<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>A QUARTERLY ECONOMETRIC MODEL OF JAPAN</th>
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<td><strong>Sub Title</strong></td>
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<tr>
<td><strong>Author</strong></td>
<td>浜田, 文雅(HAMADA, Fumimasa)</td>
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<td><strong>Publisher</strong></td>
<td>Keio Economic Society, Keio University</td>
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<td><strong>Jtitle</strong></td>
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<tr>
<td><strong>Abstract</strong></td>
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<td><strong>Notes</strong></td>
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<td><strong>Genre</strong></td>
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Chapter 1

A QUARTERLY ECONOMETRIC MODEL OF JAPAN*

Fumimasa Hamada

INTRODUCTION

The purpose of this paper is to present a quarterly econometric model of Japan. This model was constructed to make an attempt to analyze the structure of the postwar Japanese economy from the viewpoint of the interdependency between financial and non-financial transactions, and also to forecast the movements of the Japanese economy in the short-run. The effects of fiscal and monetary policies are under investigation too.

The supply of cash currency through changes in demand for and supply of treasury funds including those of general government and foreign exchange has recently been increasing, which appear not only to influence real economic activity, but also to form a potential factor to induce creeping or even hyper inflation through the accumulation of excess liquidity in the private sector. Though this inflationary factor has not yet been analyzed, a monetary expansion mechanism is assumed to work so as to transmit a monetary impact to real economic activity.

The new issue of the government bonds to finance the government deficits is dealt with as a factor to give rise to an impact on money market, based on the so-called “credit-expansion” mechanism. The rigidity of interest rates is a specific feature of our financial market, so that the monetary impact on the real economic activity is given by the volume of funds supplied mainly through financial intermediaries. Consequently, the indirect financing system, in particular with commercial banks as the main participants, has an important role in making adjustment of shortages and overages of funds by sector, or in other words, in transferring savings by sector.

To deal with the interdependency described above, (i) the government budget constraint is introduced in the model explicitly so as to be able to match an increase in the volume of government expenditures with that of sources of funds

* This paper was presented at the fourth annual convention of the Eastern Economic Association held in Washington, D.C., April 27-29, 1978. The author is indebted to Ron Bodkin and others at a session for helpful comments. He also expresses many thanks to James Tobin, William Brainard, Ray Fair, Hugh T. Patrick, Otto Eckstein, Gary Fromm for valuable comments. He is also indebted to Kazuseke Tsujimura for kind assistance in simulation tests. Needless to say, he is solely responsible for errors which may remain. This model was constructed and simulated with the UNIVAC 1106, the simulation program ASPEC designed and written by Professor M. Arai at the Keio Economic Observatory. Data processing was done by Miss C. Adachi and others at the Institute of Social Engineering Inc.
such as an increase in tax-revenues, a new issue of government bonds, and so forth, (ii) commercial bank behavior is specified in its relation to derivative deposits and to the "quota system" of government bonds newly issued, and (iii) the public depositors' behavior is specified in its relation to their sources of funds.

The present paper includes (i) the outline of the model, and (ii) the summary of final test of the model and its dynamic multipliers. The results of extrapolation and policy simulation will be seen in another paper separately.

I. THE OUTLINE OF THE MODEL

This model is a medium size non-linear and dynamic system, composed of 168 structural equations including 16 equations of a monetary sector and 43 equations of international trade sector, the observation period of which is from the first quarter of 1965 through the fourth quarter of 1975. Needless to say, the influence on this model of many works on macroeconometric models, already published abroad as well as in our country, has been inevitable. Among others, Teigen (1964) was useful in dealing with the credit-expansion process in the Japanese money market explicitly, and further more, equations for demand for labor and those for wage determination are following those proposed in E. Kuh and R. L. Schmalensee (1973).

A. Final Demand Sector

This sector determines the level of effective demand, the main components of which are personal consumption expenditures, gross fixed investment, investment in inventories by private non-agriculturel enterprises, and government expenditures. The last one is assumed to be an exogenous variable. Export variables are dealt with separately in International Trade Sector.

Equation for personal consumption expenditures determines the distribution of income into consumption and savings. This equation reflects a recent declining tendency of marginal propensity to consume, presumably caused by a longer average lag in consumer behavior and by the increasing importance of the effect of real financial assets. When total private consumption is determined, consumption by sub-item is taken as depending not only on this total (the budget constraint), but also on the relative prices.

The equation for gross investment in private dwellings is specified, taking account of the income-effect and costs of dwelling's services relative to prices of consumption goods. The effect of costs of dwelling's services is approximated as

$$a_1PIHP + a_2PIHP \cdot SRL0 = a_2PIHP(SRL0 + a_1/a_2),$$

where $$a_1 \geq 0, a_2 < 0,$$

where $PIHP$ is the price of dwellings, and $SRL0$ is a short-term (regulated) rate on lendings of all banks, the latter of which seems to be a good proxy variable for
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

rates by which individuals borrow funds for dwelling investment. In the equation above, the ratio \( a_i/a_2 \) is supposed to be the difference between real rate of depreciation of dwellings, and the expected rate of change in prices of dwellings. The sign of coefficient \( a_i \) depends on that of the difference.

Equation for gross fixed investment is also assumed to depend on the level of general economic activity, and real costs of capital services. Here, the expected rate of change in prices of fixed capital goods was found to play an important role in moving the economy as a whole, in which alternative simulation experiments are made.

Investment in inventories by private non-agricultural sector is assumed to be of the 'stock-adjustment' type, and also assumed to be dependent on changes in borrowings from city banks, deflated by prices of inventory goods, and changes in prices of imported goods.

B. Production and Employment Sector

This sector is composed of equations for the production level, potential real gross private product, labor-hours, demand for the number of workers, real private GNP, real stock of capital, and so forth.

Production level is simply dependent on real gross private product. A structural change is assumed to have taken place at the second quarter (July through September) of 1973, caused by the first "Oil-Crisis". Taking this into account, two dummy variables were introduced to switch two alternative coefficients on and off. A production function for potential real gross private product is introduced to determine the degree of utilization, in combination with real final demand. Labor-hours, and the number of workers are determined by the level of effective demand, the specification of which is following E. Kuh and R. L. Schmalensee (1973).

C. Wages and Prices Sector

Price equations are, in principle, of the 'Full-Cost' type. At first, we attempted to fit to data, the flexible mark-up schedule, but it was in vain. Now, as a matter of fact, the simplest specification was adopted. This has, unexpectedly, brought about a new problem on the specification of price equations, on which I will present interesting results at the earliest opportunity.

In price equations, principal determinants are found to be the prices of regulated industry goods, money wage rate, prices of raw materials, and those of fuels, the last two of which are imported from abroad.

Equation for wage rate determination is of E. Kuh and R. L. Schmalensee type\(^1\). That is, money wage rate is dependent on the normal level of the 'Value-Productivity' of labor, and its short-run divergence from the normal level, with a simple linear adjustment lag-distribution. In our country, there seems to be about 2% rate of unemployment and 6-7% increase in money wage rate these

\(^1\) See, E. Kuh (1967) and also E. Kuh and R. L. Schmalensee (1973), Chapter 9.
days. The observations during the last two decades, however, have not precisely yielded the so-called 'Phillips Curve' relationship.

D. Income Distribution

Wage earnings of private employees are the product of money wage rate and labor-hours of private sector. The interest income of individuals from property is assumed to be dependent on the accumulation of personal savings, and interest rate, with a lag-distribution. Equation for dividends income is assumed to be explained by the ‘Dividends-Hypothesis’ of John Lintner. Corporate profits are determined as the difference between net national product and the sum of personal incomes. No adjustment has been made of the errors which were generated through the determination of corporate income, and this does not appear so serious in the final tests.

E. Fiscal and Monetary Sector

Three tax equations are introduced; that is, personal income tax, corporate income tax, and indirect taxes. Tax rate is not introduced into personal income tax equation, because of complexity in its progressive system, and, in contrast, tax rate on corporate income is explicitly introduced in the equation for corporate income tax.

The monetary sector of this model is specifically designed to deal with the indirect financing system and regulated interest rates, which are actually prevailing in the post-war Japanese financial market. We assume that, except for specific period 1971 through 1975, the expected marginal internal rate of return on bank-loans has been higher than the marginal cost of accepting deposits from private non-financial sector, so that there has presumably been excess demand for bank-loans potentially in the market.

Moreover, the regulated interest rates on commercial bills and those on lendings of all banks appear to be adjusted by monetary authority, move in the direction of equating the sum of demand for and the sum of supply of bank-loans, for these several years. As a matter of fact, a flexible credit expansion mechanism is assumed, to deal with the commercial bank behavior, and also with the interrelation between the credit expansion process and changes in cash currency in circulation. The latter is closely related to changes in receipts and payments of government's treasury, particularly its transactions with the public. This item is also related to the balance of foreign exchange accounts of the government, its selling of the short term government securities to the Bank of Japan, on the one hand, and to changes in supply of high-powered money to commercial banks by the Bank of Japan, on the other hand.

F. International Trade Sector

Our international trade sector is designed after the one that has already been established as a part of "A Quarterly Forecasting Econometric Model of Japan: KYQ75 (Kyoto Institute of Economic Research, Kyoto University) of the LINK
Model, though ours has turned out to be rather simplified in its commodity classification and specification of equations.

Finally, the simplified flow diagram of the model is shown below:

**The Simplified Flow Diagram of the Model**

![Flow Diagram]

Note: ITS means International Trade Sector.

II. Final Test and Multipliers Analysis

II.1 Final Test

Final test has been done for the period of 1968-75 fiscal years. The reason why the first two years of the observation period were excluded is, that it seemed inappropriate to take observed values of predetermined endogeneous variables in 1965 (fiscal year) reflecting a drastic recession.

Table 1 shows a summary of findings by the test, where RMS is the root-mean-squares of errors, and the rightmost column shows percentage rates of RMS to sample mean. These figures show that the deviations of final test run from the observed values appear not so small as those for the periods excluding recent few years of drastic fluctuations caused by the international monetary crisis and the 'Oil-Crisis'. Though the direction of deviations of the final test run is not

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shown here, it appears that most of the variables are underestimated throughout the observation period. Particularly, the real consumption expenditures are significantly under-estimated, because of interaction between real consumption and real demand for time deposits at banks. The latter enters, as a determinant, the equation for real consumption, so that underestimation of the latter has probably brought about a decline of the former, which in turn, reduce the latter through a decline of personal disposable income. This general tendency, however, vanishes when the starting period of the final test, in making an extrapolation or a prediction for the period of the first quarter of 1977 through the fourth quarter of 1980, is moved to the second quarter of 1973.

II.2 Dynamic Multipliers Analysis

Since this model includes an explicit identity between the government investment and a corresponding change in the government debt, for the calculation of investment multipliers, it is necessary to make an increase in government invest-

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sample Mean</th>
<th>RMS</th>
<th>Percentage rate</th>
</tr>
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<td><strong>B. Output &amp; Employment</strong></td>
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<td></td>
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<tr>
<td>RGNPPO</td>
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<td>O</td>
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</tr>
<tr>
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<td>M2</td>
<td>71985.22</td>
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<td>MJBY</td>
<td>27200.3</td>
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To make calculation of dynamic multipliers of government investment, it is assumed that an increase in government investment is 1,000 billion yen (equivalent to about 426 million dollar), the sum of government bonds newly issued is the same volume, of which 800 billion yen is bought by private financial institutions, and 200 billion yen is bought by the individuals’ withdrawal of time deposits. Furthermore, to relieve a transitory liquidity-shortage of the member banks, the Bank of Japan makes buy-operations of 500 billion yen for them.

