THE SRI-WEFA SOVIET ECONOMETRIC MODEL:
PHASE THREE DOCUMENTATION —
VOLUME II

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ARLINGTON, VIRGINIA 22209

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This volume contains the appendices for the Technical Note presenting the results of Phase Three work on the SRI-WEFA Econometric Model of the Soviet Union. Appendix A is documentation for SOVMOD II version of the SRI-WEFA model, while Appendix B documents the SOVMOD III version.
ABSTRACT

This volume contains the appendices for the Technical Note presenting the results of Phase Three work on the SRI-WEFA Econometric Model of the Soviet Union. Appendix A is documentation for SOVMOD II version of the SRI-WEFA Model, while Appendix B documents the SOVMOD III version.

DISCLAIMER

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Defense Advanced Research Projects Agency of the U.S. Government.

CONTRACTUAL TASK

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DOCUMENTATION FOR THE SRI-WEFA ECONOMETRIC MODEL OF THE SOVIET UNION
- SOVMOD II -
APPENDIX A

DOCUMENTATION FOR THE
SRI-WEFA
ECONOMETRIC MODEL OF THE SOVIET UNION:
SOVMOD II
by
DONALD W. GREEN

I. Structure and Scale

In its fully endogenous mode, the model consists of 156 stochastic relationships (behavioral and technical) and 97 identities arranged in the sectors given below. Each sector is identified by a single letter which is then used as the initial letter in the names of all variables determined in that sector.

<table>
<thead>
<tr>
<th>SECTOR IDENTIFIER</th>
<th>SECTOR NAME</th>
<th>EQUATIONS</th>
<th>BEHAVIORAL</th>
<th>IDENTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Population and Employment</td>
<td>26</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Investment</td>
<td>19</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Capital Formation</td>
<td>18</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Other Agricultural Variables</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Production</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>Material Inputs</td>
<td></td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>W</td>
<td>Wages</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>Incomes</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Prices</td>
<td>11</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Consumption</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Budget Revenues</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Budget Outlays</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Exports</td>
<td>14</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Imports</td>
<td>15</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Hard Currency</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Aggregate Identities &amp; Balances</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

| TOTAL             | 156                                | 97        |            |          |
II. Simulation of SOVMOD II

The model is encoded into a simulation program using the WEFA general model solution system SOLVEM. This program has standard facilities to convert the status of any variable (e.g., from endogenous) and to apply additive adjustments to any variable. In addition it has facility to change the status of BLOCKS of the model which has been utilized in the following way.

<table>
<thead>
<tr>
<th>BLOCK NO.</th>
<th>DESCRIPTION</th>
<th>CONSISTING OF SECTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population and Employment</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>Capital Formation</td>
<td>K</td>
</tr>
<tr>
<td>3</td>
<td>Production</td>
<td>A,X</td>
</tr>
<tr>
<td>4</td>
<td>Wages, Incomes and Prices</td>
<td>W,Z,P</td>
</tr>
<tr>
<td>5</td>
<td>Investment</td>
<td>I</td>
</tr>
<tr>
<td>6</td>
<td>Consumption</td>
<td>C</td>
</tr>
<tr>
<td>7</td>
<td>State Budget</td>
<td>T,B</td>
</tr>
<tr>
<td>8</td>
<td>Foreign Sector</td>
<td>E,M,F</td>
</tr>
<tr>
<td>9</td>
<td>Aggregates</td>
<td>G</td>
</tr>
<tr>
<td>10</td>
<td>Material Inputs</td>
<td>U</td>
</tr>
</tbody>
</table>

Most of the simultaneity in the model occurs in Blocks 1-5 and 10; the other four Blocks are virtually post-recursive except for certain import equations (grain and machinery) in Block 8. SOLVEM has a BLOCK feature which allows the user to change the status of an entire Block of equations from endogenous to enogenous.

SOLVEM also has the facility to allow the user to select different alternatives of an equation or set of equations, thus establishing different variants of the model. The alternative switches en-

* The coding of SOVMOD II was done by Raymond Chién. We are indebted to George Schink and Bill Brown, the developers of SOLVEM, for guidance in using it for this model.
coded in SOVMOD II are given below where ZERO is the initial default option:

<table>
<thead>
<tr>
<th>ALTERNATE SWITCH NO.</th>
<th>SETTING</th>
<th>ALTERNATIVE</th>
<th>EQUATION NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ZERO</td>
<td>Non-agricultural investment by adding components</td>
<td>I.1a-6a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Non-agricultural investment by direct function (components by exogenous ratios).</td>
<td>I.1b-6b</td>
</tr>
<tr>
<td>2</td>
<td>ZERO</td>
<td>Industrial branch investment by direct function</td>
<td>I.10a-I.20a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Industrial branch investment determined by aggregate level and exogenous share</td>
<td>I.10b-I.20a</td>
</tr>
<tr>
<td>3</td>
<td>ZERO</td>
<td>Gross profits, no anticipation variable</td>
<td>Z.7a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Gross profits, with anticipation variable ZFPG&amp;9</td>
<td>Z.7b</td>
</tr>
<tr>
<td></td>
<td>TWO</td>
<td>Gross profits determined by Residual Income</td>
<td>Z.7c</td>
</tr>
<tr>
<td>4</td>
<td>ZERO</td>
<td>Total consumption by adding components</td>
<td>C.1b</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Total consumption by direct function</td>
<td>C.1a</td>
</tr>
<tr>
<td></td>
<td>TWO</td>
<td>Total consumption by residual function</td>
<td>C.1c</td>
</tr>
<tr>
<td>5</td>
<td>ZERO</td>
<td>Consumption Components by direct functions</td>
<td>C.2a-C.5a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Consumption components by share functions</td>
<td>C.2b-C.5b</td>
</tr>
<tr>
<td>6</td>
<td>ZERO</td>
<td>Industrial output, disaggregated capital stock, dummy variable 1964-1966</td>
<td>X.1a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Industrial output, disaggregated capital stock, no dummy</td>
<td>X.1b</td>
</tr>
<tr>
<td>ALTERNATE SWITCH NO.</td>
<td>SETTING</td>
<td>ALTERNATIVE</td>
<td>EQUATION</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>6 (con't)</td>
<td>TWO</td>
<td>Industrial output, aggregated capital stock, dummy variable 1944-66.</td>
<td>X.1c</td>
</tr>
<tr>
<td></td>
<td>THREE</td>
<td>Industrial output, aggregated capital stock, no dummy</td>
<td>X.1d</td>
</tr>
<tr>
<td>7</td>
<td>ZERO</td>
<td>Grain output, link equation to gross agricultural output.</td>
<td>X.18a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Grain output, direct production function.</td>
<td>X.18b</td>
</tr>
<tr>
<td>8</td>
<td>ZERO</td>
<td>Direct production functions for industrial branches using only primary inputs.</td>
<td>X.7a-X.18a</td>
</tr>
<tr>
<td></td>
<td>ONE</td>
<td>Production functions using exogenous material input series from I-O data.</td>
<td>X.7b-X.18b</td>
</tr>
<tr>
<td></td>
<td>TWO</td>
<td>Same production functions as ONE with material inputs determined endogenously with balanced B matrix.</td>
<td>X.7b-X.18b, U.1-U.2</td>
</tr>
<tr>
<td></td>
<td>THREE</td>
<td>Same production functions as ONE but material inputs determined endogenously using A Matrix and excess demands distributed using B Matrix.</td>
<td>X.7b-X.18b, U.1-U.2</td>
</tr>
<tr>
<td></td>
<td>FOUR</td>
<td>Same as THREE, but excess demands distributed so as to minimize weighted coefficient change.</td>
<td>X.7b-X.18b, U.1-U.2</td>
</tr>
</tbody>
</table>

