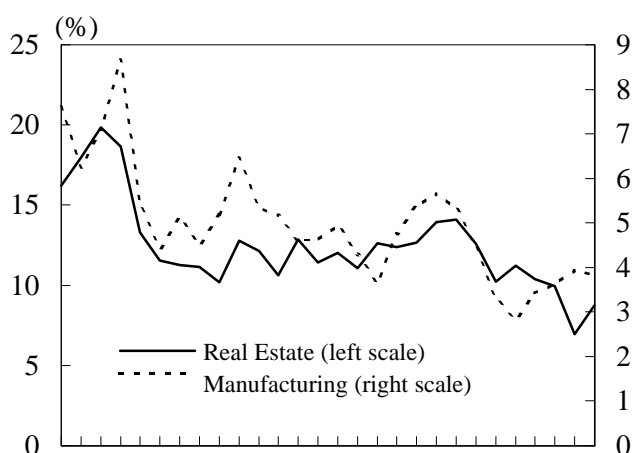
FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

(6) Electricity & Gas

(%)
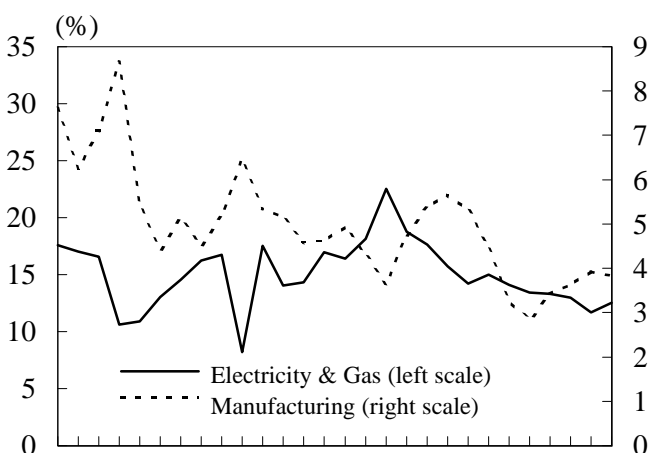
FY 70 72 74 76 78 80 82 84 86 88 90 92 94 96

Note: Data for Transportation & Communication before 1985 are adjusted for the NTT's privatization.
Source: Ministry of Finance, "Quarterly Statistics of Financial Statements of Incorporated Enterprises."

(Chart 5)

Industrial Production and Tertiary Industry Activity

(S.A., 1990=100)

Indices of Industrial Production
Indices of Tertiary Industry Activity
Indices of Tertiary Industry Activity (excluding electricity, gas and water supply)

CY 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
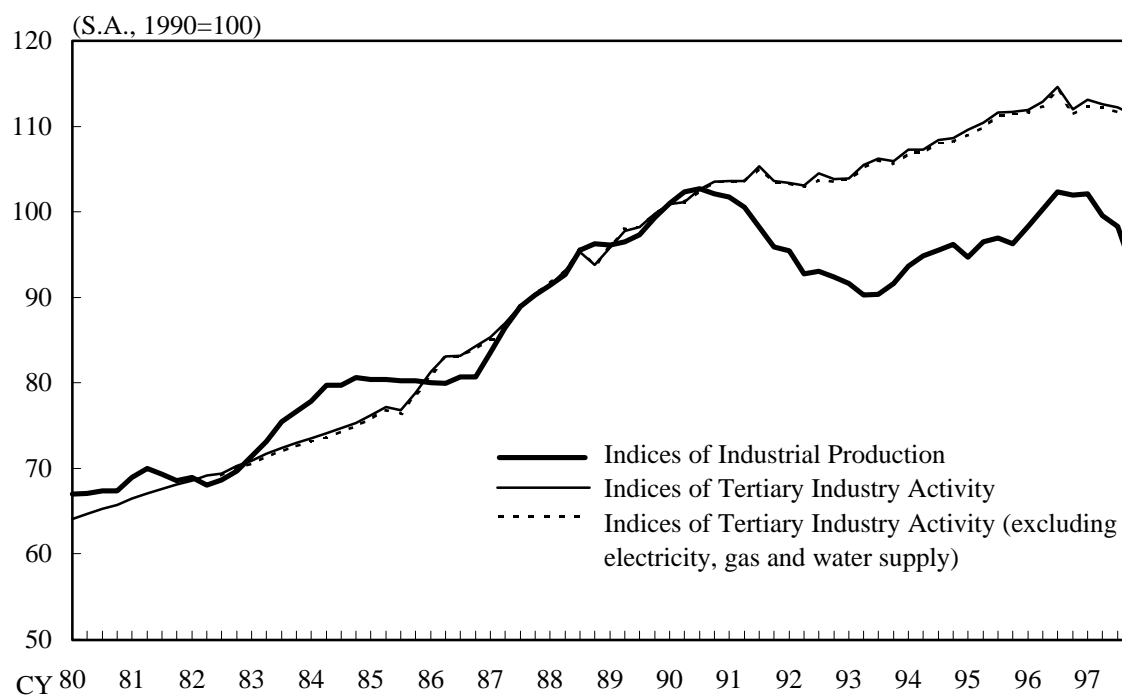
Source: Ministry of International Trade and Industry, "Indices of Industrial Production,"
"Indices of Tertiary Industry's Activity."

Corporate Service Prices and Output Prices

(4 quarter backward moving average, %)

Corporate Service Price Index (CSPI)
Output Price Index (OPI)
Nominal Wage Index (per head)

CY 86 87 88 89 90 91 92 93 94 95 96 97 98
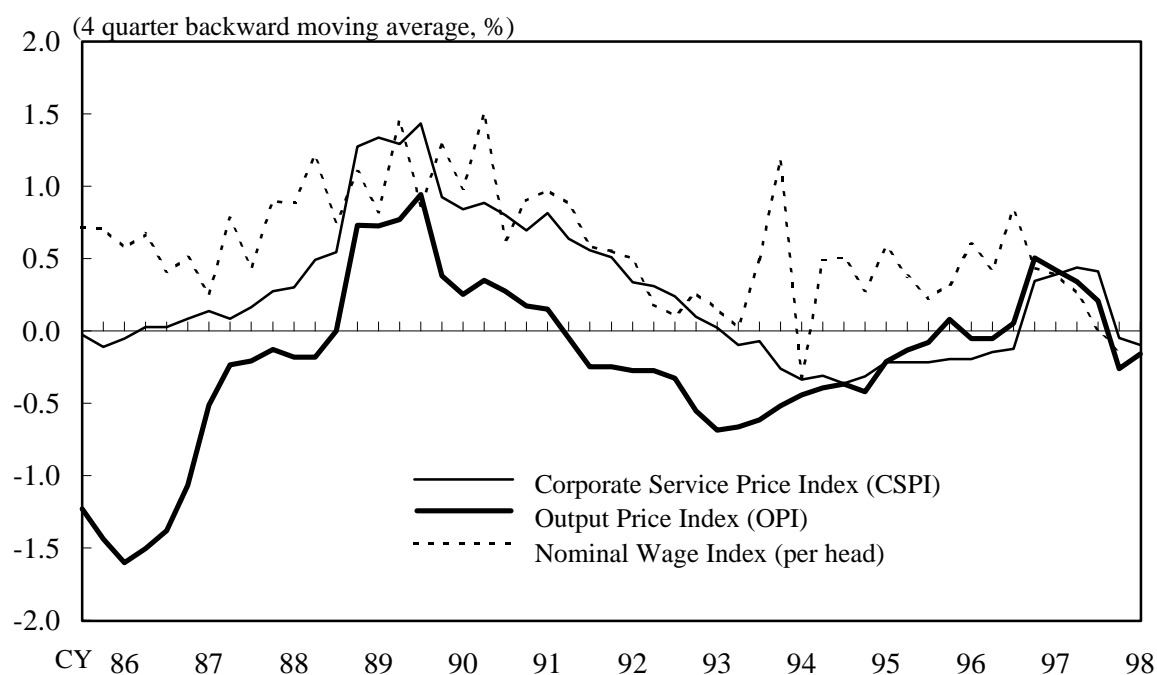
Sources: Bank of Japan, "Input-Output Price Indexes of Manufacturing Industry by Sector,"
"Corporate Service Prices Indexes"; Ministry of Labor, "Monthly Labor Survey."