Tax-cut multipliers are also computed. It is assumed that personal income tax cut is 1,000 billion yen, the sum of government bond newly issued is 1,000 billion yen, of which 800 billion yen is bought by private financial institutions, 200

### TABLE 2. Public Investment Multipliers: Sustained Change Case

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<tr>
<th>Period</th>
<th>GNP</th>
<th>RGNP</th>
<th>RIFEP</th>
<th>PCP</th>
<th>M2</th>
<th>DDBTG</th>
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</table>
Table 2 shows the estimated dynamic multipliers of sustained change of the government investment, starting at the second quarter of 1973. All figures are merely the differences between the benchmark run and the controlled run, so that the leftmost column, for GNP, should be read, as multipliers, 1.4071, 1.8337, 2.3431, 2.9771, ..., and so forth. The first period multiplier on annual basis is 2.14 which seems to be higher than the one starting at the latest period.

The sequence of this multiplier has some complex cyclical nature, and I don't have a series long enough to analyze it full. The sequence for implicit deflator for personal consumption, PCP shows a very moderate change. On the contrary, the sequence for money supply shows a dynamic configuration, reflecting changes...
TABLE 4. PUBLIC INVESTMENT MULTIPLIERS: IMPACT CHANGE CASE

<table>
<thead>
<tr>
<th>Period</th>
<th>GNP</th>
<th>RGNP</th>
<th>RIFEP</th>
<th>PCP</th>
<th>M2</th>
<th>DDBTG</th>
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<tbody>
<tr>
<td>1</td>
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<td>60.8</td>
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In credit of the Bank of Japan. There seems to remain the counteractions by the Bank of Japan to be reconsidered more carefully. The rightmost column shows the sequence for the government debt changes, all of which may be completely cleared by government bonds to be issued, and even more than 20% of the bonds issued could be returned. Increases in DDBTG may restrict the government activity in the future.

Table 3 summarizes dynamic multipliers of personal income tax cut. As easily foreseen, tax-cut multipliers are smaller than multipliers of government investment. Moreover, increases in government debt are larger, so that as far as the macroscopic effects and the government accounts are concerned, the government investment seems to be preferable to the tax-cut.
### TABLE 5. TAX-CUT MULTIPLIERS: IMPACT CHANGE CASE

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Tables 4 and 5 are summaries of impact change multipliers, the evaluation of which will be omitted because of the length constraint of this paper.

Keio University

REFERENCES


EMPIRICAL RESULTS

A. Final Demand Sector

Private consumption expenditure (1970 const. prices), 1964·III–1975·IV

(1) \[ RCP = 1435.0578 + 0.0270051 \left[ \frac{YD}{PCP} + \frac{YD}{PCP}_{-1} + \frac{YD}{PCP}_{-2} + \frac{YD}{PCP}_{-3} \right] + 0.7226966 \left( 0.4 \* DTDP_{-1} + 0.3 \* DTDP_{-2} + 0.2 \* DTDP_{-3} + 0.1 \* DTDP_{-4} \right) \div PCP + 0.542731 RCP_{-1} + 0.2799388 RCP_{-2} \]

\[ R^2 = 0.99704 \quad SE = 492.08 \quad DW = 1.97972 \quad \rho = 0.00512 \]

Expenditure of households for foods, beverages and tobacco (1970 const. prices), 1963·IV–1975·IV

(2) \[ \log(RCF) = 3.175573260 + 0.004378456481 \times + 0.4991262908 \log(RCP) - 0.8580500111 \log(\frac{PCF}{PCP}) - 0.08788034252 \log(RCF)_{-1} \]

\[ \text{anti-log} = 23.9405 \]

\[ R^2 = 0.99870 \quad SE = 0.0070672 \quad DW = 0.92828 \quad \rho = 0.51084 \]

Expenditure of households for housing (Rent) (1970 const. prices), 1963·III–1976·IV

(5) \[ \log(RCR) = 4.010796739 + 0.3609626373 \log(RCP) \]

Note: \[ DOT(x, i) = (x - x_{-1}) \div x_{-1}; \quad DIF(x, i) = x - x_{-1} \]
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\[-0.1506069083\log(RCR/PCP) + 0.01358361832T\]
\[(4.905) \quad (10.541)\]

anti-log = 55.1908

\[\bar{R}^2 = 0.99936 \quad SE = 0.0074792 \quad DW = 0.76880 \quad \hat{\beta} = 0.56103\]


(6) \[\log(RCO) = -28'42547686 + 3.658470104\log(RCP)\]
\[(14.352) \quad (18.196)\]
\[-0.5968259204\log(PCO/PCP) - 0.04520220010T\]
\[(2.690) \quad (13.848)\]

anti-log = 0.4518012

\[\bar{R}^2 = 0.99461 \quad SE = 0.032104 \quad DW = 1.54445 \quad \hat{\beta} = 0.22329\]


(7) \[\log(RCOT) = 0.3814971556 + 0.8131295663\log(RCP)\]
\[(0.652) \quad (13.414)\]
\[-0.7039836419\log(PCOT/PCP) + 0.008122027920T\]
\[(6.629) \quad (6.741)\]

anti-log = 1.4645

\[\bar{R}^2 = 0.99905 \quad SE = 0.010967 \quad DW = 1.02039 \quad \hat{\beta} = 0.48953\]


(8) \[RIHP = -749.8667044 + 0.03815731291(YD/PCP = (YD_{-1})/PCP_{-1})\]
\[(1.063) \quad (6.671)\]
\[+ 1836.360937PIHP/PCP - 24294.53575PIHP*0.01*SRL0/PCP\]
\[(2.172) \quad (6.185)\]
\[+0.3973170395RIHP_{-1}\]
\[(4.021)\]

\[\delta_H = -\frac{\Delta PIHP}{PIHP} = -0.07559\]

\[\bar{R}^2 = 0.98519 \quad SE = 193.66 \quad DW = 2.03366 \quad \hat{\beta} = -0.02638\]
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

Gross fixed investment by private sector (excl. dwellings, at 1970 const. prices), 1964·III–1975·IV

(9) \[ RIFEP - RRF = 940.8682661 + 0.01488097748 \sum_{i=0}^{3} (RGNPP + RM)_{-i} \]

\[ + 0.01110071547 \sum_{i=0}^{3} \frac{PIFEP}{(P*ROH_2)} \times (RGNPP + RM)_{-i} \]

\[ - 0.00294253544 \sum_{i=0}^{3} \frac{PIFEP*SRL1}{P*ROH2} \times (RGNPP + RM)_{-i} \]

\[ + 0.8872747486(RIFEP - RRF)_{-1} \]

\[ \delta - \frac{\Delta PIFEP}{PIFEP} = -0.03773 \]

\[ R^2 = 0.98665 \quad SE = 357.02 \quad DW = 2.11557 \quad \hat{\rho} = -0.05822 \]

Investment in inventories by private non-agricultural enterprises (1970 const. prices), 1964·III–1975·IV

(10) \[ RJNAP = 105.8300304 + 0.1729224445DIF((RGNPP + RM), 4) \]

\[ + 0.2175812702RJNAP_{-1} + 0.07256727965 \sum_{i=0}^{3} \frac{4-i}{10} DBLND_{-i}/0.5*(PJPN + PJPN_{-1}) \]

\[ + 3681.056764DOT(PM, 4) + 882.9879449\mu_0 + 635.0440778\mu_1 \]

\[ + 403.202691\mu_2 + 172.3474390\mu_3 - 419.3520093\mu_4 \]

\[ + 729.7311819\mu_5 \]

\[ R^2 = 0.7009 \quad SE = 529.79 \quad DW = 1.90696 \quad \hat{\rho} = 0.00381 \]

Expenditure of households for durable goods (current prices), 1963·IV–1975·IV

(11) \[ CD = 5.018817998 + 0.03577531436PCO*RCO + 0.8410257276CD_{-1} \]

\[ (0.357) \quad (2.265) \quad (11.515) \]

\[ R^2 = 0.99070 \quad SE = 39.087 \quad DW = 2.06790 \quad \hat{\rho} = -0.05108 \]
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Expenditure of households for non-durable goods (current prices), 1964·III–1975·IV

(12) \[ CND = 56.81764007 + 0.04739896778(PCP \times RCP)_{-1} + 0.0428439161DIF(PCP \times RCP, 4) + 0.6606025353CND_{-1} \]
\[ (0.440) \quad (3.075) \quad (1.079) \quad (7.746) \]
\[ R^2 = 0.98811 \quad SE = 351.31 \quad DW = 2.12465 \quad \rho = -0.14537 \]

Expenditure of households for services (current prices), 1964·III–1975·IV

(13) \[ CS = -54.97477167 + 0.02902541238(PCP \times RCP)_{-1} + 0.6680576446CS_{-1} \]
\[ (0.766) \quad (3.324) \quad (7.775) \]
\[ R^2 = 0.99138 \quad SE = 172.95 \quad DW = 2.18351 \quad \rho = -0.17371 \]

Investment in inventories by incorporated sector (current prices), 1964·III–1975·IV

(14) \[ JC = -217.9444559 + 1.150124142(0.5 \times (PJPN + PJPN_{-1}) \times R Jain) - 0.131069462JC_{-1} + 150.7373231DOT(PWI, 4) \]
\[ (2.019) \quad (16.215) \quad (2.259) \quad (0.192) \]
\[ R^2 = 0.94653 \quad SE = 311.92 \quad DW = 1.85590 \quad \rho = -0.01107 \]

A'. Final Demand Sector Identities

Household consumption expenditure (at 1970 const. prices)

(15) \[ RCHT = RCF + RCC + RCL + RCR + RCO + RCOT \]

Expenditure of private non-profit institutions (1970 const. prices)

(16) \[ RCNH = RCP - RCHT - RCB \]

Gross domestic capital formation (1970 const. prices)

(17) \[ RIT = RI + RJ \]
Gross domestic fixed capital formation (1970 const. prices)

(18) \( RI = RIP + RIHG + RIFG \)

Gross fixed capital formation by private sector (1970 const. prices)

(19) \( RIP = RIHP + RIFEP \)

Gross fixed capital formation by government sector (at 1970 const. prices)

(20) \( RIG = RIHG + RIFG \)

Gross fixed capital formation: Dwellings by government sector (at 1970 const. prices)

(21) \( RIHG = IHG/PIHG \)

Gross fixed capital formation: Others by government sector (at 1970 const. prices)

(22) \( RIFG = IFG/PIFG \)

Change in inventories (1970 const. prices)

(23) \( RJ = RJP + RIG \)

Change in inventories of private enterprises (1970 const. prices)

(24) \( RJP = RJNAP + RJAP \)

Private consumption expenditure (current prices)

(25) \( CP = PCP \times RCP \)

Household consumption expenditure (current prices)

(26) \( CHT = CF + CC + CL + CR + CO + COT \)
Expenditure of households for foods, beverages and tobacco (current prices)

(27) $CF = PCF \times RCF$

Expenditure of households for clothing (at current prices)

(28) $CC = PC\text{C} \times RCC$

Expenditure of households for fuel and light (at current prices)

(29) $CL = PCL \times RCL$

Expenditure of households for housing (Rent) (at current prices)

(30) $CR = PCR \times RCR$

Expenditure of households for housing (Others) (at current prices)

(31) $CO = PCO \times RCO$

Expenditure of households for the miscellaneous (at current prices)

(32) $COT = PCOT \times RCOT$

Expenditure of private non-profit institutions (at current prices)

(33) $CNH = CP - CHT - CB$

Expenditure of residents abroad and etc. (at current prices)

(34) $CB = PCB \times RCB$

Gross domestic capital formation (at current prices)

(35) $IT = I + J$
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Gross domestic fixed capital formation (at current prices)