Except in the form in which total consumption is residually determined (Alt. 4=TWO), GNP is determined both from the side of production (eq. G.3) and from the side of use (by adding components). The difference is a simulation residual defined in equation G.7.
III. Variables

Variables in the model are contained in the attached alphabetical list; there are 252 endogenous and 140 exogenous variables. The following naming conventions have been employed.*

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>CONVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Symbol</td>
<td></td>
</tr>
<tr>
<td>Sector symbols</td>
<td>Sector of model (see above list) in which endogenous variable is determined.</td>
</tr>
<tr>
<td>Q</td>
<td>Dummy or time trend variables (figures following generally denote year(s), e.g., Q65 is a dummy variable for 1965).</td>
</tr>
<tr>
<td>Final Symbol</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Exogeneous variable other than Q-type.</td>
</tr>
<tr>
<td>Embedded or Trailing Symbols</td>
<td></td>
</tr>
<tr>
<td>Industries</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Industrial Branches</td>
<td>EP</td>
</tr>
<tr>
<td></td>
<td>CP</td>
</tr>
<tr>
<td></td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>FM</td>
</tr>
<tr>
<td></td>
<td>NF</td>
</tr>
<tr>
<td></td>
<td>CH</td>
</tr>
<tr>
<td></td>
<td>FP</td>
</tr>
<tr>
<td></td>
<td>PA</td>
</tr>
</tbody>
</table>

* The reader is urged to study these conventions prior to consulting the equations of the model as an understanding of them will greatly facilitate that process.
### SYMBOL CONVENTION

**Industrial Branches (cont)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM</td>
<td>Construction Materials</td>
</tr>
<tr>
<td>MB</td>
<td>Machine-Building and Metal-Working</td>
</tr>
<tr>
<td>SG</td>
<td>Soft Goods</td>
</tr>
<tr>
<td>PF</td>
<td>Processed Foods</td>
</tr>
<tr>
<td>NC</td>
<td>Not-Classified Elsewhere (Residual)</td>
</tr>
</tbody>
</table>

**Other**

- & Current ruble value (always used)
- $ Current dollar value (always used)
- 70 1970 Ruble basis (not always used)

**NOTE:** A variable is exogenous if and only if its name ends in 9 or begins with Q.

Data file management programs developed at WEFA were used to construct, maintain and utilize a databank for the model.* The structure of the list of variables is largely self-explanatory. Variable # refers to the number of the variable in the model (simulation program) which generally differs from the number on the data-bank. The set of model variables is a subset of the complete data-bank.

---

* We are indebted to Virginia Long for assistance in setting up these programs for our purposes.
<table>
<thead>
<tr>
<th>SERIES LABEL</th>
<th>DESCRIPTION</th>
<th>QTR</th>
<th>NON ANN</th>
<th>UNITS</th>
<th>SOURCE</th>
<th>VARI EQUA</th>
</tr>
</thead>
<tbody>
<tr>
<td>67 A511</td>
<td>INDEX OF AGRICULTURAL INPUTS, CURRENT PURCHASES</td>
<td>1965</td>
<td>1020</td>
<td>A.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>563 A512</td>
<td>VALUE OF PRODUCIVE LIVESTOCK, (PEAK YEAR 1955 PRICES)</td>
<td>1965</td>
<td>1018</td>
<td>A.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>567 A514</td>
<td>STATE BUDGET EXPENDITURES, ADMINISTRATION</td>
<td>1965</td>
<td>1493</td>
<td>B.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>569 A520</td>
<td>STATE BUDGET EXPENDITURES, DEFENCE</td>
<td>1965</td>
<td>1520</td>
<td>B.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>577 A522</td>
<td>DEFENSE NONDEFENCE EXPENDITURES, CURRENT PRICES</td>
<td>1965</td>
<td>1530</td>
<td>B.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>583 A524</td>
<td>STATE BUDGET EXPENDITURES, CURRENT EXPENDITURE, N/A ACCOUNTS BASIS</td>
<td>1965</td>
<td>1511</td>
<td>B.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>584 A525</td>
<td>SCIENCE EXPENDITURES, US$ PER GROWTH (CURRENT PRICES)</td>
<td>1965</td>
<td>1489</td>
<td>B.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>585 A526</td>
<td>TRANSFER PAYMENTS (1973 FIGURES)</td>
<td>1965</td>
<td>2413</td>
<td>B.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>612 A528</td>
<td>STATE BUDGET EXPENDITURES N/D</td>
<td>1965</td>
<td>1570</td>
<td>C.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>523 A529</td>
<td>STATE BUDGET EXPENDITURES, SOCIAL AND CULTURAL MEASURES (INCL. SCIENCE)</td>
<td>1965</td>
<td>1476</td>
<td>C.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>413 A530</td>
<td>CONSUMPTION PER CAPITA, TOTAL</td>
<td>1965</td>
<td>1341</td>
<td>C.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>417 A531</td>
<td>CONSUMPTION PER CAPITA, CONSUMER DURABLES</td>
<td>1965</td>
<td>1370</td>
<td>C.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>418 A532</td>
<td>CONSUMPTION PER CAPITA, FOOD</td>
<td>1965</td>
<td>1355</td>
<td>C.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>419 A533</td>
<td>CONSUMPTION PER CAPITA, SOFT GOODS</td>
<td>1965</td>
<td>1342</td>
<td>C.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>420 A534</td>
<td>CONSUMPTION PER CAPITA, SERVICES</td>
<td>1965</td>
<td>1340</td>
<td>C.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>421 A535</td>
<td>TOTAL IMPORTS FOR CATEGORY II AND IV EXCEPT GRAIN</td>
<td>1965</td>
<td>2720</td>
<td>C.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>422 A536</td>
<td>TOTAL IMPORTS FOR CATEGORY III</td>
<td>1965</td>
<td>2620</td>
<td>C.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>423 A537</td>
<td>TOTAL IMPORTS FOR CATEGORY IV</td>
<td>1965</td>
<td>2565</td>
<td>C.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>424 A538</td>
<td>TOTAL IMPORTS FOR CATEGORY V</td>
<td>1965</td>
<td>2610</td>
<td>D.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>425 A539</td>
<td>TOTAL IMPORTS FOR CATEGORY VI</td>
<td>1965</td>
<td>2670</td>
<td>D.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>426 A540</td>
<td>TOTAL IMPORTS FOR CATEGORY VII</td>
<td>1965</td>
<td>2663</td>
<td>D.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>427 A541</td>
<td>TOTAL IMPORTS FOR CATEGORY VIII</td>
<td>1965</td>
<td>2570</td>
<td>D.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>428 A542</td>
<td>TOTAL IMPORTS FOR CATEGORY IX</td>
<td>1965</td>
<td>2740</td>
<td>D.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>429 A543</td>
<td>TOTAL IMPORTS FOR CATEGORY X</td>
<td>1965</td>
<td>3060</td>
<td>D.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>430 A544</td>
<td>TOTAL IMPORTS FOR CATEGORY XI</td>
<td>1965</td>
<td>3500</td>
<td>D.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>431 A545</td>
<td>TOTAL IMPORTS FOR CATEGORY XII</td>
<td>1965</td>
<td>3230</td>
<td>D.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>432 A546</td>
<td>TOTAL IMPORTS FOR CATEGORY XIII</td>
<td>1965</td>
<td>3251</td>
<td>D.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>433 A547</td>
<td>TOTAL IMPORTS FOR CATEGORY XIV</td>
<td>1965</td>
<td>3291</td>
<td>D.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>434 A548</td>
<td>TOTAL IMPORTS FOR CATEGORY XV</td>
<td>1965</td>
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IV. Equations*

Equations are arranged by sector in the sector-order given above. Behavioral equations are written in the form used for estimation with the sample mean value of the dependent variable shown in parentheses beneath it. In some cases auxiliary variables have been defined below the equation in which they appear. Such auxiliary variables serve only this presentation purpose and do not have model variable numbers.