(Chart 6)

Cost Components of Manufacturing and Nonmanufacturing Industries

(Ratio to Sales, %)

	Manufacturing	Nonmanufacturing
Others	7.13	5.78
Capiatal Depreciation	5.35	10.75
Operating Surplus	6.36	12.82
Comensation to Employees	17.22	36.46
Input from nonmanufacturing industry	19.36	23.69
Input from manufacturing industry	39.66	9.95
Input from primary industry	4.92	0.55
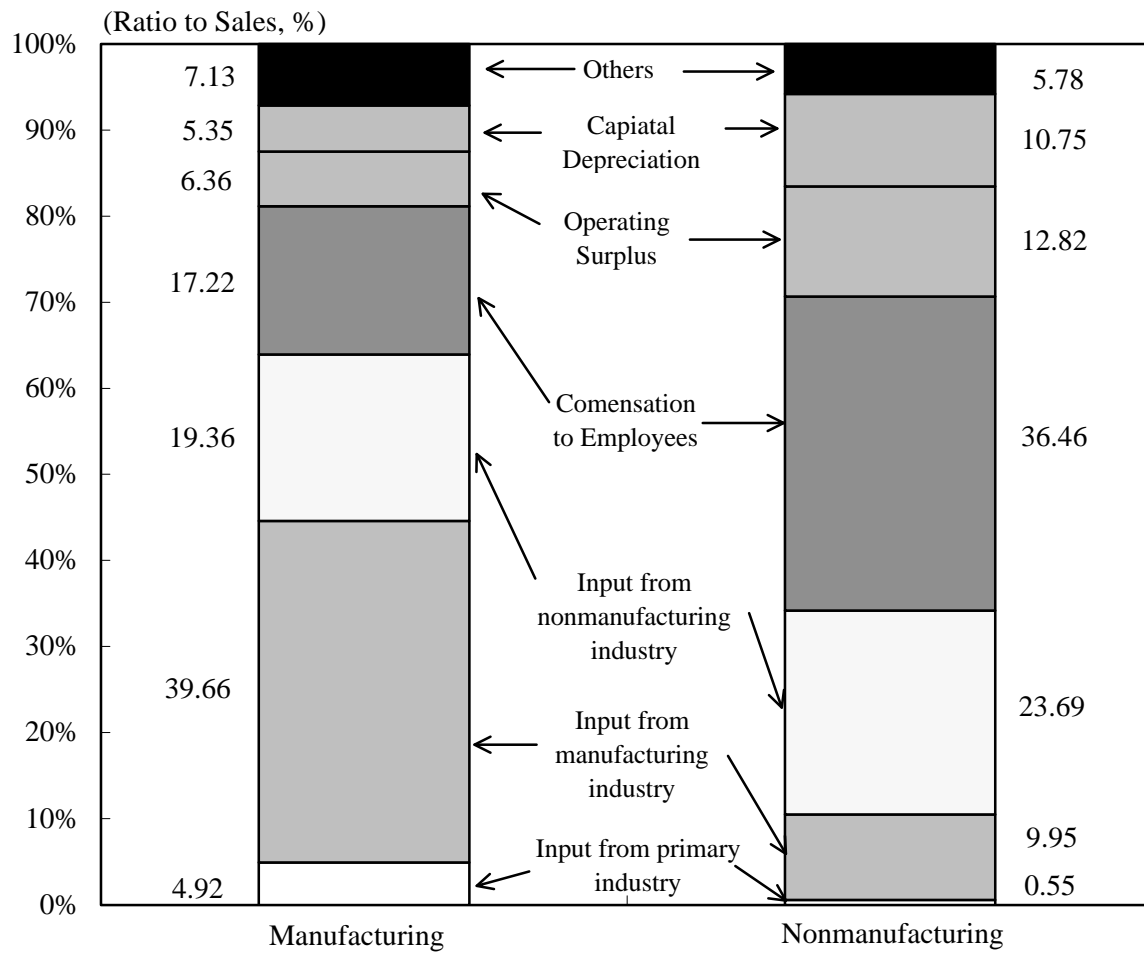
Source: Management and Coordination Agency, "Input-Output Tables 1995 (preliminary)."

(Chart 7)

Shifts in Factors Affecting Operating Surplus

(1) Manufacturing
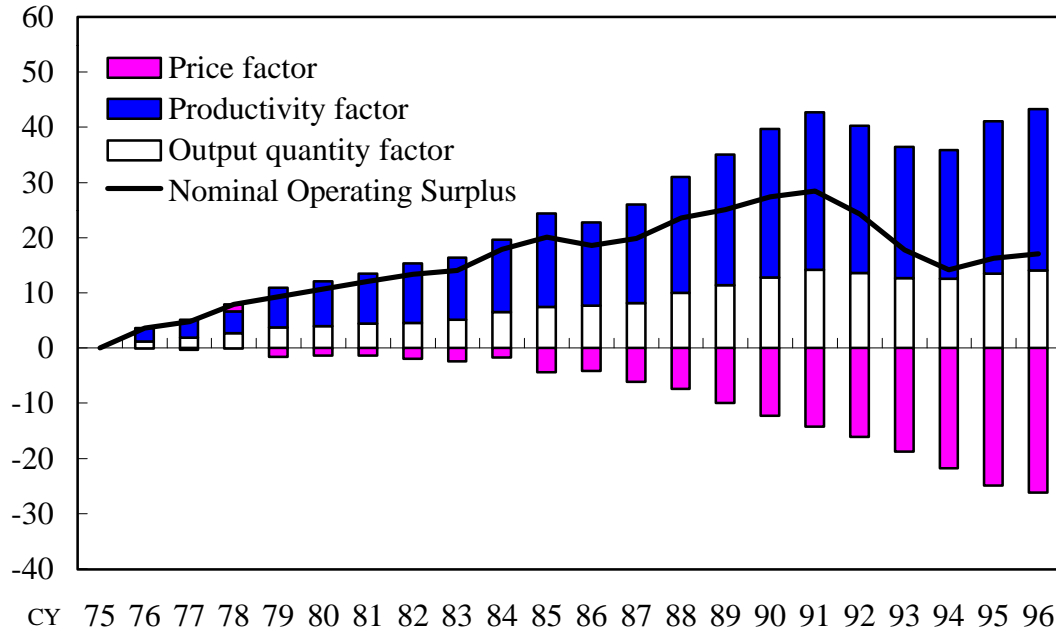
(2) Nonmanufacturing
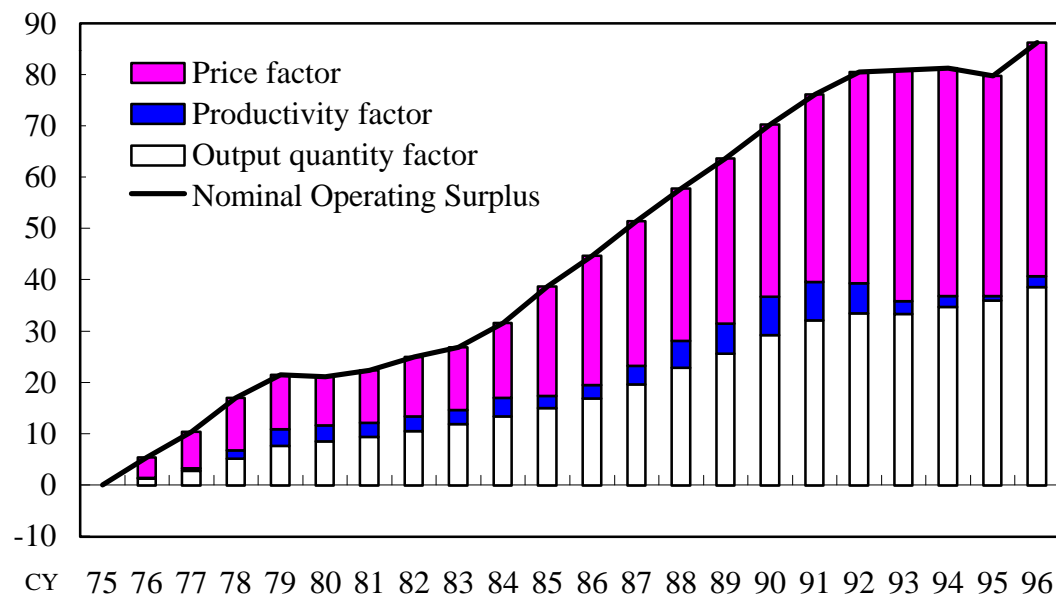
Notes: 1. Constant price at 1975=100
2. For detalied calculation methods, see Bank of Japan (1998a).
3. Operating surplus defined here includes net indirect taxes for the simplicity of the calculation.
Therefore, they slightly differ from operating surplus found in the National Accounts.
Source: Ministry of Finance, "Quarterly Statistics of Financial Statements of Incorporated Enterprises";
Ministry of International Trade and Industry, "Indices of Industrial Production";
Bank of Japan, "Input-Output Price Indexes of Manufacturing Industry by Sector,"
"Shuyou Kigyou Keiei Bunseki (Analysis of Financial Statements of Principal Enterprises)".