(36) \( I = IP + IG \)

Gross fixed capital formation by private sector (at current prices)

(37) \( IP = IHP + IFEP \)

Gross investment in private dwellings (at current prices)

(38) \( IHP = PIHP \times RIHP \)

Gross fixed investment by private sector (at current prices)

(39) \( IFEP = PIFEP \times RIFEP \)

Change in inventories (at current prices)

(40) \( J = JP + JG \)

Change in inventories of private sector (at current prices)

(41) \( JP = JNAP + JNP \)

Investment in inventories by private non-agricultural enterprises (at current prices)

(42) \( JNAP = 0.5 \times (PJPN + PJPN_{-1}) \times RJNAP + AVNAP \)

B. Production and Employment Sector

Production index for mining and manufacturing industries, 1964 III–1975 IV

\[
O = -1.357046358 + 0.0003581801445W1 \times RGNPP + 0.0002992841473W2 \times RGNPP + 0.7866171795O_{-1} \\
(0.842) \quad (3.726) \quad (3.253) \quad (12.669)
\]

\[ \hat{R}^2 = 0.99136 \quad SE = 2.4840 \quad DW = 1.16721 \quad \hat{\rho} = 0.40914 \]

\[(2) \quad \log(RGNPPO) = -41.61496467 + 2.822489070 \log(LP*HM) + 1.910845139 \log(RKF_{-1}) - 0.03602662985 T \]
\[
\begin{align*}
(9.828) & \quad (9.421) \\
(12.871) & \quad (7.862)
\end{align*}
\]
anti-log = \(0.8450-018\)

\[R^2 = 0.99472 \quad SE = 0.023029 \quad DW = 0.62903 \quad \hat{\rho} = 0.65819\]

Average hours worked (for one quarter per capita), 1966 - II - 1974 - IV

\[(3) \quad \log(H/H_{-1}) = 4.5 - 0.0055 T + 0.1524 \log(RGNPP) - 0.7703 \log(H)_{-1} + 0.0023 \log(H*LPW)_{-1} \]
\[
\begin{align*}
(4.199) & \quad (3.80) \quad (4.631) \\
(3.155) & \quad (0.021)
\end{align*}
\]
anti-log = \(0.441\)

\[R^2 = 0.441 \quad SE = 0.0046443 \quad DW = 1.569 \quad \hat{\rho} = 0.20154\]

The number of workers in private sector, 1963 - IV - 1975 - IV

\[(4) \quad \log(LP) = 0.3556380012 - 0.00009948386658 T + 0.01595338778 \log(RGNPP) + 0.8647927404 \log(LP)_{-1} \]
\[
\begin{align*}
(1.707) & \quad (0.365) \\
(0.885) & \quad (10.077)
\end{align*}
\]
anti-log = \(1.4271\)

\[R^2 = 0.98473 \quad SE = 0.0046443 \quad DW = 1.99325 \quad \hat{\rho} = -0.00610\]

Man-hours of employee in private sector, 1964 - IV - 1975 - IV

\[(5) \quad \log(H*LPW) = 4.538548475 - 0.002614398870 T + 0.2082361564 \log(RGNPP) + 0.3975056065 \log(H*LPW)_{-1} \]
\[
\begin{align*}
(4.269) & \quad (2.648) \\
(3.473) & \quad (2.916)
\end{align*}
\]
anti-log = \(93.5549\)

\[R^2 = 0.92527 \quad SE = 0.014700 \quad DW = 1.83116 \quad \hat{\rho} = -0.10555\]
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Replacement of fixed capital stock (1970 const. prices), 1963·IV–1975·IV

(6) \[ RRF = 18.32055770 + 0.04434624199 RKF_{-1} \]

\[ (2.298) \quad (468.284) \]

\[ R^2 = 0.99978 \quad SE = 21.344 \quad DW = 0.48479 \quad \hat{\rho} = 0.75673 \]

B'. Production and Employment Sector Identities

Gross national product (at current)

(7) \[ GNP = GNPP + CG2 \]

Gross private product

(8) \[ GNPP = CP + (CG - CG2) + IT + XAB \]

Gross national product (at 1970 const. prices)

(9) \[ RGNP = RGNPP + RCG2 \]

Gross private product (at 1970 const. prices)

(10) \[ RGNPP = RCP + (RCG - RCG2) + RIT + FSRP \]

Degree of utilization of private sector

(11) \[ ROH2 = RGNPP / RGNPPO \]

Gross stock in fixed capital of private sector (at 1970 const. prices)

(12) \[ RKF = 0.25 \ast (RIFEP - RRF) + RKF_{-1} \]

Stock in inventories of private non-agricultural enterprises (at 1970 const. prices)

(13) \[ RSJNAP = 0.25 \ast RJNAP + RSJNAP_{-1} \]
The number of workers

(14) \[ L = L_P + L_G \]

The number of employees

(15) \[ LW = LWP + LG \]

Man-hours in normal operation

(16) \[ \text{LOG}(HLWPE) = 7.52 - 0.00469T + 0.34562\text{LOG}(RGNPP) \]

Stock in private dwellings (at current prices)

(17) \[ KIHP = 0.25*(IHP - DEP1) + KIHP_{-1} \]

Stock in fixed capital of private sector (at acquire prices)

(18) \[ KFP = 0.25*(IFEP - DEP2) + KFP_{-1} \]

C. Wages and Prices Sector

Implicit price deflator for private consumption expenditure (1970 = 1.0), 1964·IV -1975·IV

(1) \[ \text{DOT}(PCP, 1) = 0.008396376781 \]
\[ + 0.05964895123(\text{DOT}(RWP, 1) + \text{DOT}(RWP, 1)_{-1})_{-1} \]
\[ + 0.2552959081\text{DOT}(PWI, 1)_{-1} \]
\[ + 0.1227211162\text{DOT}(PPCP, 1)_{-2} + 0.09148162554\text{DOT}(PMJRM, 1)_{-1} \]
\[ R^2 = 0.62311 \quad SE = 0.0085843 \quad DW = 2.66067 \quad \hat{\rho} = -0.33956 \]

Implicit price deflator for fuel and light (1970 = 1.0), 1964·III–1975·IV

(2) \[ \text{DOT}(PCL, 1) = -0.02097566012 + 0.7398151513\text{DOT}(PPCP, 1)_{-2} \]
\[ + 0.0004970623308T \]
\[ R^2 = 0.44501 \quad SE = 0.017385 \quad DW = 1.43319 \quad \hat{\rho} = 0.27499 \]
Implicit price deflator for housing (Rent) \((1970 = 1.0), 1964 \cdot \text{III} - 1975 \cdot \text{IV}\)

\[
\begin{align*}
\text{DOT}(RCH, 1) &= 0.008850170960 + 0.5889845491 \text{DOT}(PCP, 1) \\
&\quad - 0.1585346748 \text{DOT}(RCR, 1) \\
\hat{R}^2 &= 0.69727 \\
\text{SE} &= 0.0053374 \\
\text{DW} &= 1.54547 \\
\hat{\rho} &= 0.20287
\end{align*}
\]

Implicit price deflator for housing (Others) \((1970 = 1.0), 1964 \cdot \text{III} - 1975 \cdot \text{IV}\)

\[
\begin{align*}
\text{DOT}(PCO, 1) &= -0.003273978225 + 1.083063718 \text{DOT}(PCP, 1) \\
&\quad - 0.1961434772 \text{DOT}(RCO, 1) \\
\hat{R}^2 &= 0.72804 \\
\text{SE} &= 0.012071 \\
\text{DW} &= 1.35545 \\
\hat{\rho} &= 0.31507
\end{align*}
\]

Implicit price deflator for the miscellaneous \((1970 = 1.0), 1964 \cdot \text{III} - 1975 \cdot \text{IV}\)

\[
\begin{align*}
\text{DOT}(PCOT, 1) &= 0.001719685428 + 0.718036326 \text{DOT}(PCP, 1) \\
&\quad + 0.1841504916 \text{DOT}(PCOT, 1) \\
\hat{R}^2 &= 0.63057 \\
\text{SE} &= 0.0083098 \\
\text{DW} &= 2.09674 \\
\hat{\rho} &= -0.07882
\end{align*}
\]

Implicit price deflator for the consumption expenditure of private non-profit institutions \((1970 = 1.0), 1964 \cdot \text{III} - 1975 \cdot \text{IV}\)

\[
\begin{align*}
\text{DOT}(PCNH, 1) &= -0.005616610662 + 1.197869613 \text{DOT}(PCP, 1) \\
&\quad + 0.1823361559 \text{DOT}(RCP, 1) \\
\hat{R}^2 &= 0.89509 \\
\text{SE} &= 0.0051151 \\
\text{DW} &= 2.34195 \\
\hat{\rho} &= -0.45576
\end{align*}
\]

Implicit price deflator for the inventory stocks by private non-agricultural, sector \((1970 = 1.0), 1964 \cdot \text{III} - 1975 \cdot \text{IV}\)

\[
\begin{align*}
\text{DOT}(PJPN, 1) &= 0.0004883210186 \\
&\quad + 0.5731963441[\text{DOT}(PW1, 1) + \text{DOT}(PW1, 1)] \\
\hat{R}^2 &= 0.296 \\
\text{SE} &= 0.0051151 \\
\text{DW} &= 2.34195 \\
\hat{\rho} &= -0.45576
\end{align*}
\]
Whole sale price index for all industries (1970 = 1.0), 1964 - IV - 1975 - IV

(8) \[ \text{DOT}(PWI, 1) = 0.0005810940332 + 0.07754210244[\text{DOT}(RWP, 1) + \text{DOT}(RWP, 1)_{-1}] + 0.07092904168\text{DOT}(PMJOL, 1) + 0.3182221751\text{DOT}(PMJRM, 1) \]
\[ R^2 = 0.82737 \quad SE = 0.010781 \quad DW = 1.57726 \quad \hat{\rho} = 0.13879 \]

Implicit price deflator for private fixed investment, 1964 - III - 1975 - IV

(9) \[ \text{DOT}(PIFEP, 1) = -0.0003102524214 - 0.3882371513(\text{DOT}(PWI, 1) + \text{DOT}(PWI, 1)_{-1}) + 0.05640241995\text{DOT}(O, 1)_{-1} \]
\[ R^2 = 0.85130 \quad SE = 0.0077851 \quad DW = 1.83398 \quad \hat{\rho} = 0.05115 \]

Implicit deflator for housing investment by private sector, 1965 - I - 1975 - IV

(10) \[ PIHP = 0.06086338591 - 0.1322337779PWI_{-1} + 0.6498472058\text{DIF}(PWI_{-1}) + 1.086418946PIHP_{-1} \]
\[ R^2 = 0.99734 \quad SE = 0.016951 \quad DW = 1.29078 \quad \hat{\rho} = 0.33980 \]

Implicit price deflator for general government consumption expenditure (1970 = 1.0), 1964 - III - 1975 - IV

(11) \[ PCG = -0.5356601020 + 1.533755481PCP \]
\[ R^2 = 0.99627 \quad SD = 0.027557 \quad DW = 1.43286 \quad \hat{\rho} = 0.26235 \]
Implicit price deflator for investment in non-housing items by government sector (at 1970 const. prices), 1964·III–1975·IV

(12) \[ PIFG = -0.3250030222 + 1.307529143 PIFEP \]
\[ \hat{R}^2 = 0.98766 \quad SE = 0.027860 \quad DW = 0.40288 \quad \hat{\rho} = 0.77558 \]

Implicit price deflator for investment in dwellings by government sector (at 1970 const. prices), 1964·III–1975·IV