Figures in parentheses under coefficients are t-statistics; absence thereof implies extraneous estimate. $R^2$ is the multiple correlation coefficient (unadjusted for degrees of freedom); S.E. is the standard error of estimate and D.W. the Durbin-Watson statistic; D is the normal variate devised by Durbin to test for first order serial correlation in the presence of a lagged dependent variable.

Final equations were estimated by ordinary least squares using T.S.P. (Time Series Processor).†

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* In the estimation of SOVMOD II, valuable research assistance was provided by Michael Marrese, Marc Jarsulic, and Marc Rubin.

† We are indebted to Jean-Pierre LeMaitre for assistance in adapting this program to our data files.
N POPULATION AND EMPLOYMENT

(N.1) NPOPU Urban Population

\[
\frac{100 \cdot NPOPU}{NPOP9} = -78.13531 + 35.23935 \text{QLT28} \\
(14.26) \quad (26.67)
\]

\[
+ 1.07249 \left( \frac{\text{IHS}}{\text{IHS}_1} - 1. \right) \quad (1.46)
\]

\[
+ 0.01432 \left\{ \frac{100 \cdot \text{WIS}}{(\text{ZPWSC} + \text{ZPWS}) / (\text{NAT}/10^3)} \right\} \quad (4.74)
\]

\[
- 2.69524 \left( \frac{\text{XAT}_1}{\text{XATPK}_{1}} + \frac{\text{XAT}_2}{\text{XATPK}_{2}} - 2. \right) / 2.
\]

\[
R^2 = 0.998 \quad \text{S.E.} = 0.16 \quad \text{D.W.} = 1.67
\]

Sample Period 1960-1973

(N.2) NPOPR Rural Population

\[
NPOPR = NPOP9 - NPOPU
\]

(N.3) NMNA Nonagricultural Employment

\[
\frac{1 \cdot \text{NMNA}}{(NPOPU_1 + NPOPU)/2} = 23.75604 \text{QLT28} (1. - \text{Q69ON}) \\
(56.13) \\
+ 89.38518 \text{Q69ON} + 0.02757 \left( \frac{\text{NPAB9} + \text{NPAB9}_1}{\text{NPOP9} + \text{NPOP9}_1} \right) \\
(12.96) \quad (1.72)
\]

\[
+ 8.3782 \left( \frac{\text{WIS}/\text{PRC}}{\text{WIS}_1/\text{PRC}_1} \right) \\
(1.37)
\]
(N.3) **NMNA** Nonagricultural Employment, Continued

\[
\begin{align*}
- 52.722 & + (NPOPU + NPOPU -1) + (NPOPU -1 + NPOPU -2), \\
& (4.86) (NPOPU -1 + NPOPU -2) + (NPOPU -2 + NPOPU -3)
\end{align*}
\]

\[R^2 = 0.995 \quad \text{S.E.} = 0.24 \quad \text{D.W.} = 1.44\]
Sample Period 1959-1973

(N.4) **NMI** Industrial Employment

\[
\frac{100 \cdot \text{NMI}}{\text{NMNA}} = 0.92375 \left(\frac{100 \cdot \text{NMI}}{\text{NMNA}}\right)_{-1} - 0.00116 \left(\frac{100 \cdot \text{NMC}}{\text{NMNA}}\right)_{-1} \\
(16.63) (0.01)
\]

\[+ 0.23506 \left(\frac{100 \cdot \text{NMTC}}{\text{NMNA}}\right)_{-1} \]
\[(1.37)\]

\[- 2.11470 \left(\frac{100 \cdot \text{NMS}}{\text{NMNA}}\right)_{-1} + 0.71934 \left(\frac{100 \cdot \text{NMG}}{\text{NMNA}}\right)_{-1} \]
\[(4.12) \quad (4.37)\]

\[- 2.2286 \left(\frac{100 \cdot \text{INA}}{\text{INA}} - 1\right) \]
\[(2.89)\]

\[R^2 = 0.997 \quad \text{S.E.} = 0.094 \quad \text{D.W.} = 2.35 \]
Sample Period 1957-1973

D. = 0.74
(N.5) **NMC Construction Employment**

\[
\frac{100 \text{NMC}}{\text{NMNA}} = 0.07432 \left( \frac{100 \text{NMI}}{\text{NMNA}-1} \right) - 0.72402 \left( \frac{100 \text{NMC}}{\text{NMNA}-1} \right)
\]

\[
(10.998)
\]

\[
- 0.14580 \left( \frac{100 \text{NMTC}}{\text{NMNA}-1} \right)
\]

\[
(0.56)
\]

\[
+ 1.67705 \left( \frac{100 \text{NMS}}{\text{NMNA}-1} \right) - 0.50598 \left( \frac{100 \text{NMG}}{\text{NMNA}-1} \right)
\]

\[
(2.13)
\]

\[
+ 3.35792 \left( \frac{\text{INA}}{\text{INA}-1} \right)
\]

\[
(2.84)
\]

\[R^2 = 0.900 \quad S.E. = 0.144 \quad D.W. = 2.25\]

Sample Period 1957-1973 \quad D. = 0.69

(N.6) **NMTC Transport and Communications Employment**

\[
\frac{100 \text{NMTC}}{\text{NMNA}} = 0.002354 \left( \frac{100 \text{NMI}}{\text{NMNA}-1} \right) + 0.02394 \left( \frac{100 \text{NMC}}{\text{NMNA}-1} \right)
\]

\[
(12.070)
\]

\[
+ 0.94521 \left( \frac{100 \text{NMTC}}{\text{NMNA}-1} \right)
\]

\[
(8.39)
\]

\[
+ 1.05191 \left( \frac{100 \text{NMS}}{\text{NMNA}-1} \right) - 0.35967 \left( \frac{100 \text{NMG}}{\text{NMNA}-1} \right)
\]
(N.6) **NMTC**  
Transport and Communications Employment, Continued

\[ + 1.16270 \frac{\text{INA} - 1}{\text{INA}_1} \]
\[ (2.29) \]

\[ R^2 = 0.989 \quad \text{S.E.} = 0.062 \quad \text{D.W.} = 2.01 \]
Sample Period 1957-1973 \[ D. = 0.02 \]