(Chart 8)

Relations between Labor Productivity and GDP Deflator

(1) 1975-85 (average)

% change in Deflator

Electricity, Gas and
Water Supply

Construction

Transportation and
Communication

Real Estate

Finance and
Insurance

Services

Wholesale and
Retail

y = -0.7893x + 6.1859

% change in Labor Productivity

(2) 1985-95 (average)

% change in Deflator

Real
Estate

Services

Construction

Transportation and
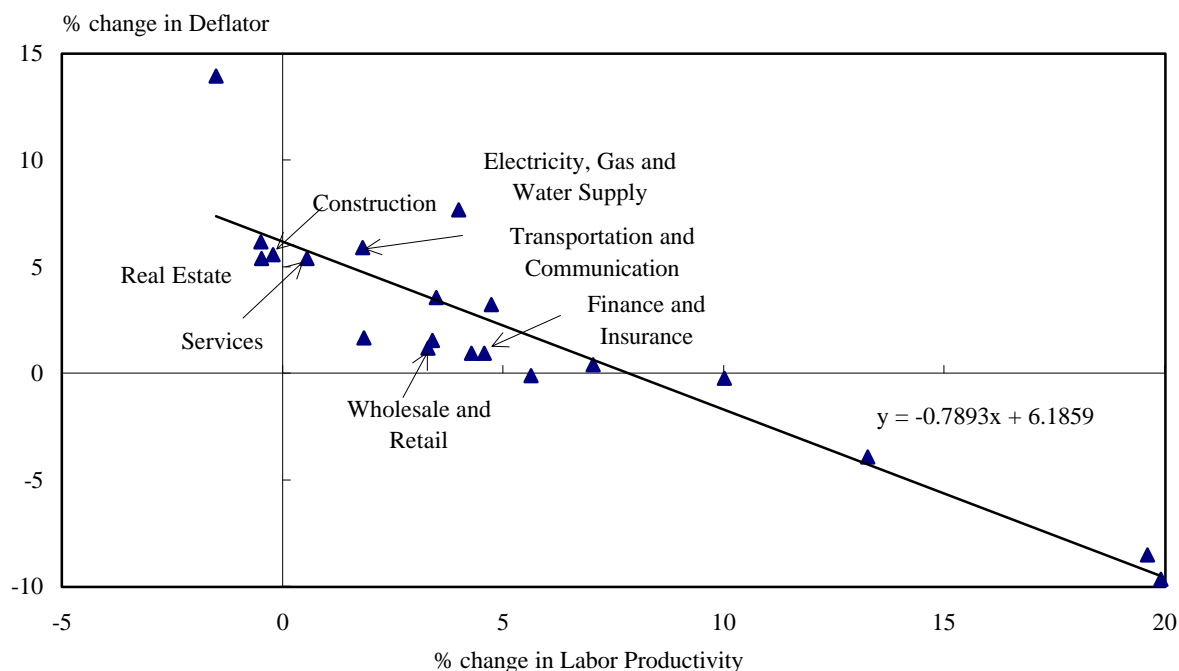Communication

Wholesale and
Retail

Electric, Gas and
Water Supply

Finance and
Insurance

y = -0.8485x + 1.9671

% change in Labor Productivity

Note: Industries regressed above are 13 manufacturing industries (Food and Beverages, Textiles, Pulp, Paper
and Paper Products, Chemicals, Petroleum and Coal Products, Basic Metal, Fabricated Metal Products,
Machinery, Electrical Machinery, Equipment and Supplies, Transport Equipment, Precision Equipment,
and Others) and 7 nonmanufacturing industries (Construction, Electricity, Gas and Water Supply, Wholesale
and Retail, Finance and Insurance, Real Estate, Transportation and Communication, and Services).
Source: Economic Planning Agency, "Annual Report on National Accounts."

(Chart 9)

Principal Component Analysis on Operating Profit Ratios

(1) Sensitivity of the operating profit ratios to the primary and secondary component

1970.1Q-1974.4Q	Manufacturing Large Enterprises	Manufacturing Small and Medium	Nonmanufacturing Large Enterprises	Nonmanufacturing Small and Medium
Primary component	0.94	0.94	0.44	0.91
Secondary compnent	0.05	-0.26	0.89	-0.21

1975.1Q-1980.4Q	Manufacturing Large Enterprises	Manufacturing Small and Medium	Nonmanufacturing Large Enterprises	Nonmanufacturing Small and Medium
Primary component	0.90	0.88	0.19	0.78
Secondary compnent	0.05	-0.05	-0.97	0.22

1981.1Q-1986.4Q	Manufacturing Large Enterprises	Manufacturing Small and Medium	Nonmanufacturing Large Enterprises	Nonmanufacturing Small and Medium
Primary component	0.93	0.63	-0.80	0.40
Secondary compnent	0.00	0.60	0.06	-0.83

1987.1Q-1992.4Q	Manufacturing Large Enterprises	Manufacturing Small and Medium	Nonmanufacturing Large Enterprises	Nonmanufacturing Small and Medium
Primary component	0.89	0.91	0.40	0.86
Secondary compnent	0.06	0.22	-0.92	0.13

1993.1Q-1997.4Q	Manufacturing Large Enterprises	Manufacturing Small and Medium	Nonmanufacturing Large Enterprises	Nonmanufacturing Small and Medium
Primary component	0.85	0.30	-0.88	-0.74
Secondary compnent	0.23	0.90	0.11	0.51