(13) \[ PIHG = 0.09448330711 + 0.8995826247 PIHP \]
\[ \hat{R}^2 = 0.99684 \quad SE = 0.016794 \quad DW = 0.35691 \quad \hat{\rho} = 0.82618 \]

Wage rate for employee in private sector (billion yen per hour per million persons) 1964·IV–1975·IV

(14) \[ RWP = -0.02341338299 + 0.3572606793 GNPP \ast (1.0/LWP) - 1.0/HLPW \]
\[ + 0.131363312 GNPP/HLPW + 0.7734695764 RWP_{-1} \]
\[ + 0.1946938932 DIF(PCP, 1) \]
\[ \hat{R}^2 = 0.99820 \quad SE = 0.010349 \quad DW = 2.35248 \quad \hat{\rho} = -0.18218 \]

C'. Wages and Prices Sector Identities

Implicit deflator for household consumption expenditure (1970 = 1.0)

(15) \[ PCHT = CHT/RCHT \]

Implicit deflator for gross domestic capital formation (1970 = 1.0)

(16) \[ PIT = IT/RIT \]

Implicit deflator for gross domestic fixed capital formation (1970 = 1.0)

(17) \[ PI = I/RI \]
Implicit deflator for private gross fixed capital formation (1970 = 1.0)

(18) \[ P_{IP} = \frac{IP}{RIP} \]

Implicit deflator for government gross fixed capital formation (1970 = 1.0)

(19) \[ P_{IG} = \frac{IG}{RIG} \]

Implicit deflator for GNP (1970 = 1.0)

(20) \[ P = \frac{GNP}{RGNP} \]

Implicit deflator for investment in inventories of private sector (1970 = 1.0)

(21) \[ P_{JNAP} = 0.5 \times (P_{JPN} + P_{JPN_{-1}}) \]

D. Income Distribution Sector

Incomes of employee other than wages and salaries, 1963·IV–1975·IV

(1) \[ YWO = -73.08346469 + 0.08518210808(YW - GC2) \]
\[ + 0.012469941250GC2 + 0.4482691603YWO_{-1} \]
\[ (1.635) \quad (5.747) \quad (0.400) \quad (4.408) \]
\[ \hat{R}^2 = 0.99784 \quad SE = 134.18 \quad DW = 1.41563 \quad \hat{\rho} = 0.22012 \]

Profits from unincorporated non-agricultural enterprises, 1964·III–1975·IV

(2) \[ YFNA = -51.16008218 + 0.08842202888(GNP - GC2)_{-1} \]
\[ + 0.1554173171DIF((GNP - GC2), 4) + 87.76333603SRL0 \]
\[ (0.077) \quad (20.228) \quad (6.039) \quad (0.852) \]
\[ \hat{R}^2 = 0.98072 \quad SE = 528.20 \quad DW = 1.03682 \quad \hat{\rho} = 0.47617 \]

Income from property: Rent, 1964·III–1975·IV

(3) \[ YRNT = -8.48834987 + 0.001306125451GNPP \]
\[ + 1.010512355YRNT_{-1} \]
\[ (0.705) \quad (1.051) \quad (33.953) \]
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\[ R^2 = 0.99965 \quad SE = 28.866 \quad DW = 1.77355 \quad \hat{\rho} = 0.03629 \]

Income from property: Interest, 1963•IV–1975•IV

\[
YINT = -1106.790821 + 0.01317319333(\text{SSP} + SSP_{-1}) + 135.6141514SRL0 + 0.6757598036YINT_{-1}
\]

\[
(6.002) \quad (5.556) \quad (5.709) \quad (10.101)
\]

\[ R^2 = 0.99911 \quad SE = 89.870 \quad DW = 2.06244 \quad \hat{\rho} = -0.04497 \]

Income from property: Dividends, 1964•III–1975•IV

\[
YDIV = 18.45939265 + 0.01529320782(YC + YC_{-1} - TAXC - TAXC_{-1}) + 0.8678740858YDIV_{-1} - 0.005610022486(YC_{-1} + YC_{-2} - TAXC_{-1} - TAXC_{-2}) + 614.9949518DOT(PWI, 4)
\]

\[
(0.767) \quad (3.489) \quad (23.434) \quad (1.515) \quad (4.359)
\]

\[ R^2 = 0.97235 \quad SE = 49.064 \quad DW = 3.07204 \quad \hat{\rho} = -0.54053 \]

Provisions for the consumption of private dwellings, 1963•IV–1975•IV

\[
DEP1 = 196.5014432 + 0.05586401208KIHP_{-1}
\]

\[
(10.151) \quad (65.576)
\]

\[ R^2 = 0.98896 \quad SE = 81.457 \quad DW = 0.70749 \quad \hat{\rho} = 0.64658 \]

Provisions for the consumption of private fixed capital, 1963•IV–1975•IV

\[
DEP2 = 7082.520146 + 0.08317474284(PIFEPRKF_{-1}) - 887.39965999SRL0
\]

\[
(7.349) \quad (31.544) \quad (5.975)
\]

\[ R^2 = 0.96653 \quad SE = 726.06 \quad DW = 0.21600 \quad \hat{\rho} = 0.97376 \]

Provisions for the consumption of incorporate dwellings, 1963•IV–1975•IV

\[
DEPC1 = -0.03436341977 + 0.06109840624DEP1 + 0.6577941073DEPC1_{-1}
\]

\[
(0.004) \quad (2.892) \quad (5.727)
\]

\[ R^2 = 0.94894 \quad SE = 32.399 \quad DW = 1.54297 \quad \hat{\rho} = 0.21865 \]
Provisions for the consumption of incorporate fixed capital, 1963·IV–1975·IV

(9) \[ \text{DEPC}_2 = 1491.568005 + 0.2390861809 \text{DEP}_2 \]
\[ + 0.7402376486 \text{DEPC}_{2-1} - 224.3682371 \text{SRL}_0 \]
\[ R^2 = 0.98567 \quad SE = 409.01 \quad DW = 2.02814 \quad \hat{\rho} = -0.03713 \]

Stock valuation adjustment, 1965·II–1975·IV

(10) \[ \text{AVNAP} = -61.31521886 + 4.131750175 \text{DIF(} \text{PJNAP}, 1) \times \text{RJNAP} \]
\[ - 0.4681912249 \text{DIF(} \text{PFNAP}, 1) \times \text{RSJNAP} \]
\[ R^2 = 0.12659 \quad SE = 239.83 \quad DW = 2.10585 \quad \hat{\rho} = -0.15983 \]

D'. Income Distribution Sector Identities

Compensation of employees (incl. social insurance contributions by employers)

(11) \[ \text{YW} = \text{YWPP} + \text{GC2} \]

Wages and salaries (incl. social insurance contributions by employers)

(12) \[ \text{YWR} = \text{YW} - \text{YWO} \]

Income from unincorporated enterprises

(13) \[ \text{YF} = \text{YFNA} + \text{YFA} \]

Income from property

(14) \[ \text{YR} = \text{YRNT} + \text{YINT} + \text{YDIV} \]

Saving of private corporations

(15) \[ \text{SAVC} = \text{YC} - \text{TAXC} - \text{TRCH} - \text{YDIV} - \text{YDIV3} \]
Income from private corporations

(16) \[ YC = Y - (YP + YG - TRCH - TRGH - TRFH - GINT) + YDIV + YDIV2 \]

National income

(17) \[ Y = GNP - (DEPG + DEP1 + DEP2) - ITAX + SUB - SGAP \]

Personal income

(18) \[ YP = YW + YF + YR + TRCH - CINT + TRGH + TRFH \]

Personal savings

(19) \[ SP = YP - (CP + TAXH + SI + TRHG + TRHF) \]

Disposable income of persons

(20) \[ YD = YP - (TAXH + SI + TRHG + TRHF) \]

Cumulative personal savings

(21) \[ SSP = 0.25 \times SP + SSP_{-1} \]

Compensation of employees in private sector

(22) \[ YWPP = RWP \times H \times LWP \]

E. Fiscal and Monetary Sector

Corporate income tax, 1965·I–1975·IV

\[
TAXC = -689.0178630 + 0.02825048649(R1 \times (YC - YDIV)_{-1} \\
+ R1_{-1} \times (YC - YDIV)_{-2} + R1_{-2} \times (YC - YDIV)_{-3} \\
+ R2 \times YDIV_{-1} + R2_{-1} \times YDIV_{-2} + R2_{-2} \times YDIV_{-3}) \\
+ 126.71935605RL0 + 0.8634172574TAXC_{-1} \\
(0.587) (0.601) (3.808) (8.402) \]

\[ R^2 = 0.94959 \quad SE = 499.36 \quad DW = 2.67121 \quad \hat{\rho} = -0.36287 \]
Personal income taxes and charges, 1965 • I–1975 • IV

(2) \[ TAXH = 395.4003709 + 0.07089852796 \sum_{i=0}^{3} \frac{5-i}{10} (YP - YDIV)_{-1} \]
\[ -261.3197856DEL T + 62089.86183DOT(PCM, 1) \]
\[ (0.975) \quad (22.568) \]
\[ R^2 = 0.96141 \quad SE = 501.91 \quad DW = 1.88802 \quad \hat{\rho} = 0.00580 \]

Indirect taxes, 1964 • III–1975 • IV

(3) \[ ITAX = 153.8674438 + 0.02339336591GNPP \]
\[ + 0.04558685263DIF(GNPP, 4) + 0.620705652ITAX_{-1} \]
\[ (2.646) \quad (2.941) \]
\[ R^2 = 0.99675 \quad SE = 147.25 \quad DW = 2.34501 \quad \hat{\rho} = -0.18054 \]

Changes in demand for cash currency by private sector (excl. financial intermediaries), 1964 • III–1975 • IV

(4) \[ DCUR = -77.80626709 \]
\[ + 0.1200897685(DCUR + DBLND + DBSEC + DABG + DABL) \]
\[ (1.264) \]
\[ + 0.05518549152DIF(GNPP, 4) \]
\[ (6.508) \]
\[ -2.953580468(Q2)DCUR_{-1} - 1.462384187(Q3)DCUR_{-1} \]
\[ (9.484) \quad (3.974) \]
\[ -1.716308173(Q4)DCUR_{-1} + 0.6502323412DCUR_{-1} \]
\[ (9.901) \quad (5.146) \]
\[ + 124.0542684zz0 + 110.8858970zz1 \]
\[ (0.663) \quad (0.591) \]
\[ - 102.4367979zz2 - 351.7856541zz3 \]
\[ (0.539) \quad (1.768) \]
\[ - 87.81382828zz4 - 62.15112304zz5 \]
\[ (0.443) \quad (0.328) \]
\[ - 141.5791868zz6 \]
\[ (0.699) \]
\[ R^2 = 0.95107 \quad SE = 180.78 \quad DW = 1.69784 \quad \hat{\rho} = 0.12029 \]

Changes in demand for demand and short-term deposits by private sector (excl. financial intermediaries), 1964 • III–1975 • IV
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(5) \[ DMDP = 502.7680434 \] 
\[ + 0.3383460576(DCURN + DBLND + DBSEC + DABG + DABLG) \] 
\[ - 88.0345120555L0 - 0.8920058388Q2 \times DMDP_{-1} + 0.03385318259Q3 \times DMDP_{-1} \] 
\[ -0.3099453927Q4 \times DMDP_{-1} + 0.2295035495DMDP_{-1} \] 
\[ \bar{R}^2 = 0.80915 \quad SE = 411.08 \quad DW = 1.46089 \quad \hat{\rho} = 0.25012 \]

Changes in demand for time deposits by private sector (excl. financial intermediaries), 1965·I–1975·IV