(N.7) **NMS**  
Domestic Trade Employment

\[ \frac{100 \text{.NMS}}{\text{NMNA}} = 0.0507 \frac{100 \text{.NMI}}{\text{NMNA} - 1} + 0.08538 \frac{100 \text{.NMC}}{\text{NMNA} - 1} \]
\[ (2.10) (1.88) \]
\[ - 0.17491 \frac{100 \text{.NMTC}}{\text{NMNA} - 1} \]
\[ (2.35) \]
\[ + 0.70146 \frac{100 \text{.NMS}}{\text{NMNA} - 1} + 0.07343 \frac{100 \text{.NMG}}{\text{NMNA} - 1} \]
\[ (3.18) (1.03) \]
\[ - 0.83225 \frac{\text{INA} - 1}{\text{INA}_1} \]
\[ (2.48) \]

\[ R^2 = 0.997 \quad \text{S.E.} 0.041 \quad \text{D.W.} = 1.77 \]
Sample Period 1957-1973 \[ D. = 1.20 \]
(N.8) **NMG Services Employment**

\[
100.\text{NMG} = -0.01470 \left( \frac{100.\text{NMI}}{\text{NMNA} - 1} \right) + 0.11300 \left( \frac{100.\text{NMC}}{\text{NMNA} - 1} \right) \\
\text{NMNA} (0.37) \quad (1.52)
\]

\[
(26.267)
\]

\[
+ 0.03348 \left( \frac{100.\text{NMTC}}{\text{NMNA} - 1} \right) - 0.18159 \left( \frac{100.\text{NMS}}{\text{NMNA} - 1} \right) \\
\text{NMNA} (0.27) \quad (0.50)
\]

\[
+ 1.03535 \left( \frac{100.\text{NMG}}{\text{NMNA} - 1} \right) - 2.27867 \left( \frac{\text{INA}}{\text{INA} - 1} \right) \\
\text{NMNA} (8.83) \quad (4.14)
\]

\[
R^2 = 0.997 \quad \text{S.E.} = 0.067 \quad \text{D.W.} = 2.64
\]

Sample Period 1957-1973 \quad D. = 1.51

(N.9) **NMF Forestry Employment**

\[
100.\text{NMF} = 0.009133 \left( \frac{100.\text{NMI}}{\text{NMNA} - 1} \right) - 0.063775 \left( \frac{100.\text{NMC}}{\text{NMNA} - 1} \right) \\
\text{NMNA} (0.68) \quad (2.53)
\]

\[
(0.606)
\]

\[
+ 0.094811 \left( \frac{100.\text{NMTC}}{\text{NMNA} - 1} \right) \\
\text{NMNA} (2.30)
\]

\[
+ 0.22939 \left( \frac{100.\text{NMS}}{\text{NMNA} - 1} \right) - 0.086497 \left( \frac{100.\text{NMG}}{\text{NMNA} - 1} \right) \\
\text{NMNA} (1.86) \quad (2.18)
\]
(N.9) \[ \text{NMF} \quad \text{Forestry Employment} \]

\[
\begin{align*}
&+ 0.16160 \left( \frac{\text{INA}}{\text{INA}_1} - 1 \right) \\
&\quad (0.87)
\end{align*}
\]

\[ R^2 = 0.944 \quad \text{S.E.} = 0.023 \quad \text{D.W.} = 1.06 \]

Sample Period 1957-1973

(N.10) \[ \text{NMO} \quad \text{Other Branch Employment} \]

\[
\frac{100 \cdot \text{NMO}}{\text{NMNA}} = -0.029339 \left( \frac{100 \cdot \text{NMI}}{\text{NMNA}_1} \right) + 0.24467 \left( \frac{100 \cdot \text{NMC}}{\text{NMNA}_1} \right)
\]

\[ (0.46) \quad (2.03) \]

\[ (1.010) \]

\[
-0.21841 \left( \frac{100 \cdot \text{NMTC}}{\text{NMNA}_1} \right)
\]

\[ (1.11) \]

\[
-1.48453 \left( \frac{100 \cdot \text{NMS}}{\text{NMNA}_1} \right) + 0.58859 \left( \frac{100 \cdot \text{NMG}}{\text{NMNA}_1} \right)
\]

\[ (2.51) \quad (3.10) \]

\[ -0.96157 \left( \frac{\text{INA}}{\text{INA}_1} - 1 \right) \]

\[ (1.08) \]

\[ R^2 = 0.900 \quad \text{S.E.} = 0.108 \quad \text{D.W.} = 1.09 \]

Sample Period 1957-1973
(N.11) NASK Agricultural Employment, State and Collective Farms

\[
\frac{100 \cdot \text{NASK}}{(\text{NPOP}_{R} + \text{NP}_{O} - 1)/2.} = 0.78311 \left[ \frac{100 \cdot \text{NASK}}{(\text{NPOP}_{R} + \text{NP}_{O} - 1)/2.} - 1 \right]
\]

\[
(25.26)
\]

\[
+ 1.61122 \quad \text{QLT28} - 0.27513 \quad \text{QSH65} - 0.56095
\]

\[
(1.00) \quad (1.48) \quad (0.06)
\]

\[
- 0.25410 \quad \text{JPS9} - 4.56542 \left( \frac{\text{XAT}_{-1}}{\text{XATPK}_{-1}} + \frac{\text{XAT}_{-2}}{\text{XATPK}_{-2}} \right)
\]

\[
(1.18) \quad (2.29)
\]

\[
R^2 = 0.813 \quad \text{S.E.} = 0.17 \quad \text{D.W.} = 1.68
\]

Sample Period 1961-1973

\[
D. = 0.80
\]

(N.12) NAPRV Agricultural Employment, Private

\[
\frac{\text{NAPRV}}{\text{NASK}} = 0.46529 - 0.04081 \quad \text{QSH65} - 0.00841 \quad \text{JPS9}
\]

\[
(24.74) \quad (7.79) \quad (1.61)
\]

\[
0.4163\]

\[
- 0.96807 \left[ \frac{\text{NP}_{O} + \text{NP}_{U}}{(\text{NP}_{O} + \text{NP}_{U})} - 1 \right]
\]

\[
(1.63)
\]

\[
R^2 = 0.895 \quad \text{S.E.} = 0.0063 \quad \text{D.W.} = 2.42
\]

Sample Period 1959-1973

\[
23
\]
(N.13) \[ \text{NAT Total Agricultural Employment} \]

\[ \text{NAT} = \text{NASK} + \text{NAPRV} \]

(N.14) \[ \text{NMIEP Employment, Electroenergy} \]

\[
\frac{100 \cdot \text{NMIEP}}{\text{NMI}} = -10.46001 + 0.04162 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right)^{-1} \\
(2.27) \quad (0.92)
\]

\[
+ 1.11504 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right)^{-1} \\
(3.8) \quad (1.89)
\]

\[
+ 0.02656 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right)^{-1} + 0.59063 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right)^{-1} \\
(0.43) \quad (0.98) \quad (0.59)
\]

\[- 0.07544 \frac{\text{INA}}{\text{INA}_1} + 1.44683 \text{QLT28} \\
(0.21) \quad (1.08)
\]

\[ R^2 = 0.973 \quad \text{S.E.} = 0.036 \quad \text{D.W.} = 2.00 \]

Sample Period 1957-1973
(N.15) **NMICP Employment, Coal Products**

\[
\frac{100.\text{NMICP}}{\text{NMI}} = 24.13197 + 0.05559 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right)_{-1} + 0.07455 \left( \frac{100.\text{NMIFM}}{\text{NMI}} \right)_{-1} + 0.02658 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right)_{-1} + 3.28373 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right)_{-1} + 1.88254 \frac{(\text{INA} - 1)}{\text{INA}_{-1}} - 6.90990 \text{QLT28} \\
(4.425)
\]

\[R^2 = 0.997 \quad \text{S.E.} = 0.064 \quad \text{D.W.} = 2.30\]