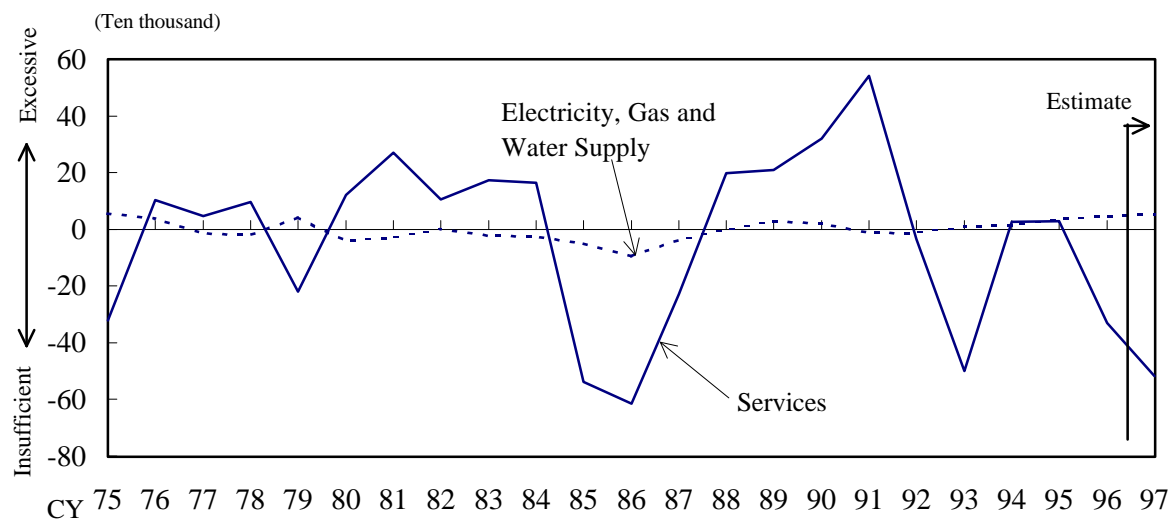(2) Relations between Pricipal Components and Macroeconomic variables

	Primary component		Secondary component
70/1Q-74/4Q	Capacity Utilization		GDPdf
t-value	5.60		-4.68
AdjR^2	0.62		0.52
75/1Q-80/4Q	Capacity Utilization	GDPdf	GDPdf(-4)
t-value	9.33	-5.04	1.56
AdjR^2	0.79	0.52	0.06
81/1Q-86/4Q	GDPdf		GDPdf(-4)
t-value	1.40		1.38
AdjR^2	0.04		0.04
87/1Q-92/4Q	Capacity Utilization		GDPdf
t-value	9.09		2.18
AdjR^2	0.78		0.14
93/1Q-97/4Q	GDPdf(-4)	Capacity Utilization	Capacity Utilization
t-value	-7.81	2.87	3.91
AdjR^2	0.76	0.28	0.43

Note: 1. GDPdf is GDP deflator. Numbers in parentheses are the period of lagged variables.

    2. Table (2) is the result of the regression of primary and secondary principal components by macroeconomic variables.

Source: Ministry of Finance, "Quarterly Statistics of Financial Statements of Incorporated Enterprises."

(Chart 10)

Estimates of Excess Workers

(Ten thousand)

Excessive ↑ / Insufficient ↓

150
100
50
0
-50
-100
-150

Nonmanufacturing

Manufacturing

Estimate

CY 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97

(Ten thousand)

Excessive ↑ / Insufficient ↓

50
40
30
20
10
0
-10
-20
-30
-40
-50
-60

Construction

Wholesale and Retail

Transportation and Communication

Estimate

CY 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97

(Ten thousand)

Excessive ↑ / Insufficient ↓

60
40
20
0
-20
-40
-60
-80

Electricity, Gas and Water Supply

Estimate

Services

CY 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
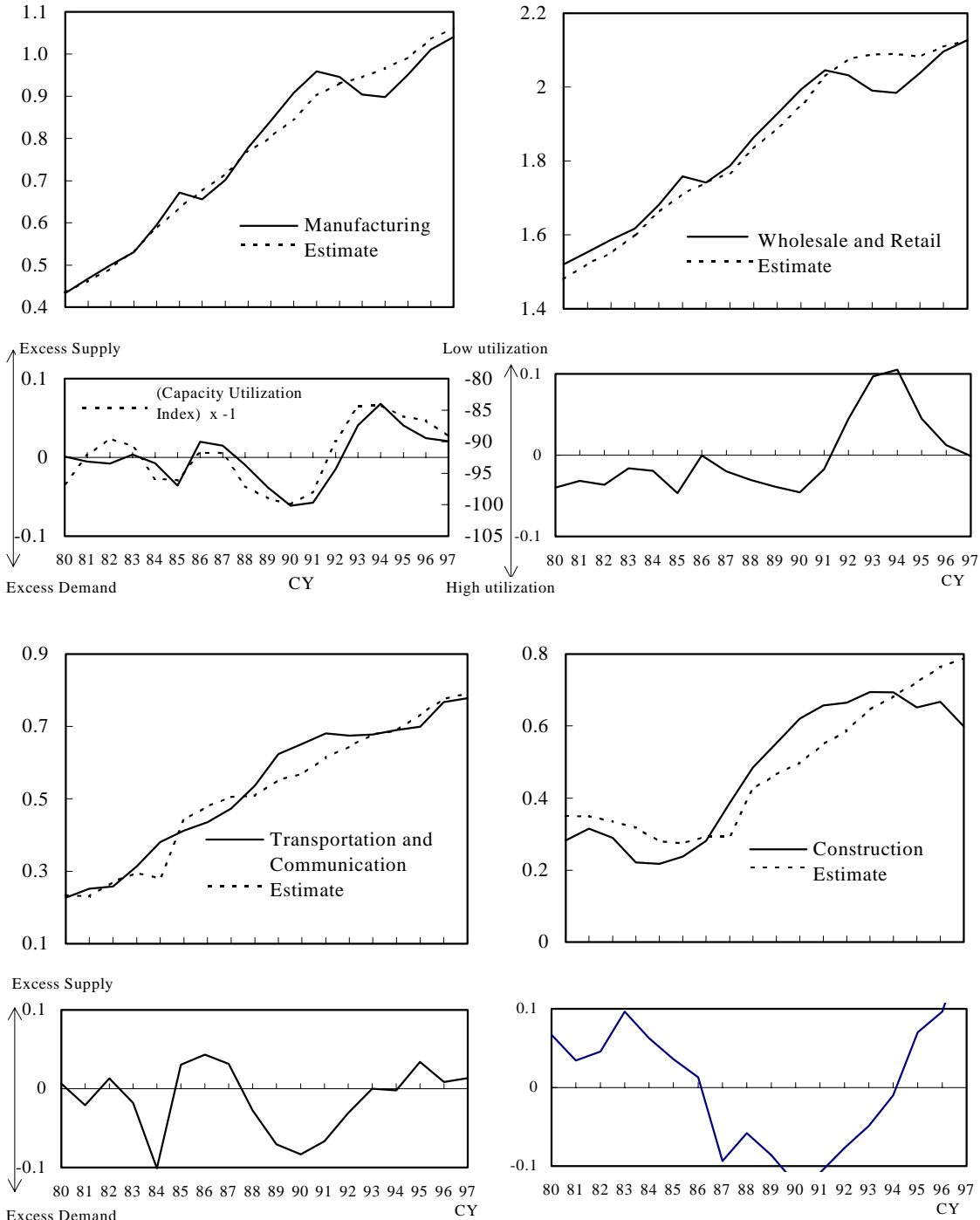
Note: The numbers of excess workers are estimated by utilizing the deviation of the actual labor's share of output from the trend of labor's share from 1975 to present.

Source: Economic Planning Agency, "Annual Report on National Accounts."