(6) \[ DTDP = 36.71346927 \] 
\[ + 0.2246415173(DCURN + DBLND + DBSEC + DABG + DABLG) \] 
\[ - 0.6849987819(Q2) \times DTDP_{-1} - 1.219040862(Q3) \times DTDP_{-1} \] 
\[ -1.219040862(Q4) \times DTDP_{-1} + 1.348472270DTDP_{-1} \] 
\[ R^2 = 0.91213 \quad SE = 255.54 \quad DW = 2.64351 \quad \hat{\rho} = -0.47312 \]

Change in reserve requirement of depository money banks, 1964·III–1975·IV

(7) \[ DDBJ = 357.3751361 \] 
\[ + 0.967714227(RRS1 \times DMDP + RRS2 \times (DTDP + DFB2)) \] 
\[ +(RRS1 \times DMDP + RRS2 \times (DTDP + DFB2))_{-1} \] 
\[ + 0.119247357BJCR - 45.36112800SRL0 \] 
\[ + 0.6679880614(Q2) \times DDBJ_{-1} - 1.846235844(Q3) \times DDBJ_{-1} \] 
\[ + 0.7652010933(Q4) \times DDBJ_{-1} - 0.5553288508DDBJ_{-1} \] 
\[ \bar{R}^2 = 0.91213 \quad SE = 255.54 \quad DW = 2.64351 \quad \hat{\rho} = -0.47312 \]
Changes in bank-loans to private sector, 1964·III–1975·IV

\( \hat{R}^2 = 0.25544 \quad SE = 177.90 \quad DW = 1.96317 \quad \hat{\rho} = 0.01593 \)

\[(8) \quad DBLND - BJCR = -435.8352424 \quad (-1.719) + 0.7166354768((1.0 - RRS1) \cdot DMDP + (1.0 - RRS2) \cdot (DTDP + DFB2) - DABG - DABLG) \quad (7.109) + 334.6030595(SRL0 - DELT) + 0.5291522425(Q2) \cdot (DBLND - BJCR) - 1 \quad (1.795) + 0.3878688426(Q2) \cdot (DBLND - BJCR) \quad - 1 \quad (3.372) + 0.3121774701(Q4) \cdot (DBLND - BJCR) \quad - 1 \quad (1.945) - 0.03160152719(DBLND - BJCR) \quad - 1 \quad (0.184) \]

\( \hat{R}^2 = 0.88936 \quad SE = 478.31 \quad DW = 1.57609 \quad \hat{\rho} = 0.20147 \)

Changes in private security holdings by banks, 1964·III–1975·IV

\[(9) \quad DBSEC = 36.61403556 \quad (2.000) + 0.01366642376((1.0 - RRS1) \cdot DMDP + (1.0 - RRS2) \cdot (DTDP + DFB2) - DABG - DABLG) \quad (1.658) - 4.946442481(RCAM - DELT) + 0.04297328642(Q2) \cdot DBSEC \quad - 1 \quad (0.803) - 0.1860567138(Q3) \cdot DBSEC \quad - 1 - 0.5438607351(Q4) \cdot DBSEC \quad - 1 \quad (1.095) + 0.7405960801DBSEC \quad \cdot 1 \quad (2.616) \]

\( \hat{R}^2 = 0.67491 \quad SE = 39.860 \quad DW = 1.23087 \quad \hat{\rho} = 0.35186 \)

Changes in loans and security holdings by financial intermediaries, 1964·III–1975·IV

\[(10) \quad DABP = 20.84969054 + 1.015376597(DBLND + DBSEC) \quad (0.459) \quad (62.043) \]

\( \hat{R}^2 = 0.98844 \quad SE = 168.97 \quad DW = 1.12510 \quad \hat{\rho} = 0.43652 \)

Changes in financial bond issued by banks, 1964·III–1975·IV
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

\[ DF_{B2} = -12.55877419 + 0.01992718211 (DM_{DP} + DT_{DP} + DM_{DP-1} + DT_{DP-1}) \]
\[ + 0.0320229943 DB_{LN}D_{-2} + 0.4640441525 (Q2)(DBF2)_{-1} \]
\[ + 1.133588999 (Q3)(DFB2)_{-1} + 0.1221250113 (Q4)(DFB2)_{-1} \]
\[ R^2 = 0.55699 \quad SE = 143.32 \quad DW = 2.11000 \quad \hat{\rho} = -0.05583 \]

Changes in supply of cash currency through the government sector deficit, 1964·IV–1975·IV

\[ DC_{URN} = -302.2685467 - 0.09282910608 SG + 0.178166329 IG \]
\[ + 0.278119934 JG + 0.2687056415 E - M + 1.119940661 DABG \]
\[ - 1.298482276 Q2 \cdot DC_{URN-1} - 0.9559246434 Q3 \cdot DC_{URN-1} - 1.110670116 Q4 \cdot DC_{URN-1} \]
\[ R^2 = 0.64790 \quad SE = 621.69 \quad DW = 1.74968 \quad \hat{\rho} = 0.11465 \]

Changes in postal savings, 1964·III–1975·IV

\[ DT_{DPG} = -22.51700121 \]
\[ + 0.01819147525 (DC_{URN} + DB_{LN}D + DBSEC + DABG + DABLG) \]
\[ + 0.06281768914 DIF(YD, 4) - 0.2124220526 Q2 \cdot DT_{DPG-1} \]
\[ + 0.2000933747 Q3 \cdot DT_{DPG-1} - 0.5167966546 Q4 \cdot DT_{DPG-1} \]
\[ R^2 = 0.98136 \quad SE = 53.731 \quad DW = 1.72516 \quad \hat{\rho} = 0.09338 \]

**E'. Fiscal and monetary sector Identities**

Total tax payments (excl. subsidies)

\[ TAX = TAXH + TAXC + ITAX \]
(15) \[ SG = TAX + SI + TRHG + TRFG + YG - GINT - (CG + TRGH + TRGF) \]

Net change in public debts to private sector

(16) \[ DDBTG = (DLOGH + DLOGC) + IG/4 + JG/4 - (SG/4 + DEPG/4 + (DTDPG + DLISG))) \]

Net change in public bonds holdings by private non-financial sector

(17) \[ DPBG = DDBTG - (DABG + DABLG) \]

Change in cash-holding by commercial banks

(18) \[ DCAS = DMDP + DTDP + DFB2 + BJCR + DBOT - (DABP + DABG + DABLG) \]

Outstanding of demand deposite at commercial banks

(19) \[ SDP = DMDP + SDP_{-1} \]

Outstanding of time deposite at commercial banks

(20) \[ TDP = DTDP + TDP_{-1} \]

Cash currency in circulation

(21) \[ CUR = DCUR + CUR_{-1} \]

Money supply (incl. time deposite at commercial banks)

(22) \[ M2 = 0.4*(CUR + SDP + TDP) + 0.3*(CUR + SDP + TDP)_{-1} \\
+ 0.2*(CUR + SDP + TDP)_{-2} + 0.1*(CUR + SDP + TDP)_{-3} \]

F. International Trade Sector

Commodity exports to U.S.A. (FOB basis, at 1970 const prices), 1966·III–1976·IV
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

(1) \[ \log(RejNA) = -1.9707 + 0.3163 \log\left(\frac{MTNA}{PEJTP} \right) \]
\[ + 0.1869 \log(RejNAP) \]
\[ + 0.7619 \log(RejNA_{-1}) \]
\[ - 0.0303Q2 - 0.0777Q3 - 0.2132Q4 \]
\[ \text{anti-log} = 0.1394 \]

\[ RejNAP = (PEJNA \times EXR / (PEJT \times 3.6))^{-1} + (\cdot)_{-2} + (\cdot)_{-3} + (\cdot)_{-4} \]

\[ PEJTP = (PEJT \times 3.6 / EXR)^{-1} + (\cdot)_{-2} + (\cdot)_{-3} + (\cdot)_{-4} \]

Commodity exports to Western Europe (FOB basis, at 1970 const. prices), 1964·III–1976·IV

(2) \[ \log(RejWE) = -8.3355 + 0.6018 \log\left(\frac{MTWE}{PEJTP} \right) \]
\[ + 0.7810 \log(RejWEP) \]
\[ + 0.6522 \log(RejWE_{-1}) \]
\[ + 0.0959Q2 + 0.0767Q3 - 0.0417Q4 \]
\[ \text{anti-log} = 0.00024 \]

\[ RejWEP = (PEJWE \times EXR / (PEJT \times 3.6))^{-1} + (\cdot)_{-2} + (\cdot)_{-3} + (\cdot)_{-4} \]

\[ PEJTP = (PEJT \times 3.6 / EXR)^{-1} + (\cdot)_{-2} + (\cdot)_{-3} + (\cdot)_{-4} \]

\[ R^2 = 0.967 \quad SE = 0.0923 \quad DW = 2.03 \]

Exports to Asian Countries (FOB basis, at 1970 const. prices), 1964·III–1975·IV

(3) \[ RejSEA = -196.8038798 + 0.04423406206MTSEA / (PEJT \times (3.60 / EXR)) \]
\[ + 99.08347328T - 46.10386072Q2 \]
\[ + 509.0026145Q3 - 420.1396654Q4 \]
\[ R^2 = 0.95605 \quad SE = 340.87 \quad DW = 0.97832 \quad \hat{\rho} = 0.50173 \]
Other commodity imports (CIF basis, at 1970 const. prices), 1964·III–1975·IV

(4) \[ \text{LOG}(RMJOT) = 0.6930 + 0.4313 \text{LOG}(RGNPP) \]
\[ - 0.2313 \text{LOG}(PMJOT*EXR/PWT) + 0.6424 \text{LOG}(RMJOT_{-1}) \]
\[ \text{anti-log} = 1.9997 \]
\[ R^2 = 0.976 \quad SE = 0.078 \quad DW = 1.503 \]

Food-Stuff imports (CIF bases, at 1970 const. prices), 1964·III–1975·IV

(5) \[ RMJFD = -676.9267442 + 0.1697335420RCF \]
\[ + 0.5075163311RMJFD_{-1} - 242.7365011Q2 \]
\[ + 70.80197220Q3 - 262.9398038Q4 \]
\[ \text{anti-log} = 3.5544 \]
\[ R^2 = 0.92423 \quad SE = 217.81 \quad DW = 2.31772 \quad \hat{\rho} = -0.16051 \]

Fuel imports (CIF basis, at 1970 const. prices), 1964·III–1975·IV

(6) \[ \text{LOG}(RMJOIL) = 1.268185819 + 0.5891271756\text{LOG}(O) \]
\[ + 0.5192554386\text{LOG}(RJOIL_{-1}) - 0.02882796743Q2 \]
\[ + 0.05394004584Q3 - 0.01572327729Q4 \]
\[ \text{anti-log} = 3.5544 \]
\[ R^2 = 0.98831 \quad SE = 0.044788 \quad DW = 2.33913 \quad \hat{\rho} = -0.22199 \]

Crude materials imports (CIF basis, at 1970 const. prices), 1964·III–1975·IV

(7) \[ RMJRM = 721.6891743 + 48.53661583Q \]
\[ - 0.03819737738RSJNAP + 0.2994105625RMJRM_{-1} \]
\[ - 398.9193331Q2 - 300.3556388Q3 - 391.6085820Q4 \]
\[ \text{anti-log} = 0.97076 \]
\[ R^2 = 0.97076 \quad SE = 262.17 \quad DW = 1.79013 \quad \hat{\rho} = 0.09238 \]
Exports of services: freights and insurances (at current prices), 1964 · III–1975 · IV

\[ ESFISY = -89.85167483 + 0.1183451578 EJBY \]
\[ - 0.1729592856 ESFISY_{-1} - 533.6997217 Q2 \]
\[ -180.2760816 Q3 + 236.0027681 Q4 \]
\[ R^2 = 0.80811 \quad SE = 856.86 \quad DW = 2.14087 \quad \hat{p} = -0.09001 \]