Sample Period 1957-1973
(N.16)  NMIPP  Employment, Petroleum Products

\[
\frac{100 \cdot \text{NMIPP}}{\text{NMI}} = 4.76174 + 0.03752 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right)_{-1}
\]

(0.847)  (3.39)  (2.72)

- 0.24763 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right)_{-1}

(2.81)

+ 0.02381 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right)_{-1} + 0.06767 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right)_{-1}

(1.27)  (0.37)

+ 0.20798 \frac{\text{INA}}{\text{INA}_{-1}} - 1.19394 \text{QLT28}

(1.88)  (2.94)

\[ R^2 = 0.903 \quad \text{S.E.} = 0.011 \quad \text{D.W.} = 3.06 \]

Sample Period 1957-1973

D. = 3.35

(N.17)  NMIFM  Employment, Ferrous Metallurgy

\[
\frac{100 \cdot \text{NMIFM}}{\text{NMI}} = 3.22183 + 0.01766 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right)_{-1}
\]

(4.446)  (0.90)  (0.50)

+ 0.77451 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right)_{-1}

(3.44)

+ 0.06205 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right)_{-1} - 0.46494 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right)_{-1}

(1.29)  (0.99)

+ 0.17647 \frac{\text{INA}}{\text{INA}_{-1}} - 0.79103 \text{QLT28}

(0.62)  (0.76)

\[ R^2 = 0.983 \quad \text{S.E.} 0.028 \quad \text{D.W.} = 1.93 \]

Sample Period 1957-1973

D. = 0.39
(N.18) **NMINF** Employment, Non Ferrous Metallurgy

\[
\frac{100 \times \text{NMINF}}{\text{NMI}} = 14.82597 + 0.10362 \left( \frac{100 \times \text{NMIMB}}{\text{NMI}} \right) - 0.24017 \left( \frac{100 \times \text{NMIFM}}{\text{NMI}} \right) + 0.00908 \left( \frac{100 \times \text{NMICM}}{\text{NMI}} \right) - 0.63786 \left( \frac{\text{INA}}{\text{INA}_1} \right) - 3.95831 \text{QLT28}
\]

\[
\left( \frac{100 \times \text{NMIMB}}{\text{NMI}} \right) = (2.559) \quad \left( \frac{100 \times \text{NMIFM}}{\text{NMI}} \right) = (1.56) \quad \left( \frac{100 \times \text{NMICM}}{\text{NMI}} \right) = (0.28) \quad \left( \frac{\text{INA}}{\text{INA}_1} \right) = (3.29)
\]

\[
\text{R}^2 = 0.990 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 1.79
\]

Sample Period 1957-1973

(N.19) **NMICH** Employment, Chemical and Petrochemical

\[
\frac{100 \times \text{NMICH}}{\text{NMI}} = -23.48491 + 0.08489 \left( \frac{100 \times \text{NMIMB}}{\text{NMI}} \right) + 2.07976 \left( \frac{100 \times \text{NMIFM}}{\text{NMI}} \right) - 0.34042 \left( \frac{100 \times \text{NMICM}}{\text{NMI}} \right) - 0.38575 \left( \frac{100 \times \text{NMIPP}}{\text{NMI}} \right) + 0.18963 \left( \frac{\text{INA}}{\text{INA}_1} \right) + 4.96972 \text{QLT28}
\]

\[
\left( \frac{100 \times \text{NMIMB}}{\text{NMI}} \right) = (4.40) \quad \left( \frac{100 \times \text{NMIFM}}{\text{NMI}} \right) = (6.20) \quad \left( \frac{100 \times \text{NMICM}}{\text{NMI}} \right) = (4.77) \quad \left( \frac{\text{INA}}{\text{INA}_1} \right) = (0.45)
\]

\[
\text{R}^2 = 0.998 \quad \text{S.E.} = 0.041 \quad \text{D.W.} = 1.97
\]

Sample Period 1957-1973
(N.20) **NMIMB** Employment, Machine-Building and Metal-Working

\[
\frac{100.\text{NMIMB}}{\text{NMI}} = 4.62478 + 0.76670 \left(\frac{100.\text{NMIMB}}{\text{NMI}}\right) - 0.24136 \left(\frac{\text{100.NMIFM}}{\text{NMI}}\right) - 0.01610 \left(\frac{100.\text{NMICM}}{\text{NMI}}\right) - 9.13906 \left(\frac{\text{100.NMIPP}}{\text{NMI}}\right)^0.5 + 0.96943 \left(\text{INA}_{-1}\right) + 3.55470 \text{QLT28} \tag{N.20}
\]

\[
R^2 = 0.997 \quad \text{S.E.} = 0.199 \quad \text{D.W.} = 1.93
\]

Sample Period 1957-1973

---

(N.21) **NMIPF** Employment, Forest Products

\[
\frac{100.\text{NMIFP}}{\text{NMI}} = 75.40619 + 0.16006 \left(\frac{100.\text{NMIMB}}{\text{NMI}}\right) - 2.51932 \left(\frac{\text{100.NMIFM}}{\text{NMI}}\right) + 0.54956 \left(\frac{100.\text{NMICM}}{\text{NMI}}\right)^0.5 - 2.29041 \left(\frac{100.\text{NMIPP}}{\text{NMI}}\right)^0.5 + 1.13075 \left(\text{INA}_{-1}\right) - 17.00851 \text{QLT28} \tag{N.21}
\]

\[
R^2 = 0.998 \quad \text{S.E.} = 0.075 \quad \text{D.W.} = 1.98
\]

Sample Period 1957-1973
(N.22) \textbf{NMIPA Employment, Paper and Pulp}

\[
\frac{100 \cdot \text{NMIPA}}{\text{NMI}} = -0.33794 - 0.000855 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right) - 1 \\
\text{(0.24)} \quad \text{(0.06)} \quad \text{(0.795)}
\]

\[
+ 0.085595 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right) - 1 \\
\text{(0.98)}
\]

\[
- 0.07519 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right) + 0.35700 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right) - 1 \\
\text{(3.77)} \quad \text{(1.91)} \quad \text{(3.77)}
\]

\[
- 0.04055 \left( \frac{\text{INA}}{\text{INA} - 1} \right) + 0.26434 \quad \text{QLT28} \\
\text{(0.33)} \quad \text{(0.63)} \quad \text{(0.03)}
\]

\[
R^2 = 0.874 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 2.19
\]

Sample Period 1957-1973
(N.23) \[ \text{NMICM} \quad \text{Employment, Construction Materials} \]

\[
\frac{100 \text{NMICM}}{\text{NMI}} = 9.12825 + 0.01611 \left( \frac{100 \text{NMIMB}}{\text{NMI}} \right)_{-1}
\]

\[
(6.407)
\]

\[-1.13350 \left( \frac{100 \text{NMIFM}}{\text{NMI}} \right)_{-1}
\]

\[
(1.59)
\]

\[+ 0.88652 \left( \frac{100 \text{NMICM}}{\text{NMI}} \right) + 2.08320 \left( \frac{100 \text{NMIPP}}{\text{NMI}} \right)_{-1}
\]

\[
(5.83)
\]

\[+ 1.08117 \left( \frac{\text{INA}}{\text{INA}_{-1}} - 1. \right) - 1.57299 \text{QLT28}
\]

\[
(1.20)
\]

\[
R^2 = 0.908 \quad \text{S.E.} = 0.088 \quad \text{D.W.} = 2.38
\]