(Chart 11-1)

Estimates of Suppy-Demand Gap (1)

(logarithm)

Manufacturing — Estimate

Wholesale and Retail — Estimate

Excess Supply

Low utilization

(Capacity Utilization Index) x -1

Excess Demand   CY

High utilization

Transportation and Communication — Estimate

Construction — Estimate

Excess Supply

Excess Demand   CY   CY

Note: Charts underneath show the residuals between the estimates and actual figures. Positive values indicate
      excess supply and negative excess demand.   Dotted line in the manufacturing's chart
      is the capital utilization index times minus 1
Source: Economic Planning Agency, "Annual Report on National Accounts," "Gross Capital
        Stock of Private Enterprises"; Ministry of International Trade and Industry,
        "Indices of Industrial Production"; Ministry of Labor, "Monthly Labor Review."

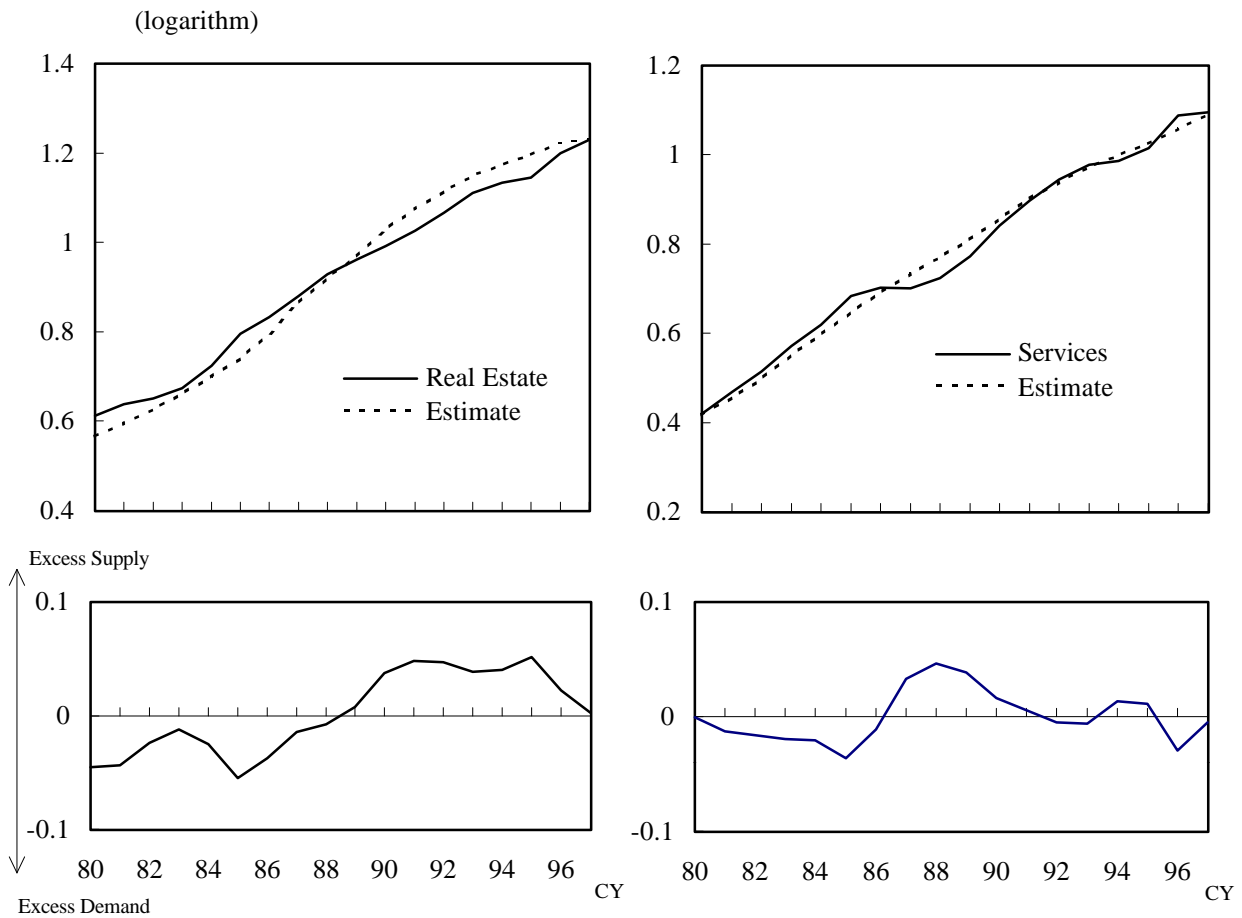(Chart 11-2)

Estimates of Suppy-Demand Gap (2)

(logarithm)



Note: Charts underneath show the residuals between the estimates and actual figures. Positive values indicate
excess supply and negative excess demand.
Source: Economic Planning Agency, "Annual Report on National Accounts," "Gross Capital
Stock of Private Enterprises"; Ministry of International Trade and Industry,
"Indices of Industrial Production"; Ministry of Labor, "Monthly Labor Review."

(Chart 12)

Expected Demand Growth and Actual Figures

(1) Manufacturing
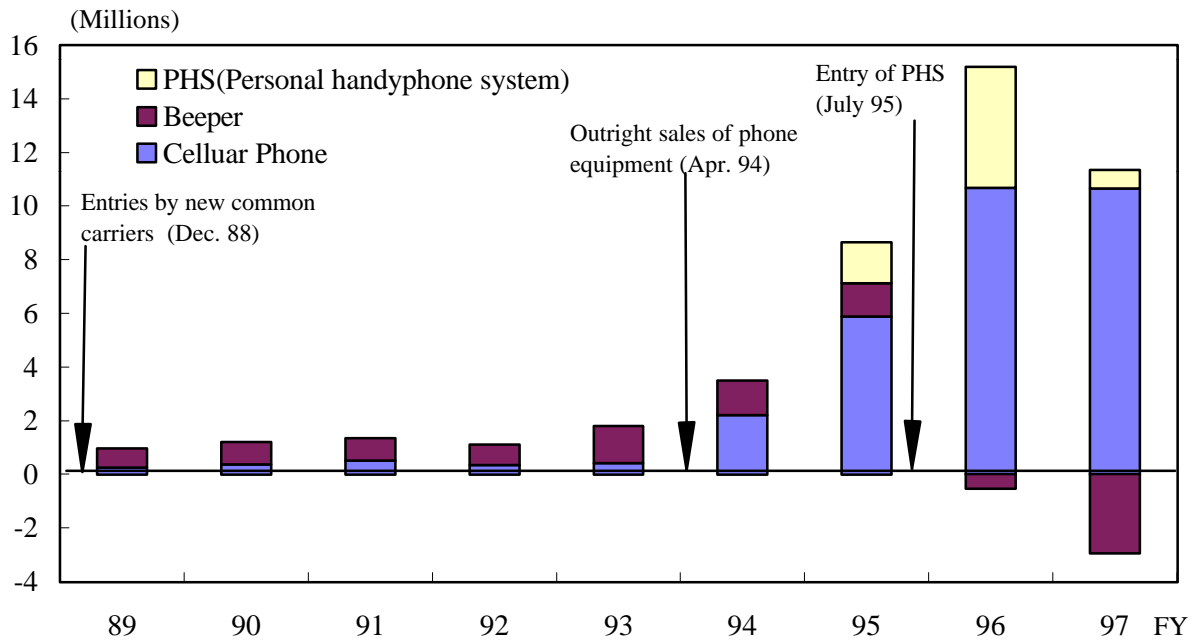
(%)
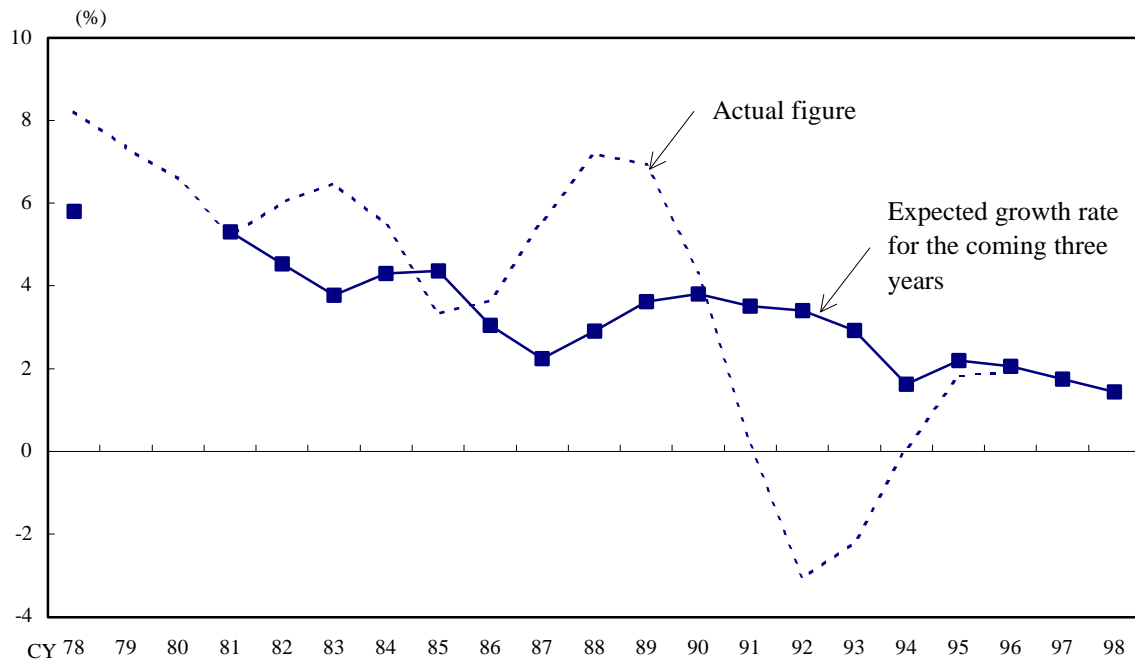
(2) Wholesale and Retail