Imports of services: freights and insurances (at current prices), 1964 · III–1975 · IV

\[ MSFISY = 236.7722714 + 0.08218514997 MJBY \]
\[ + 0.5000956842 MSFISY_{-1} + 3.602308292 Q2 \]
\[ + 30.97258967 Q3 - 123.3897264 Q4 \]
\[ R^2 = 0.99793 \quad SE = 119.35 \quad DW = 1.46332 \quad \hat{p} = 0.23316 \]

Investment incomes from abroad, 1964 · III–1975 · IV

\[ \log(ESIVY) = -1.719452912 \]
\[ + 0.4604852724 \log(KLDA + KLTA + KLLA + KLSOA) \]
\[ + 0.6212341722 \log(ESIVY_{-1}) + 0.2390776305 Q2 \]
\[ - 0.04558715627 Q3 + 0.2752662372 Q4 \]
\[ R^2 = 0.98847 \quad \text{anti-log} = 0.1792 \quad DW = 1.95611 \quad \hat{p} = -0.07781 \]

Investment incomes to abroad, 1964 · III–1975 · IV

\[ \log(MSIVY) = -3.416342945 + 0.7174978402 \log(EJBY + MJBY) \]
\[ + 0.3956689166 \log(MSIVY_{-1}) + 0.1702532861 Q2 \]
\[ - 0.03116438066 Q3 + 0.2385794919 Q4 \]
\[ R^2 = 0.98847 \quad \text{anti-log} = 0.1792 \quad DW = 1.95611 \quad \hat{p} = -0.07781 \]
anti-log = 0.03283

\[ R^2 = 0.98625 \quad SE = 0.097595 \quad DW = 1.97617 \quad \hat{\rho} = -0.00734 \]

Other payments to abroad, 1964 · III–1975 · IV

(13) \( \text{LOG}(MSOTY) = -1.955494981 + 0.3264222733 \text{LOG}(RGNP*P) \)
\[
(2.692) \quad (2.657)
\]
\(+ 0.7754919772 \text{LOG}(MSOTY_{-1}) + 0.1197887944Q2 \)
\[
(9.095) \quad (5.369)
\]
\(+ 0.02598812181Q3 + 0.1396300256Q4 \)
\[
(1.257) \quad (6.491)
\]

anti-log = 0.1415

\[ R^2 = 0.99559 \quad SE = 0.04341 \quad DW = 2.14475 \quad \hat{\rho} = -0.12423 \]

Total commodity exports (Custom clearance and FOB basis, at current prices), 1964 · III–1975 · IV

(14) \( EJBY = 60.89428405 + 0.9810583347EJTOTY \)
\[
(1.935) \quad (1344.311)
\]
\(- 24.99296021Q2 - 50.50901113Q3 - 77.62574856Q4 \)
\[
(0.781) \quad (1.404) \quad (2.162)
\]
\[ R^2 = 0.99998 \quad SD = 86.033 \quad DW = 2.16671 \quad \hat{\rho} = -0.18919 \]

Total commodity imports (Custom clearance and FOB basis, at current prices), 1964 · III–1975 · IV

(15) \( MJBY = -1131.484465 + 0.8736773435MJTOTY \)
\[
(8.777) \quad (312.733)
\]
\(- 52.15246314Q2 + 68.20637357Q3 + 26.14962083Q4 \)
\[
(0.343) \quad (0.458) \quad (0.176)
\]
\[ R^2 = 0.99954 \quad SE = 356.40 \quad DW = 1.26956 \quad \hat{\rho} = 0.35687 \]

Commodity-service exports and incomes from abroad (national accounts, at current prices), 1964 · III–1975 · IV

(16) \( E = 67.83325223 \)
\[
(0.453) \]
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

+ 1.582551168(0.4*(EJBY + ESTOTY)*(EXR/1000))
   (10.022)
+ 0.9348640751(0.3*(EJBY + ESTOTY)*(EXR/1000))
   (3.139)
+ 0.6746056059(0.2*(EJBY + ESTOTY)*(EXR/1000))
   (1.466)
- 0.35292594(0.1*(EJBY + ESTOTY)*(EXR/1000))
   (0.522)
\[ R^2 = 0.99212 \quad SE = 526.66 \quad DW = 1.68166 \quad \hat{\rho} = 0.10580 \]

Commodity-service imports and incomes to abroad (National accounts, at current prices), 1964 • III—1975 • IV

(17) \[ M = 27.69386398 \]
   (0.881)
+ 2.352015913(0.4*(MJBY + MSTOTY)*(EXR/1000))
   (36.577)
+ 0.4266806401(0.3*(MJBY + MSTOTY)*(EXR/1000))
   (2.645)
- 0.6028423262(0.2*(MJBY + MSTOTY)*(EXR/1000))
   (2.425)
+ 0.5071876751(0.1*(MJBY + MSTOTY)*(EXR/1000))
   (1.841)
\[ R^2 = 0.99964 \quad SE = 118.14 \quad DW = 2.36022 \quad \hat{\rho} = -0.18089 \]

Implicit deflator for commodity-service exports and incomes from abroad (1970 = 1.0), 1964 • III—1975 • IV

(18) \[ PE = 0.09074513466 + 2.725214955(0.4*PEJT/100.) \]
    (5.663) \quad (11.110)
- 1.174573197(0.3*PEJT/100.) \quad + 0.06656278242(0.2*PEJT/100.)
    (1.853) \quad (0.069)
+ 1.641432501(0.1*PEJT/100.)
    (1.542)
\[ R^2 = 0.99048 \quad SE = 0.019562 \quad DW = 1.25191 \quad \hat{\rho} = 0.31906 \]

Implicit deflator for commodity-service imports and incomes to abroad (1970 = 1.0), 1964 • III—1975 • IV

(19) \[ PM = 0.1692588862 \]
    (7.462)
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\[ \begin{align*}
+2.498033787(0.4\ast(MJTOTY/RMJTOT)\ast(EXR/360)) \\
(10.351) \\
-0.7108050472(0.3\ast(MJTOTY/RMJTOT)\ast(EXR/360))_{-1} \\
(1.209) \\
+0.4470230794(0.2\ast(MJTOTY/RMJTOT)\ast(EXR/360))_{-2} \\
(0.499) \\
-0.4610400196(0.1\ast(MJTOTY/RMJTOT)\ast(EXR/360))_{-3} \\
(0.441) \\
R^2 = 0.98385 \quad SE = 0.045820 \quad DW = 0.96003 \quad \hat{\rho} = 0.52007
\end{align*} \]

Export price index for all commodities of Japan (1970 = 1.0), 1965·1–1975·IV

(20) \[ \begin{align*}
PEJT = 16.0702 + 0.2040DIF(PWI\ast EXR, 1) \\
(6.524) \\
-0.0796(PWI\ast EXR)_{-1} + 1.1207PEJT_{-1} \\
(24.91) \\
R^2 = 0.985 \quad SE = 0.0269 \quad DW = 2.089
\end{align*} \]

F'. International Trade sector Identities

Commodity exports to U.S.A. (FOB basis, at current prices)

(21) \[ \begin{align*}
EJNAY = REJNA\ast(PEJT\ast(3.60/EXR))
\end{align*} \]

Commodity exports to Asian countries (FOB basis, at current prices)

(22) \[ \begin{align*}
EJSEAY = REJSEA\ast(PEJT\ast(3.60/EXR))
\end{align*} \]

Commodity exports to the Rest of the World (FOB basis, at current prices)

(23) \[ \begin{align*}
EJOTY = REJOT\ast(PEJT\ast(3.60/EXR))
\end{align*} \]

Total commodity exports (Custom clearance and FOB basis, at 1970 const. prices)

(24) \[ \begin{align*}
REJTOT = REJNA + REJWE + REJSEA + REJOT + REJCOM
\end{align*} \]

Total commodity exports (Custom clearance and FOB basis, at 1970 const. prices)

(25) \[ \begin{align*}
EJTOTY = REJTOT\ast(PEJT\ast(3.60/EXR))
\end{align*} \]
Food-stuff imports (CIF basis, at current prices)
(26) \[ MJFDY = RMJFD \times (PMJFD \times \frac{3.60}{EXR}) \]

Fuel imports (CIF basis, at current prices)
(27) \[ MJOILY = RMJOIL \times (PMJOL \times \frac{3.60}{EXR}) \]

Crude materials imports (CIF basis, at current prices)
(28) \[ MJRMY = RMJRM \times (PMJRM \times \frac{3.60}{EXR}) \]

Other commodity imports (CIF basis, at current prices)
(29) \[ MJOTY = RMJOT \times (PMJOT \times \frac{3.60}{EXR}) \]

Total commodity imports (Custom clearance and FOB basis, at 1970 const. prices)
(30) \[ RMJTOT = RMJFD + RMJOIL + RMJRM + RMJOT \]

Total commodity imports (Custom clearance and FOB basis, at 1970 const. prices)
(31) \[ MJTOTY = MJFDY + MJOILY + MJRMY + MJOTY \]

Total services to abroad: credits
(32) \[ ESTOTY = ESFISY + ESIVY + ESGY + ESOTY \]

Total services from abroad: debits
(33) \[ MSTOTY = MSFISY + MSIVY + MSGY + MSOTY \]

\( PEJT \) transformation ratio
(34) \[ PZ = EJTOTY \times (REJTOT \times PEJT \times \frac{3.60}{EXR}) \]
Trade balance

\( BTY = EJBY - MJBY \)

Current balance

\( BCY = BTY + (ESTOTY - MSTOTY) + (ESTY - MSTY) \)

Long-term capital balance

\( BCLY = CLAY - CLLY \)

Basic balance

\( BBY = BCY + BCLY \)

Overall balance

\( BOY = BBY + BCSY + BEOY \)

Commodity-service exports and incomes from abroad (national account)

\( RE = E/PE \)

Commodity-service imports and incomes to abroad (national account, at 1970 constant prices)

\( RM = M/PM \)

Surplus of the nation on current account (national account, at 1970 constant prices)

\( FSRP = RE - RM \)

Surplus of the nation on current account (national account, at current prices)

\( XAB = E - M \)
C". An Alternative Set of Price Equations

Implicit price deflator for private consumption expenditure (1970 = 1.0), 1965·II–1975·IV

\[ \text{DOT}(PCP, 4) = 0.0007099699235 + 0.1318001156(\text{DOT}(RW, 4) + \text{DOT}(RW, 4)_{-1}) + 0.3530946117\text{DOT}(PW, 4) + 0.23721400999\text{DOT}(PPCP, 4)_{-3} \]

\[ (0.074) \quad (4.110) \quad (9.267) \quad (4.823) \]

\[ R^2 = 0.90429 \quad SE = 0.015793 \quad DW = 0.68686 \quad \hat{\rho} = 0.64867 \]

Implicit price deflator for fuel and light (1970 = 1.0), 1964·III–1975·IV

\[ \text{DOT}(PCL, 4) = -0.1009814819 + 1.328556712\text{DOT}(PPCP, 4) + 0.001520841630T \]

\[ (-5.027) \quad (9.337) \quad (2.906) \]

\[ R^2 = 0.77490 \quad SE = 0.041455 \quad DW = 0.75140 \quad \hat{\rho} = 0.62997 \]