Sample Period 1957-1973

\[
D = 1.01
\]

(N.24) \[ \text{NMISG} \quad \text{Employment, Soft Goods} \]

\[
\frac{100 \text{NMISG}}{\text{NMI}} = 11.64421 - 0.35485 \left( \frac{100 \text{NMIMB}}{\text{NMI}} \right)_{-1}
\]

\[
(16.18)
\]

\[-0.99600 \left( \frac{100 \text{NMIFM}}{\text{NMI}} \right)_{-1}
\]

\[
(0.75)
\]

\[-0.12314 \left( \frac{100 \text{NMICM}}{\text{NMI}} \right) + 7.86857 \left( \frac{100 \text{NMIPP}}{\text{NMI}} \right)_{-1}
\]

\[
(0.44) \quad (2.84)
\]
(N.24) NMISG Employment, Soft Goods, Continued

\[ + 2.82151 \frac{\text{INA}}{\text{INA} - 1} + 4.18015 \text{QLT28} \]

\( R^2 = 0.966 \quad \text{S.E.} = 0.163 \quad \text{D.W.} = 1.91 \)

Sample Period 1957-1973

(N.25) NMIPF Employment, Processed Foods

\[ \frac{100.\text{NMIPF}}{\text{NMI}} = 5.7609 - 0.04514 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right) \]

\[ - 0.33314 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right) + 3.63546 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right) \]

\[ + 0.09462 \left( \frac{\text{INA}}{\text{INA} - 1} \right) + 1.93847 \text{QLT28} \]

\( R^2 = 0.965 \quad \text{S.E.} = 0.061 \quad \text{D.W.} = 2.13 \)

Sample Period 1957-1973
\( \frac{100 \cdot \text{NMINC}}{\text{NMI}} = -10.27373 - 0.90234 \left( \frac{100 \cdot \text{NMIB}}{\text{NMI}} \right) \)

\( (0.25) \quad (2.26) \quad (\text{NMI} - 1) \)

\( (3.863) \)

\(- 0.50822 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right) \)

\( (0.20) \quad (\text{NMI} - 1) \)

\(- 0.72073 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right) - 4.93324 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right) \)

\( (1.32) \quad (0.92) \quad (\text{NMI} - 1) \)

\(- 7.80506 \left( \frac{\text{INA}}{\text{INA}-1} - 1 \right) + 15.73648 \text{ QLT28} \)

\( (-2.43) \quad (1.33) \)

\( R^2 = 0.814 \quad \text{S.E.} = 0.315 \quad \text{D.W.} = 2.13 \)

Sample Period 1957-1973
(N.27)  \( \text{NIET Engineering - Technical Employees in Industry (End Year)} \)

\[
\text{NIET} - \text{NIET}_1 = 0.16841 \frac{\text{NEIND9}_1 + \text{NEIND9}_2}{(13.38) 2} \\
\text{(149.43)}
\]

\[ - 159.08975 \text{ Q69ON} \]

\[ + 154.92920 \{ \frac{2 \cdot (\text{NIET}_1 - \text{NIET}_2)}{\text{NEIND9}_1 + \text{NEIND9}_2} - 0.13589 \} \]

\[ R^2 = 0.726 \quad \text{S.E.} = 32.39 \quad \text{D.W.} = 1.26 \]
Sample Period 1958-1973

(N.28)  \( \text{NTSPA Specialists Employed in Transport and Communications} \)

\[
\text{NTSPA} - \text{NTSPA}_1 = 0.48120 \frac{\text{NETRA9}_1 + \text{NETRA9}_2}{(36.28) 2} \\
\text{(46.57)}
\]

\[ + 43.69722 \{ \frac{2 \cdot (\text{NTSPA}_1 - \text{NTSPA}_2)}{\text{NETRA9}_1 + \text{NETRA9}_2} - 0.49761 \} \]

\[ R^2 = 0.895 \quad \text{S.E.} = 5.00 \quad \text{D.W.} = 1.60 \]
Sample Period 1958-1973
I Investment

(a) Non-Agricultural Investment, Sector Equations

(I.1a) IIN Capital Investment in Industry

\[
\begin{align*}
\text{IIN} - 1 &= 0.06580 - 0.05812 \text{Q6567} - 0.05178 \text{Q69} \\
\text{IIN}_{-1} &= (6.66) \quad (4.51) \quad (2.88) \\
(0.074) \\
\end{align*}
\]

\[+ 0.26201 \text{GFI} + 0.17407 \text{GPG} - 0.21017 \text{GDF} \]

\[
(2.29) \quad (3.34) \quad (5.30)
\]

\[R^2 = 0.851 \quad \text{S.E.} = 0.017 \quad \text{D.W.} = 1.27 \]

Sample Period 1959-1973

Where

\[
\begin{align*}
\text{GFI} &= \frac{\text{IFAIJ}_{-1}/\text{PII}_{-1}}{\text{IFAIJ}_{-2}/\text{PII}_{-2}} - 1 \\
\text{GPG} &= \frac{\text{ZPG}_{-1}/\text{PII}_{-1}}{\text{ZPG}_{-2}/\text{PII}_{-2}} - 1 \\
\text{GDF} &= \frac{\text{BDN}_{-9}/\text{PIWH70}}{\text{BDN}_{-9-1}/\text{PIWH70}_{-1}} - 1
\end{align*}
\]
(I.2a) ICRUB  Capital Investment in Construction

\[
\begin{align*}
\text{ICRUB} - 1. &= -0.02216 \text{ QFYP} - 0.00726 \\
\text{ICRUB}_{-1} &= (0.69) \quad (0.14) \\
(0.094) \\
+ 0.30240 \left(\frac{\text{XAT}}{\text{XATPK}} - 1.\right) + 1.97563 \text{ GINA} \\
&= (0.88) \quad (2.78)
\end{align*}
\]

\[ R^2 = 0.593 \quad \text{S.E.} = 0.055 \quad \text{D.W.} = 2.71 \]
Sample Period 1961-1973

Where

\[ \text{GINA} \equiv \frac{\text{INA}}{\text{INA}_{-1}} - 1. \]

(I.3a) ITRUB  Capital Investment in Transport and Communications

\[
\begin{align*}
\text{ITRUB} - 1. &= 0.11595 - 0.03159 \text{ QFYP} - 0.07515 \text{ Q6567} \\
\text{ITRUB}_{-1} &= (6.44) \quad (1.69) \quad (3.15) \\
(0.092) \\
- 0.03214 \text{ Q69} + 0.17208 \text{ GFT} - 0.27395 \text{ GDF} \\
&= (0.96) \quad (2.22) \quad (3.90)
\end{align*}
\]

\[ R^2 = 0.750 \quad \text{S.E.} = 0.030 \quad \text{D.W.} = 1.86 \]
Sample Period 1959-1973
(I.3a) \textbf{ITRUB} \hspace{1em} \text{Capital Investment in Transport and Communications, Continued}

Where \hspace{1em} GDF \hspace{1em} \text{defined above under (I.1a)}

\[
\frac{\text{IFTR} \& 9 \div \text{PIT}_1}{\text{IFTR} \& 9 - 1 / \text{PIT}_2} - 1.
\]