(%)
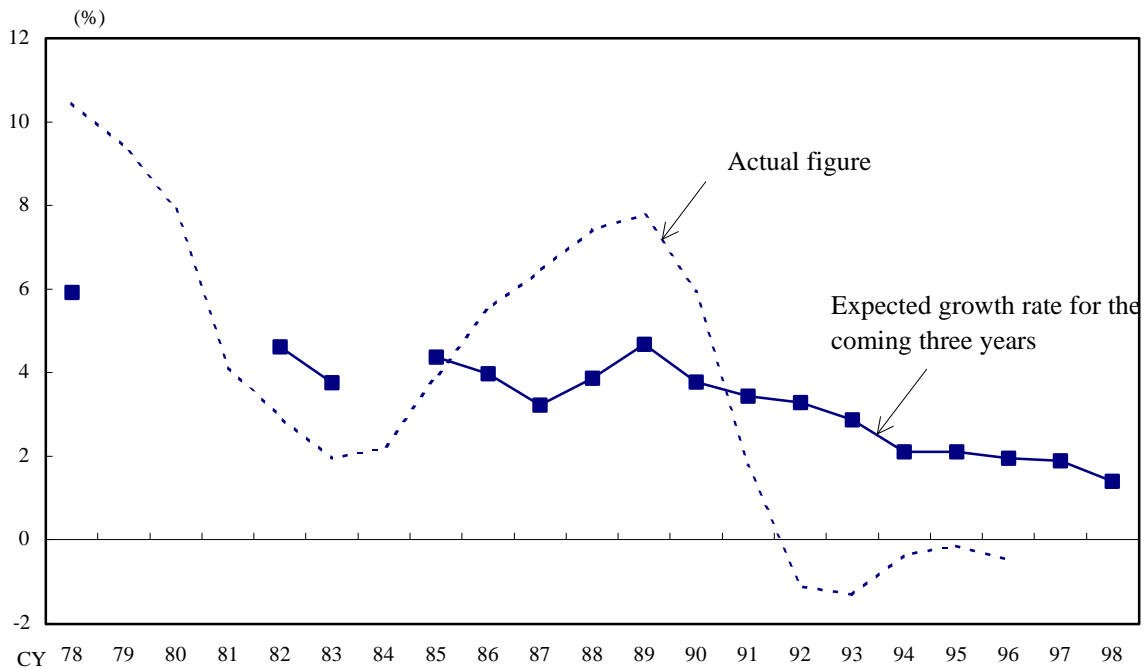
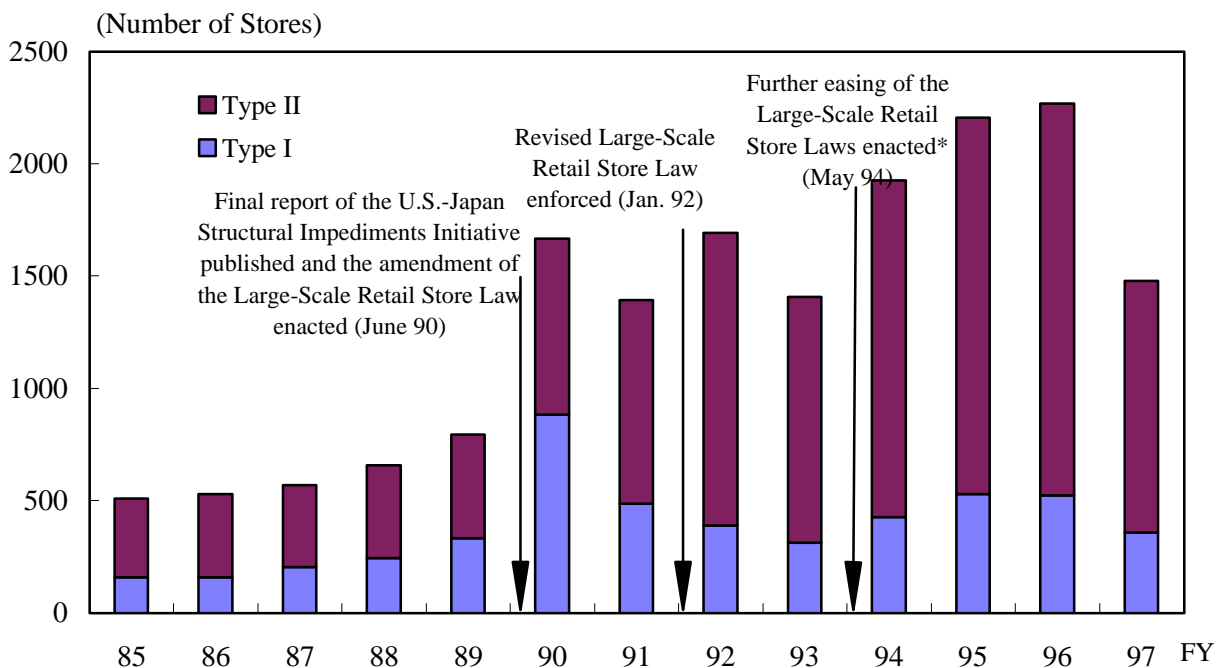Note: Actual figures are forward 3 year moving average.
Source: Economic Planning Agency, "Kigyou Koudou ni Kansuru Ankeito Chousa Houkokusho
(Report on the Survey of Private Enterprises' Activities)."