Implicit price deflator for housing (Rent) (1970 = 1.0), 1965·I–1975·IV

\[ \text{DOT}(PCH, 4) = 0.04407930846 + 0.3207443927(\text{DOT}(PCP, 4)_{-1} + \text{DOT}(PCP, 4), 2) - 0.0005650946835T \]

\[ (3.930) \quad (7.633) \quad (1.741) \]

\[ R^2 = 0.63166 \quad SE = 0.020872 \quad DW = 0.49525 \quad \hat{\rho} = 0.75251 \]

Implicit price deflator for housing (Others) (1970 = 1.0), 1964·III–1975·IV

\[ \text{DOT}(PCO, 4) = -0.06896383203 + 1.547486932\text{DOT}(PCP, 4) + 0.002400008418\text{DOT}(RCO, 4) \]

\[ (3.843) \quad (11.030) \quad (0.036) \]

\[ R^2 = 0.86540 \quad SE = 0.030086 \quad DW = 0.67618 \quad \hat{\rho} = 0.66614 \]

Implicit price deflator for the miscellaneous (1970 = 1.0), 1965·I–1975·IV
Implicit price deflator for the consumption expenditure of private non-profit institutions (1970 = 1.0), 1964 · III–1975 · IV

(5) $\dot{\text{DOT}(PCOT, 4)} = 0.01111527517$

$(1.416)$

$+ 0.4500413355(\dot{\text{DOT}(PCP, 4)}_{-1} + \dot{\text{DOT}(PCP, 4)}, 2)$

$(15.307)$

$- 0.0001061844088T$

$(0.467)$

$\hat{R}^2 = 0.89945 \quad SE = 0.014604 \quad DW = 1.74794 \quad \hat{\rho} = 0.12117$

Implicit price deflator for the inventory stocks by private non-agricultural sector (1970 = 1.0), 1965 · I–1975 · IV

(6) $\dot{\text{DOT}(PCNH, 4)} = -0.01299814745$

$(2.088)$

$+ 1.80737290(\dot{\text{DOT}(PCP, 4)} + 0.057544274767\dot{\text{DOT}(RCP, 4)})$

$(41.341) \quad (1.044)$

$\hat{R}^2 = 0.99052 \quad SE = 0.0056112 \quad DW = 1.49317 \quad \hat{\rho} = 0.24634$

Implicit price deflator for private fixed investment, 1965 · I–1975 · IV

(7) $\dot{\text{DOT}(PIFEP, 4)} = -0.007432254251$

$(2.138)$

$+ 0.3936668644(\dot{\text{DOT}(PW1, 4)} + \dot{\text{DOT}(PW1, 4)}_{-1})$

$(31.523)$

$+ 0.1106187000\dot{\text{DOT}(O, 4)}_{-1}$

$(4.635)$

$\hat{R}^2 = 0.95853 \quad SE = 0.015420 \quad DW = 0.72993 \quad \hat{\rho} = 0.63541$

Implicit price deflator for general government consumption expenditure (1970 = 1.0), 1964 · III–1975 · IV
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

\[ \text{DOT}(PCG, 4) = 0.0267120111 + 1.060166364 \text{DOT}(PCP, 4) + 0.03529259094 \text{DOT}((GCZ/LG), 4) \]
\[ R^2 = 0.76676 \quad SE = 0.030228 \quad DW = 1.76588 \quad \hat{\rho} = 0.07130 \]

Implicit prices deflator for investment in dwellings by government sector (at 1970 const. prices), 1964·III–1975·IV

\[ \text{DOT}(PIHG, 4) = -0.01207058864 + 1.018316113 \text{DOT}(PIHP, 4) \]
\[ R^2 = 0.93208 \quad SE = 0.021189 \quad DW = 0.53277 \quad \hat{\rho} = 0.73205 \]

List of Variables

**AVNAP**
Stock valuation adjustment

**BBY**
Basic balance

**BCLY**
Long-term capital balance

**BCSY**
Balance of payment: Short-term capital (U.S.$ million)

**BCY**
Current balance

**BEOY**
Balance of payment: Errors & Omissions (U.S.$ million)

**BJCR**
Change in Bank of Japan credit (incl. lendings, sales and purchases of securities, and bills purchased)

**BOY**
Overall balance

**BTY**
Trade balance

**CB**
Expenditure of residents abroad and etc. (at current prices)

**CC**
Expenditure of households for clothing (at current prices)

**CD**
Expenditure of households for durable goods

**CF**
Expenditure of households for foods, beverages and tobacco (current prices)

**CG**
General government consumption expenditure

**CHT**
Household consumption expenditure (current prices)

**CINT**
Interest on consumer’s debt

**CL**
Expenditure of households for fuel and light (at current prices)

**CLAY**
Balance of payment: Long-term capital assets (U.S.$ million)

**CLLY**
Balance of payment: Long-term liabilities (U.S.$ million)

**CND**
Expenditure of households for non-durable goods

**CNH**
Expenditure of private non-profit institutions (at current prices)
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>Expenditure of households for housing (Others) (at current prices)</td>
</tr>
<tr>
<td>COT</td>
<td>Expenditure of households for the miscellaneous (at current prices)</td>
</tr>
<tr>
<td>CP</td>
<td>Private consumption expenditure (current prices)</td>
</tr>
<tr>
<td>CR</td>
<td>Expenditure of households for housing (Rent) (at current prices)</td>
</tr>
<tr>
<td>CS</td>
<td>Expenditure of households for services</td>
</tr>
<tr>
<td>CUR</td>
<td>Cash currency in circulation</td>
</tr>
<tr>
<td>DABG</td>
<td>Change in deposite money banks' claims on the central government</td>
</tr>
<tr>
<td>DABLG</td>
<td>Change in deposite money banks' claims on local government</td>
</tr>
<tr>
<td>DABP</td>
<td>Changes in loans and security holdings by financial intermediaries</td>
</tr>
<tr>
<td>DBLND</td>
<td>Changes in bank-loans to private sector</td>
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<tr>
<td>DBOT</td>
<td>Change in other debts (net of other assets) in all banks</td>
</tr>
<tr>
<td>DBSEC</td>
<td>Changes in private security holdings by banks</td>
</tr>
<tr>
<td>DCAS</td>
<td>Change in cash-holding by commercial banks</td>
</tr>
<tr>
<td>DCUR</td>
<td>Changes in demand for cash currency by private sector (excl. financial intermediaries)</td>
</tr>
<tr>
<td>DCURN</td>
<td>Changes in supply of cash currency through the government sector deficit</td>
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<tr>
<td>DDBJ</td>
<td>Change in reserve requirement of deposite money banks</td>
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<tr>
<td>DDBTG</td>
<td>Net change in public debts to private sector</td>
</tr>
<tr>
<td>DELT</td>
<td>The Bank of Japan's discount rate of commercial bills and interest rates on loans secured by government securities, specially designated securities and bills corresponding to commercial bills.</td>
</tr>
<tr>
<td>DEP 1</td>
<td>Provisions for the consumption of private dwellings</td>
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<tr>
<td>DEP 2</td>
<td>Provision for the consumption of private fixed capital</td>
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<tr>
<td>DEPC 1</td>
<td>Provisions for the consumption of incorporate dwellings</td>
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<tr>
<td>DEPC 2</td>
<td>Provisions for the consumption of invorporate fixed capital</td>
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<tr>
<td>DEPG</td>
<td>Provisions for the government's consumption of fixed capital</td>
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<td>DFB 2</td>
<td>Changes in financial bond issued by banks</td>
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<tr>
<td>DLISG</td>
<td>Change in post-office life insurance</td>
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<tr>
<td>DLOGC</td>
<td>Change in government loans to private corporations</td>
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<tr>
<td>DLOGH</td>
<td>Change in government loans to households and private non-profit institutions</td>
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<tr>
<td>DMDP</td>
<td>Changes in demand for demand and short-term deposite by private sector (excl. financial intermediaries)</td>
</tr>
<tr>
<td>DPBG</td>
<td>Net change in public bonds holdings by private non-financial sector</td>
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<td>DTDP</td>
<td>Changes in demand for time deposite by privare sector (excl. financial intermediaries)</td>
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<tr>
<td>DTDPG</td>
<td>Changes in postal savings</td>
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<tr>
<td>E</td>
<td>Commodity-service exports and incomes from abroad (national accounts, at current prices)</td>
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<tr>
<td>EFJOT</td>
<td>Commodity exports to the Rest of the World (FOB basis, at 1970 const. prices)</td>
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</table>
### A QUARTERLY ECONOMETRIC MODEL OF JAPAN

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
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<tbody>
<tr>
<td>EJBY</td>
<td>Total commodity exports (Custom clearance and FOB basis, at current prices)</td>
</tr>
<tr>
<td>EJNAY</td>
<td>Commodity exports to U.S.A. (FOB basis, at current prices)</td>
</tr>
<tr>
<td>EJOTY</td>
<td>Commodity exports to the Rest of the World (FOB basis, at current prices)</td>
</tr>
<tr>
<td>EJSEAY</td>
<td>Commodity exports to Asian countries (FOB basis, at current prices)</td>
</tr>
<tr>
<td>EJTOTY</td>
<td>Total commodity exports (Custom clearance and FOB basis, at current prices)</td>
</tr>
<tr>
<td>EJWEY</td>
<td>Commodity exports to Western Europe (FOB basis, at current prices)</td>
</tr>
<tr>
<td>ESFISY</td>
<td>Exports of services: freights and insurances (at current prices)</td>
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<tr>
<td>ESGY</td>
<td>Balance of payment: government’s services (credits), (U.S.$ million)</td>
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<tr>
<td>ESIY</td>
<td>Investment incomes from abroad</td>
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<tr>
<td>ESOTY</td>
<td>Balance of payment: Others’ (credits), (U.S.$ million)</td>
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<tr>
<td>ESTOTY</td>
<td>Total services to abroad: credits</td>
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<tr>
<td>ESTY</td>
<td>Balance of payment: Transfers (credits), (U.S.$ million)</td>
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<tr>
<td>EXR</td>
<td>Foreign exchange rate (Yen per Dollar)</td>
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<tr>
<td>FSRP</td>
<td>Surplus of the nation on current account (national account, at 1970 const. prices)</td>
</tr>
<tr>
<td>GC 2</td>
<td>Wages and salaries of employees in government sector</td>
</tr>
<tr>
<td>GDP</td>
<td>Outstanding of time deposite at commercial banks</td>
</tr>
<tr>
<td>GINT</td>
<td>Interest on the public debt</td>
</tr>
<tr>
<td>GNP</td>
<td>Gross national product (at current)</td>
</tr>
<tr>
<td>GNPP</td>
<td>Gross private product</td>
</tr>
<tr>
<td>H</td>
<td>Average hours worked (for one quarter per capita)</td>
</tr>
<tr>
<td>H*LWP</td>
<td>Man-hours of employee in private sector</td>
</tr>
<tr>
<td>HLWPE</td>
<td>Man-hours in normal operation</td>
</tr>
<tr>
<td>HM</td>
<td>Estimated upper limit for hours worked per capita</td>
</tr>
<tr>
<td>I</td>
<td>Gross domestic fixed capital formation (at current prices)</td>
</tr>
<tr>
<td>IFC</td>
<td>Gross fixed investment by incorporated sector (excl. dwellings)</td>
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<tr>
<td>IFEP</td>
<td>Gross fixed investment by private sector (at current prices)</td>
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<tr>
<td>IFG</td>
<td>Government investment in fixed capital (excl. housing investment)</td>
</tr>
<tr>
<td>IG</td>
<td>Gross fixed capital formation by government sector</td>
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<tr>
<td>IHC</td>
<td>Gross investment in dwellings by incorporated sector</td>
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<tr>
<td>IHG</td>
<td>Government housing investment</td>
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<tr>
<td>IHH</td>
<td>Gross investment in dwellings by unincorporated sector</td>
</tr>
<tr>
<td>IHP</td>
<td>Gross investment in private dwellings (at current prices)</td>
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<tr>
<td>IP</td>
<td>Gross fixed capital formation by private sector (at current prices)</td>
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<tr>
<td>IT</td>
<td>Gross domestic capital formation (at current prices)</td>
</tr>
<tr>
<td>ITAX</td>
<td>Indirect taxes</td>
</tr>
</tbody>
</table>
J Change in inventories (at current prices)
JC Investment in inventories by incorporated sector
JG Changes in inventories of government enterprises
JNAP Investment in inventories by private non-agricultural enterprises (at current prices)
JNP Change in inventories in the sector of agriculture, forestry, and fishing (at current prices)
JP Change in inventories of private sector (at current prices)