(I.4a) \textbf{IHS} \hspace{1em} \text{Capital Investment in Housing}

\[
\frac{\text{IHS}}{\text{IHS}_1} - 1. = 0.24476 - 0.00876 \times Q5 \& 0 - 0.13795 \times Q6 \& 4
\]

\[
+ (6.58) \quad (4.78) \quad (9.35)
\]

\[
- 0.03773 \times Q9 - 0.05105 \times \text{GDF}
\]

\[
+ (2.47) \quad (1.40)
\]

\[R^2 = 0.940 \quad \text{S.E.} = 0.014 \quad D.W. = 2.36\]

\text{Sample Period 1961-1973}

GDF defined above under (I.1a)
(I.5a)  

**ISER Capital Investment in Services and Domestic Trade**

\[
\frac{\text{ISER}}{\text{ISER}_{-1}} - 1 = 1.46506 - 0.02681 \text{ QFYP} - 0.36961 \text{ QLT28} \\
(3.84) \quad (1.06) \quad (3.56) \\
(0.076)
\]

\[- 0.03111 \text{ Q69} + 0.55272 \left( \frac{\text{XAT}}{\text{XATPK}} + \frac{\text{XAT}_{-1}}{\text{XATPK}_{-1}} \right)^{-2}/2. \\
(0.71) \quad (1.38)
\]

\[- 0.11793 \text{ GDF} \\
(1.29)
\]

\[R^2 = 0.701 \quad \text{S.E.} = 0.042 \quad \text{D.W.} = 1.99\]

Sample Period 1959-1973

GDF defined above under (I.1a)

(I.6a)  

**INA Capital Investment, Total Non-Agricultural**

\[\text{INA} = \text{IIN} + \text{ICRUB} + \text{ITRUB} + \text{IHS} + \text{ISER}\]

(b)  

**Alternate Investment Model**

Total Non-Agricultural Investment determined by equation (I.6b). Sectoral Investment determined by exogenous share variables in equations (I.1b) - (I.5b).
(b) Alternate Investment Model, Continued

(I.1b) \[ \frac{\text{IIN}}{\text{INA}} = \text{IRII9} \times \frac{\text{INA}}{100}. \]

(I.2b) \[ \text{ICRUB} = \text{IRIC9} \times \frac{\text{INA}}{100}. \]

(I.3b) \[ \text{ITRUB} = \text{IRIT9} \times \frac{\text{INA}}{100}. \]

(I.4b) \[ \text{IHS} = \text{IRIH9} \times \frac{\text{INA}}{100}. \]

(I.5b) \[ \text{ISER} = \text{IRIS9} \times \frac{\text{INA}}{100}. \]

(I.6b) \[ \text{INA} = \text{Total Non-Agricultural Investment}, \]

\[
\frac{\text{INA}}{\text{INA}_{-1}} - 1 = 0.07384 - 0.013095 \frac{\text{OFYP}}{\text{Q6567}} - 0.02078 \frac{\text{Q6567}}{(0.069)}
\]

\[
- 0.03235 \frac{\text{Q69}}{\text{(1.14)}} + 0.14109 \frac{\text{GPG}}{\text{(1.80)}} - 0.13580 \frac{\text{GDF}}{\text{(2.38)}}
\]

\[ R^2 = 0.563 \quad \text{S.E.} = 0.026 \quad \text{D.W.} = 1.06 \]

Sample Period 1959-1973

GPG and GDF defined above under (I.1a)
(I.7) \( \text{IA} \) Capital Investment in Agriculture

\[
\begin{align*}
\text{IA} - 1. & = 0.05343 - 0.01262 \text{QSH65} + 0.51819 \text{GFA} \\
& + 0.17120 \text{GDF} + 0.37863 \frac{XAT}{XATPK} - 1. \\
& - 0.14341 \frac{XAT}{XATPK} - 1.
\end{align*}
\]

\( (5.13) \quad (0.79) \quad (5.38) \quad (3.90) \quad (3.61) \quad (1.26) \)

\( \text{R}^2 = 0.903 \quad \text{S.E.} = 0.015 \quad \text{D.W.} = 2.12 \)

Sample Period 1961-1973

GDP defined above under \( \text{I.1a} \)

Where

\[
\frac{\text{GFA}}{\text{IFAG}9-1/\text{PIA}_2} - 1.
\]
(I.8) IFAJ& Adjusted Finance for Centralized Capital Investment

\[ \text{IFAJ&} = \text{IFIN#9} - 4.9 \text{QSH68}_1 \]

(I.9) ITOTAL Total New Capital Investment in the National Economy

\[ \text{ITOTAL} = \text{INA} + \text{IA} \]

(a) Branch Investment, Direct Functions

(I.10a) IIEP Capital Investment, Electroenergy

\[
\text{IIEP} - 1.0 = -0.00416 + 0.8811 \text{QFYP} + 0.04703 \text{Q6567} \\
\text{IIEP}_1 \\
\quad (0.24) \quad (5.77) \quad (2.78) \\
\quad (0.053) \\
- 0.09926 \text{Q69} + 0.27386 \text{GFI} \\
\quad (4.04) \quad (1.78)
\]

\[ R^2 = 0.799 \quad \text{S.E.} = 0.021 \quad \text{D.W.} = 1.85 \]

Sample Period 1959-1973

GFI defined above under (I.1a).
(I.11a)  IICP  Capital Investment, Coal Products

\[
\begin{align*}
\text{IICP} & \quad - 1. = + 0.03618 + 0.04771 \text{ QFYP} + 0.00816 \text{ Q6567} \\
\text{IICP}_{-1} & \quad (2.29) \quad (2.66) \quad (0.38) \\
(0.033) & \quad - 0.08948 \text{ Q69} - 0.28049 \text{ GDF} \\
& \quad (3.28) \quad (4.66)
\end{align*}
\]

\[R^2 = 0.861 \quad \text{S.E.} = 0.025 \quad \text{D.W.} = 1.62\]
Sample Period 1961-1973

GDF defined above under (I.1a).

(I.12a)  IIPP  Capital Investment, Petroleum Products

\[
\begin{align*}
\text{IIPP} & \quad - 1. = 0.03409 + 0.05256 \text{ QFYP} - 0.13867 \text{ Q69} \\
\text{IIPP}_{-1} & \quad (2.01) \quad (3.28) \quad (4.57) \\
(0.088) & \quad + 0.39909 \text{ GFI} - 0.23682 \text{ GDF} \\
& \quad (3.94) \quad (3.46)
\end{align*}
\]

\[R^2 = 0.800 \quad \text{S.E.} = 0.026 \quad \text{D.W.} = 2.26\]
Sample Period 1961-1973

GFI and GDF defined above under (I.1a).
(I.13a) IIFM  Capital Investment, Ferrous Metallurgy

\[
\text{IIFM} = \frac{1}{IIFM_{-1}} = 0.16046 - 0.13377 \text{ QPY} - 0.09740 \text{ Q6567} \\
(5.03) \quad (3.20) \quad (1.92)
\]

\[
\text{GDF} = 0.06800 \text{ Q}69 - 0.14867 \text{ GDF} \\
(0.92) \quad (1.00)
\]

R² = 0.588  S.E. = 0.068  D.W. = 2.77
Sample Period 1959-1973

GDF defined above under (I.1a).