(Chart 13)

Effects of Deregulatory Measures

(1) Increase in Mobile Telecommunications Subscribers

(Millions)

- PHS(Personal handyphone system)
- Beeper
- Celluar Phone

Entries by new common carriers (Dec. 88)

Outright sales of phone equipment (Apr. 94)

Entry of PHS (July 95)

89 90 91 92 93 94 95 96 97 FY

(2) Increase in Openings of Large Scale Retail Stores

(Number of Stores)

- Type II
- Type I

Final report of the U.S.-Japan Structural Impediments Initiative published and the amendment of the Large-Scale Retail Store Law enacted (June 90)

Revised Large-Scale Retail Store Law enforced (Jan. 92)

Further easing of the Large-Scale Retail Store Laws enacted* (May 94)

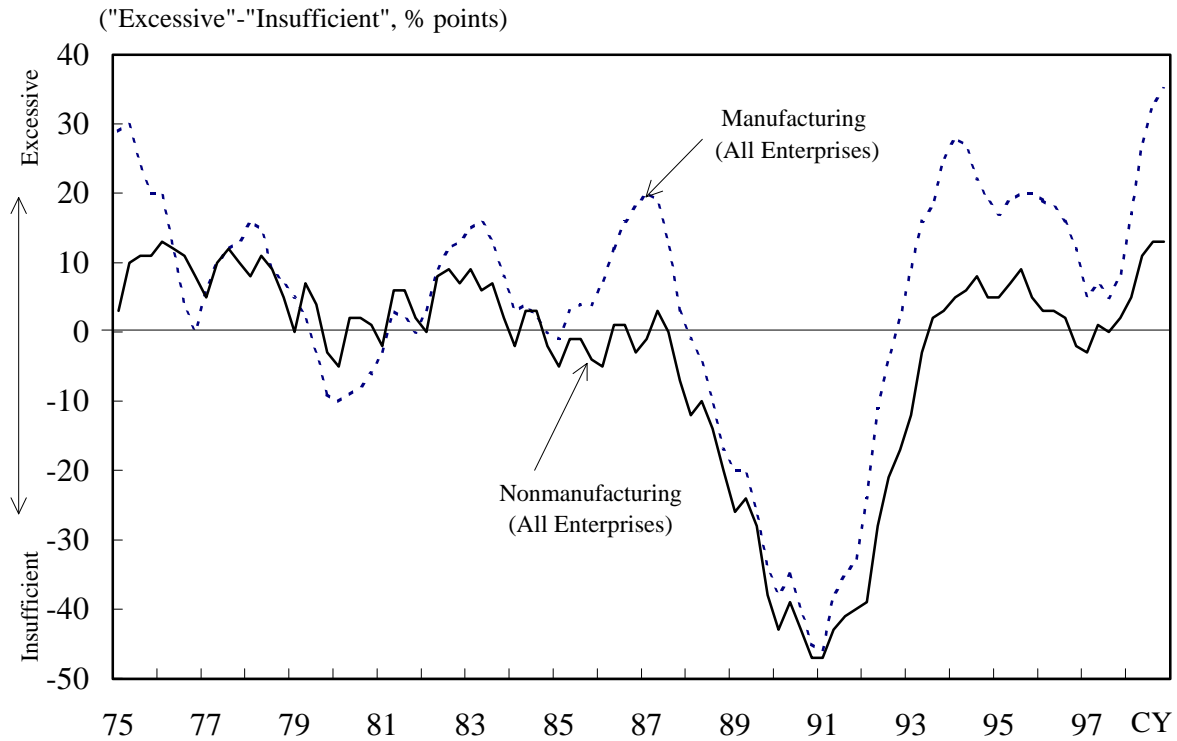85 86 87 88 89 90 91 92 93 94 95 96 97 FY

Note: Further easing of the Large-Scale Retail Store Laws allows stores with a floor area
       below 1000 square meters to be opened without registration.
Source: Ministry of Posts and Telecommunications, "Developments of Mobile Telecommunications
        Industry"; Ministry of International Trade and Industry materials.

(Chart 14)

Employment DIs of Manufacturing and Nonmanufacturing Industries
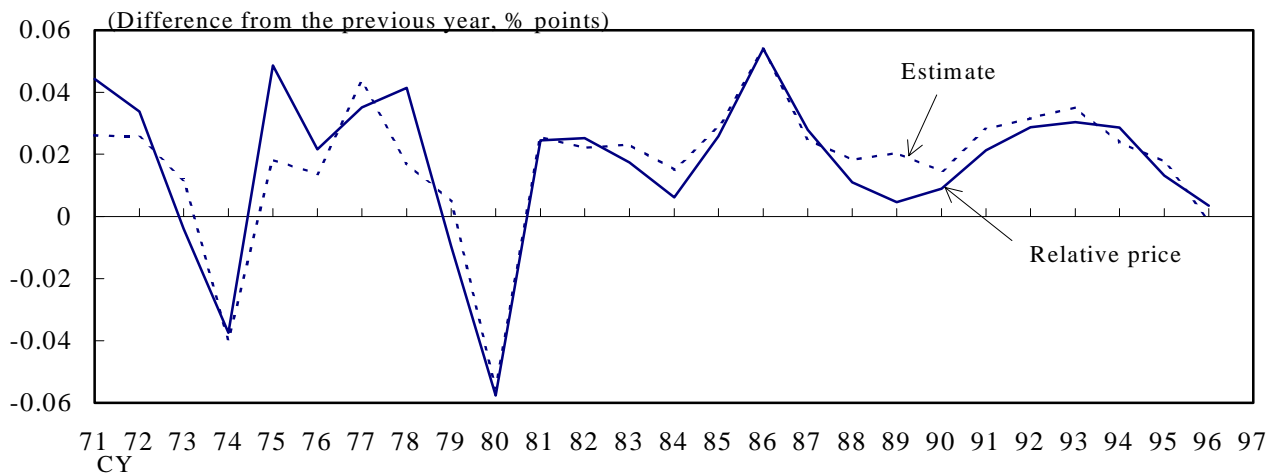
(1) Employment DIs of the Tankan

("Excessive"-"Insufficient", % points)

(2) Manufacturing DI - Nonmanufacturing DI

(% points)

Source: Bank of Japan, "Tankan-Short Term Economic Survey of Enterprises in Japan."

(Chart 15)
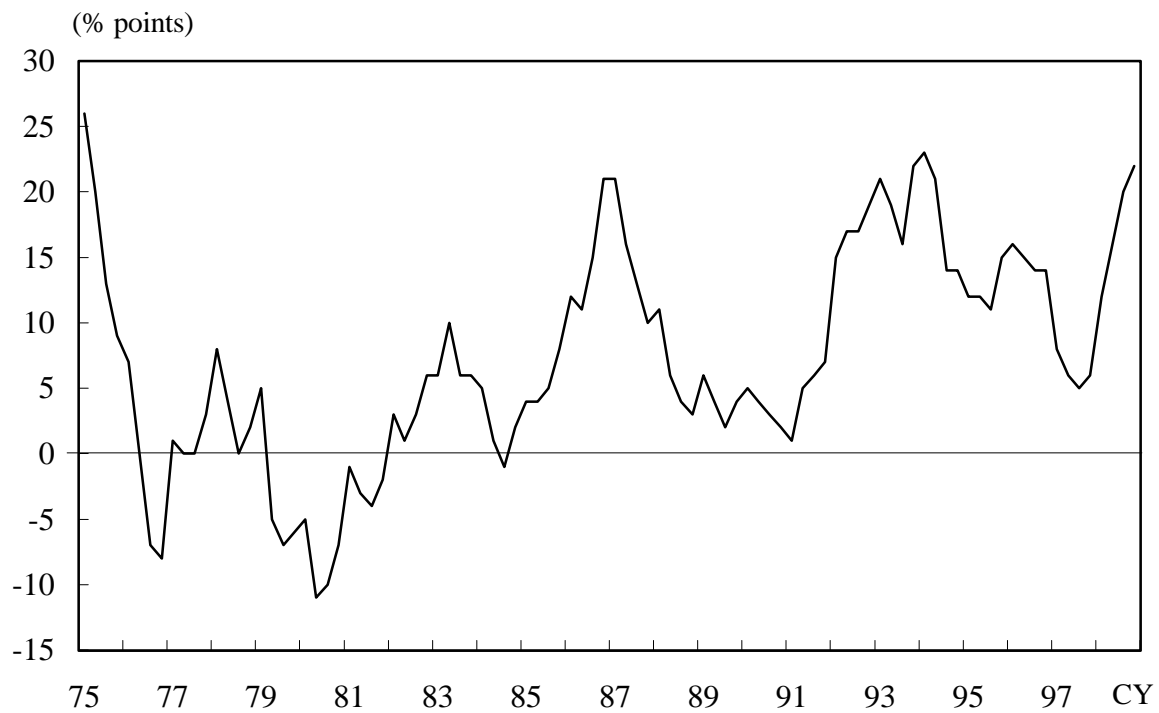
Relative Price between Manufacturing and Nonmanufacturing Industries and Administrative Expenses Ratio of Manufacturing Industry