KFP Stock in fixed capital of private sector (at acquire prices)
KIHP Stock in private dwellings (at current prices)
KLDA Balance of payment: Long-term capital; direct investments (U.S.$ million)
KLLA Balance of payment: Long-term capital; loans (U.S.$ million)
KLSOA Balance of payment: Long-term capital; securities and others (U.S.$ million)
KLTA Balance of payment: Long-term capital; trade credits (U.S.$ million)

L The number of workers
LG The number of employees in government sector
LP The number of workers in private sector
LW The number of employees
LWP The number of employees in private sector

M Commodity-service imports and incomes to abroad (national accounts, at current prices)
M2 Money supply (incl. time deposite at commercial banks)
MJBY Total commodity imports (Custom clearance and FOB basis, at current prices)
MJFDY Food-stuff imports (CIF basis, at current prices)
MJOILY Fuel imports (CIF basis, at current prices)
MJOTY Other commodity imports (CIF basis, at current prices)
MJRMY Crude materials imports (CIF basis, at current prices)
MJTOTY Total commodity imports (Custom clearance and FOB basis, at 1970 const. prices)
MSFISY Imports of services: freights and insurances (at current prices)
MSGY Balance of payment: government’s services (debts), (U.S.$ million)
MSIVY Investment incomes to abroad
MSOTY Other payments to abroad
MSTOTY Total services from abroad- debits
MSTY Balance of payment: Transfers (debts), (U.S.$ million)
MTEJC Commodity imports of the rest of the world (custom clearance basis, U.S.$ million)
MTNA Commodity imports of U.S.A. (custom clearance basis, U.S.$ million)
MTSEA
Commodity imports of the Asian countries (custom clearance basis, U.S.$ million)

MTWE
Commodity imports of the Western Europe (custom clearance basis, U.S.$ million)

NL
The number of workers

O
Production index for mining and manufacturing industries

P
Implicit deflator for GNP (1970 = 1.0)

PCB
Implicit deflator for expenditure of residents abroad and etc.

PCD
Price index of durable consumer goods (1970 = 1.0)

PCF
Implicit price deflator for foods, beverages and tobacco (1970 = 1.0)

PCG
Implicit price deflator for general government consumption expenditure (1970 = 1.0)

PCH
Implicit price deflator for housing (Rent) (1970 = 1.0)

PCHT
Implicit deflator for household consumption expenditure (1970 = 1.0)

PCL
Implicit price deflator for fuel and light (1970 = 1.0)

PCNH
Implicit price deflator for the consumption expenditure of private non-profit institutions (1970 = 1.0)

PCO
Implicit price deflator for housing (Others) (1970 = 1.0)

PCOT
Implicit price deflator for the miscellaneous (1970 = 1.0)

PCP
Implicit price deflator for private consumption expenditure (1970 = 1.0)

PCR
Implicit deflator for private housing rent

PE
Implicit deflator for commodity-service exports and incomes from abroad (1970 = 1.0)

PEJT
Export price index for all commodities of Japan (1970 = 1.0)

PEJNA
Export price index for all commodities of U.S.A. (1970 = 1.0)

PEWA
Export price index for all commodities of Western Europe (1970 = 1.0)

PI
Implicit deflator for gross domestic fixed capital formation (1970 = 1.0)

PIFEP
Implicit price deflator for private fixed investment

PIFG
Implicit price deflator for investment in non-housing items by government sector (at 1970 const. prices)

PIG
Implicit deflator for government gross fixed capital formation (1970 = 1.0)

PIHG
Implicit price deflator for investment in dwellings by government sector (at 1970 const. prices)

PIHP
Implicit deflator for housing investment by private sector

PIP
Implicit deflator for private gross fixed capital formation (1970 = 1.0)

PIT
Implicit deflator for gross domestic capital formation (1970 = 1.0)
Implicit deflator for inventories (stocks) of agricultural sector
Implicit deflator for investment in inventories of private sector
Implicit price deflator for the inventory stocks by private non-agricultural sector (1970 = 1.0)
Implicit deflator for commodity-service imports and incomes to abroad (1970 = 1.0)
Price index for food-stuff imports
Price index for fuel imports (1970 = 1.0)
Price index for other commodity imports (1970 = 1.0)
Price index for crude materials imports (1970 = 1.0)
Price index for goods and services supplied by regulated industries
Whole sale price index for all industries (1970 = 1.0)
PEJT transformation ratio
Seasonal dummy variables
Corporation tax rate
Separate tax rate on dividends
Call rate (unconditional, lenders’ rate)
Expenditure of residents abroad and etc. (at 1970 const. prices)
Expenditure of households for clothing (1970 const. prices)
Expenditure of households for foods, beverages and tobacco (1970 const. prices)
Government consumption expenditure (at 1970 const. prices)
Household consumption expenditure (at 1970 const. prices)
Expenditure of households for fuel and light (1970 const. prices)
Expenditure of private non-profit institutions (1970 const. prices)
Expenditure of households for housing (Others) (1970 const. prices)
Expenditure of households for the miscellaneous (1970 const. prices)
Private consumption expenditure (1970 const. prices)
Expenditure of households for housing (Rent) (1970 const. prices)
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Commodity exports to U.S.A. (FOB basis, at 1970 const. prices)
Commodity exports to the Rest of the World (FOB basis, at 1970 const. prices)
Exports to Asian Countries (FOB basis, at 1970 const. prices)
Total commodity exports (Custom clearance and FOB basis, at 1970 const. prices)
Commodity exports to Western Europe (FOB basis, at 1970 const. prices)
Wages and salaries of employees in government sector (at 1970 const. prices)
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

**RGNP**  Gross national product (at 1970 const. prices)

**RGNPP**  Gross private product (at 1970 const. prices)

**RIFG**  Gross fixed capital formation: Others by government sector (at 1970 const. prices)

**RGNPPO**  Potential GNP by private sector (1970 const. prices)

**RI**  Gross domestic fixed capital formation (1970 const. prices)

**RIFEP**  Gross fixed investment by private sectors (excl. dwellings) (1970 const. prices)

**RIG**  Gross fixed capital formation by government sector (at 1970 const. prices)

**RIHG**  Gross fixed capital formation: Dwellings by government sector (at 1970 const. prices)

**RIHP**  Gross investment in private dwellings (1970 const. prices)

**RIP**  Gross fixed capital formation by private sector (1970 const. prices)

**RIT**  Gross domestic capital formation (1970 const. prices)

**RJ**  Change in inventories (1970 const. prices)

**RJAP**  Change in inventories of agricultural sector (at 1970 const. prices)

**RJG**  Change in inventories of government sector (at 1970 const. prices)

**RJNAP**  Investment in inventories by private non-agricultural enterprises (1970 const. prices)

**RJP**  Change in inventories of private enterprises (1970 const. prices)

**RKF**  Gross stock in fixed capital of private sector (at 1970 const. prices)

**RM**  Commodity-service imports and incomes to abroad (national account: at 1970 const. prices)

**RMJFD**  Food-Stuff imports (CIF basis, at 1970 const. prices)

**RMJOIL**  Fuel imports (CIF basis, at 1970 const. prices)

**RMJOT**  Other commodity imports (CIF basis, at 1970 const. prices)

**RMJRM**  Crude materials imports (CIF basis, at 1970 const. prices)

**RMJTOT**  Total commodity imports (Custom clearance and FOB basis, at 1970 const. prices)

**ROH2**  Degree of utilization of private sector

**RRF**  Replacement of fixed capital stock (1970 const. prices)

**RRS1**  Reserve rate on balance of demand deposite (the regal highest rate)

**RRS2**  Reserve rate on balance of time deposite (the regal highest rate)

**RSJNAP**  Stock in inventories of private non-agricultural enterprises (at 1970 const. prices)

**RTI**  Indirect tax rate (average)

**RWG**  Wage rate of government employees

**RWP**  Wage rate for employee in private sector (billion yen per hour per million persons)

**SAVC**  Saving of private corporations

**SDP**  Outstanding of demand deposite at commercial banks

**SG**  Government savings

**SGAP**  Statistical discrepancy in national income and expenditure accounts
$SI$ Social insurance contributions by persons
$SP$ Personal savings
$SRLO$ Short-term (regulated) rate on lendings of all banks (annual percent rate)
$SRLI$ Long-term (non-regulated) rate on lendings of all banks (annual percent rate)
$SSP$ Cumulative personal savings
$SUB$ Current subsidies

$T$ Quarterly time variable (1960 I = 1.0)
$TAX$ Total tax payments (excl. subsidies)
$TAXC$ Corporate income tax
$TAXH$ Personal income taxes and charges
$TRCH$ Transfers (from private corporations to households and private non-profit institutions)
$TRFG$ Transfers (from abroad to government)
$TRFH$ Transfers (from abroad to households and private non-profit institutions)
$TRFGH$ Transfers (from government to abroad)
$TRGH$ Transfers (from government to households and private non-profit institutions)
$TRHF$ Transfers (from households and private non-profit institutions to abroad)
$TRHG$ Transfers (from households and private non-profit institutions to government)

$uu_0 \sim uu_5$ Dummy variables assigned to changes through “Nixon shocks” and “Oil shocks.”
$uu_0 = 1$ in 1970. II and $= 0$ otherwise
$uu_1 = 1$ in 1979. III and $= 0$ otherwise
$uu_2 = 1$ in 1972. II and $= 0$ otherwise
$uu_3 = 1$ in 1971. II and $= 0$ otherwise
$uu_4 = 1$ in 1972. II and $= 0$ otherwise
$uu_5 = 1$ in 1973. II and $= 0$ otherwise
$uu_6 = 1$ in 1973. IV and $= 0$ otherwise

$W1$ Dummy variable concerning to a structural change near in 1973 ($W1 = 1$ until 1973. II, and after 1973. III, $W1 = 0$)


$XAB$ Surplus of the nation on current account (national account, at current prices)

$Y$ National income
A QUARTERLY ECONOMETRIC MODEL OF JAPAN

YC  Income from private corporations
YD  Disposable income of persons
YDIV Income from property: Dividends
YDIV2 An adjustment variable defining corporate income
YDIV3 An adjustment variable defining corporate savings
YF  Income from unincorporated enterprises
YFA Income from unincorporated enterprises in agriculture, forestry and fishing sectors
YFNA Profits from unincorporated non-agricultural enterprises
YG  General government income from property and entrepreneurship
YGP Profit from government enterprises
YGR Rent, interest and dividends from general government property
YINT Income from property: Interest
YP  Personal income
YP  Income from property
YRNT Income from property: Rent
YW  Compensation of employees (incl. social insurance contributions by employers)
YWO Incomes of employee other than wages and salaries (other pays and allowances)
YWR Wages and salaries (incl. social insurance contributions by employers)
YWPP Compensation of employees in private sector

zz 0 ~ zz 6 Dummy variables assigned to changes through “Nixon-shocks” and “Oil-shocks.”