(1) Result of Estimation

Estimated Equation
 Period: 1971-96

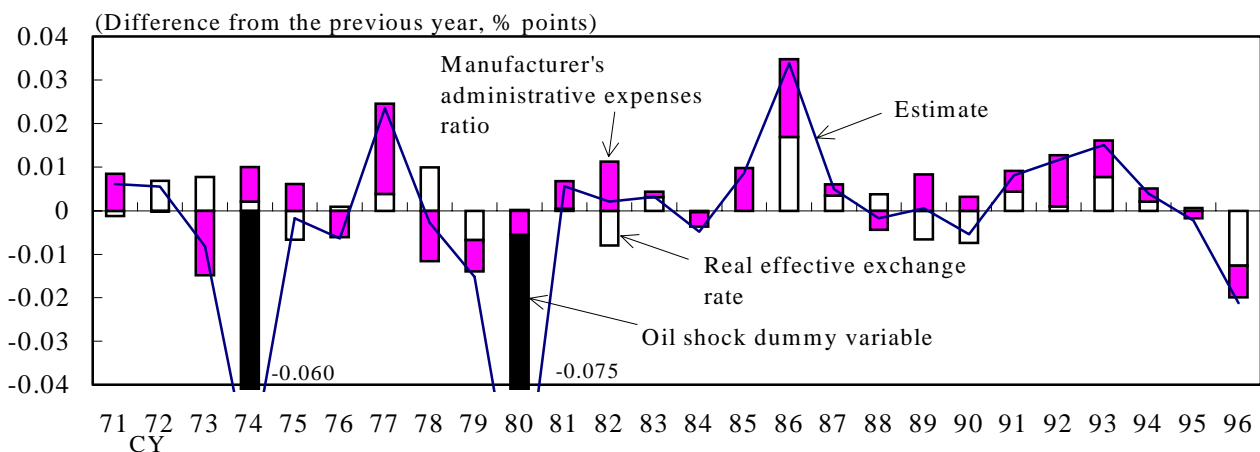$\Delta\log$ (relative price) = $0.02 + 0.08 * \Delta\log$ (real effective exchange rate)
                    (7.35)   (2.70)

$+ 1.54 * \Delta$(manufacturer's administrative expenses ratio)$-0.07 *$ (Oil shock dummy variable)
       (3.64)   (-7.83)

adjR2 = 0.77 D.W. = 1.91 F-Value = 28.84

(2) Factor analysis

Notes: 1. Relative price is GDP deflator of nonmanufacturing industry divided by that of manufacturing industry.
       2. Manufacturer's administrative expenses ratio is manufacturer's selling & administrative expenses
          divided by sales.
       3. Oil shock dummy variable is 1 in 74 and 80 and zero otherwise.
       4. Factor Analysis subtracts the estimated values from the contribution of constant variable.
Source: Economic Planning Agency, "Annual Report on National Accounts"; Ministry of Finance,
    "Quarterly Statistics of Financial Statements of Incorporated Enterprises";
       International Monetary Fund, "International Financial Statistics."

(Chart 16)

Estimates of Mark-up Function and Demand Function by Industry

(Mark-up Function)

Parameters	Wholesale and Retail		Construction		Real Estate		Transportation & Communication		Services	
	70-85	83-96	70-85	83-96	70-85	83-96	70-85	83-96	70-85	83-96
a	-0.220	1.047	-0.490	-1.144	0.416	0.423	0.191	0.865	0.082	0.649
	(-1.92)	(5.35)	(-2.49)	(-4.49)	(2.88)	(8.08)	(2.14)	(13.45)	(1.01)	(12.70)
b	1.200	-0.434	1.558	2.046	0.547	0.572	0.748	0.266	0.904	0.519
	(9.30)	(-1.87)	(9.35)	(11.21)	(4.24)	(15.35)	(10.61)	(5.98)	(14.43)	(18.54)
c_1		-0.045								
		(-3.71)								
c_2								-0.025		
								(-4.36)		
R^2	0.73	0.54	0.82	0.84	0.53	0.94	0.82	0.09	0.93	0.94

(Demand Function)

Parameters	Wholesale and Retail		Construction		Real Estate		Transportation & Communication		Services	
	70-85	83-96	70-85	83-96	70-85	83-96	70-85	83-96	70-85	83-96
d	0.282	0.151	0.099	0.076	0.131	0.127	0.173	0.176	0.278	0.366
	(20.25)	(4.77)	(10.40)	(6.67)	(9.05)	(13.87)	(20.24)	(11.46)	(12.84)	(16.64)
e	-0.180	-0.017	0.056	-0.059	-0.049	0.047	-0.774	-0.080	-0.078	-0.215
	(-18.35)	(-0.48)	(0.53)	(-0.93)	(-4.73)	(4.09)	(-10.74)	(-5.99)	(-3.42)	(-11.08)
f	-0.075	-0.004	0.075	0.016	0.021	0.015	-0.011	-0.054	-0.041	0.021
	(-0.89)	(-0.05)	(1.09)	(4.52)	(3.25)	(2.76)	(-2.11)	(-3.78)	(-3.68)	(5.25)
g			-0.315		0.011		0.003		0.031	0.054
			(-6.76)		(7.88)		(2.10)		(5.02)	(12.28)
h_1			0.373	0.184						
			(5.24)	(3.15)						
h_2						-0.082				
						(-5.40)				
R^2	0.90	0.21	0.97	0.22	0.91	0.55	0.76	0.15	0.78	0.49

Note: 1. Numbers in parentheses are t-value.

2. The estimated mark-up function and demand function are as follows;

(Mark-up Function) P=a+b*AC+c*DEREG

(Demand Function)   Q=d+e*P+f*EX+g*TREND+h*OTHERS

P: Relative GDP deflator (ratio to overall GDP deflator)

AC: Percent change of relative average cost (percent change of ratio to overall average cost)

where (Average cost) = (total cost) / (Real GDP)

DEREG: Dummy variables for deregulation (Wholesale and Retail $<c_1>$ from 1992,

Transportation & Communication $<c2>$ from 1994)

Q: (Industry's real GDP) / (Overall Real GDP)

EX: Real effective exchange rate

TREND: Trend variable

OTHERS: h_1 is (public fixed capital formation) / (Real GDP), and h_2 is (M2+CD) / (Nominal GDP)

Source: Economic Planning Agency, "Annual Report on National Accounts," "Gross Capital Stock of Private Enterprises";
Bank of Japan, "Wholesale Price Indexes," "Economic Statistics Monthly."