(I.14a) IINF  Capital Investment, Non-Ferrous Metallurgy

And Industry NEC

\[
\text{IINF} = \frac{1}{IINF_{-1}} = 0.04625 - 0.07858 \text{ Q6567} - 0.04462 \text{ Q69} \\
(1.57) \quad (1.54) \quad (0.62)
\]

\[
+ 0.43727 \text{ GPG} - 0.26357 \text{ GDF} \\
(2.11) \quad (1.77)
\]

R² = 0.430  S.E. = 0.069  D.W. = 2.65
Sample Period 1959-1973

GPG and GDF defined above under (I.1a).
(I.15a) \( \text{IICH} \) Capital Investment, Chemicals and Petrochemicals

\[
\text{IICH} = 0.05286 + 0.16279 \text{QSH65} - 0.13426 \text{Q6567} \\
\text{(1.61)} \quad \text{(3.71)} \quad \text{(3.18)}
\]

+ 0.77878 \text{GFI} - 0.40080 \text{GDF} \\
\text{(1.57)} \quad \text{(2.47)}

\( R^2 = 0.338 \) \quad \text{S.E.} = 0.058 \quad \text{D.W.} = 2.26 \\
\text{Sample Period 1961-1973}

GFI and GDF defined above under (I.1a).

(I.16a) \( \text{IIMB} \) Capital Investment, Machine-Building and Metal-Working

\[
\text{IIMB} = 0.02103 - 0.02664 \text{Q6567} + 0.07929 \text{Q70} \\
\text{(0.64)} \quad \text{(0.98)} \quad \text{(1.96)}
\]

+ 0.40442 \text{GPG} + 0.35652 \text{IIMB} \\
\text{(3.17)} \quad \text{(1.71)}

\[
\text{IIMB} - 1 = \text{IIMB} - \text{IIMB} - 1
\]
(I.16a) TIMB Capital Investment, Machine-Building and Metal-Working, Continued

\[ R^2 = 0.747 \quad \text{S.E.} = 0.035 \quad \text{D.W.} = 2.34 \]
Sample Period 1961-1973 \[ D. = 1.04 \]

GPG defined above under (I.1a)

(I.17a) IIFP Capital Investment, Forest Products

\[
\begin{align*}
\frac{\Delta \text{IIFP}}{\text{IIFP}_{-1}} - 1 &= 0.11348 + 0.02928 \text{QFYP} - 0.10974 \text{Q6567} \\
&\quad (4.77) \quad (1.25) \quad (3.72) \\
&\quad (0.057)
\end{align*}
\]

\[ -0.12625 \text{Q69} - 0.28559 \text{GDP} \]
\[ (3.10) \quad (3.32) \]

\[ -0.34833 \left( \frac{\Delta \text{IIFP}}{\text{IIFP}_{-1}} - 1 \right) \]
\[ (2.04) \quad (2.04) \]

\[ R^2 = 0.791 \quad \text{S.E.} = 0.037 \quad \text{D.W.} = 2.49 \]
Sample Period 1959-1973 \[ D. = 1.26 \]

GDP defined above under (I.1a).
(I.18a)  

**IICM Capital Investment, Construction Materials**

\[
\begin{align*}
\text{IICM} - 1 &= 0.03871 - 0.08803 \text{Q6264} + 0.14422 \text{Q6869} \\
&+ 0.14422 \text{Q6869} - 1 \\
\text{R}^2 &= 0.721 \\
\text{S.E.} &= 0.050 \\
\text{D.W.} &= 2.46 \\
\text{Sample Period} &= 1961-1973
\end{align*}
\]

(I.19a)  

**IISG Capital Investment, Soft Goods**

\[
\begin{align*}
\text{IISG} - 1 &= 0.13957 - 0.11840 \text{Q69} + 0.14302 \text{GPG} + 0.16856 \text{Q66} \\
&- 0.19383 \text{GDF} - 0.41625 \text{IISG} - 1 - 1 \\
\text{R}^2 &= 0.803 \\
\text{S.E.} &= 0.046 \\
\text{D.W.} &= 1.15 \\
\text{Sample Period} &= 1959-1973
\end{align*}
\]

GPG and GDF defined above under (I.1a).
(I.20a) IIPF  Capital Investment, Processed Foods

\[
\frac{IIPF}{IIPF_{-1}} = 0.05915 - 0.03897 Q_{6567} - 0.03907 Q_{69} - 0.28097 GPG + 0.44939 GDF
\]

\[
(3.65) \quad (1.39) \quad (1.04) \quad (2.56) \quad (5.57)
\]

\[R^2 = 0.326 \quad S.E. = 0.036 \quad D.W. = 2.25\]

Sample Period 1961-1973

GPG and GDF defined above under (I.1a).

(b) Branch Investment, Share Equations

(I.10b) \( \text{IIEP} \equiv \text{IREP9} \times \text{IIN} \)

(I.11b) \( \text{IICP} \equiv \text{IRCP9} \times \text{IIN} \)

(I.12b) \( \text{IIPP} \equiv \text{IRPP9} \times \text{IIN} \)

(I.13b) \( \text{IIFM} \equiv \text{IRFM9} \times \text{IIN} \)

(I.14b) \( \text{IINF} \equiv \text{IRNF9} \times \text{IIN} \)

(I.15b) \( \text{IIICH} \equiv \text{IRCH9} \times \text{IIN} \)

(I.16b) \( \text{IIIMB} \equiv \text{IRMB9} \times \text{IIN} \)

(I.17b) \( \text{IIPF} \equiv \text{IRFP9} \times \text{IIN} \)
(b) Branch Investment, Share Equations, Continued

(I.18b) \[ IICM = IRCM9 \times IIN \]

(I.19b) \[ IISG = IRSG9 \times IIN \]

(I.20b) \[ IIPF = IRPF9 \times IIN \]

(I.21) \[ I70T \] Change in Inventories, Domestic Trade

\[
I70T = 2.93819 - 0.10606 I70T_{-1} + 0.05940 (CR-CRS-CRF)^* \\
(5.07) \quad (1.30) \quad (1.02) \\
(2.249)
\]

\[+ 0.29956 \left( (CR-CRS-CRF)^* - (CR-CRS-CRF) - 0.45295 \right) \\
(1.66)
\]

\[+ 0.10701 \left( XAT-XATPK_{-1} + 1.816 \right) \\
(1.89)
\]

\[- 0.25209 \left( \frac{100 \text{ BDN9}}{PIWH70} - \frac{100 \text{ BDN9}_{-1}}{PIWH70_{-1}} - 0.50432 \right) \\
(1.50)
\]

\[ R^2 = 0.711 \quad \text{S.E.} = 0.567 \quad \text{D.W.} = 1.82 \]

Sample Period 1958-1972

\[ \text{Where } X^* = X_{-1} \left( .1 \frac{X_{-1}}{X_{-2}} + .4 \frac{X_{-2}}{X_{-3}} + .4 \frac{X_{-3}}{X_{-4}} + .1 \frac{X_{-4}}{X_{-5}} \right) \]

Projection from four previous growth rates.

(I.22) \[ IS70T \] Stock of Inventories, Domestic Trade (End Year)

\[ IS70T = IS70T_{-1} + I70T \]
(I.23) \( I7ONTA \)  Change in Inventories, Non-Trade Non-Agricultural

\[
I7ONTA = -0.69281 - 0.42559 IS7ONTA_{-1} + 0.18392 GNPNA^* \quad (0.28) \quad (2.40) \quad (2.56) \\
+ 5.86858 Q66 \quad (2.83)
\]

\( R^2 = 0.642 \quad S.E. = 1.952 \quad D.W. = 1.66 \)

Sample Period 1958-1972

Where \( X* \) defined above under (I.21)

(I.24) \( IS7ONTA \)  Stock of Inventories, Non-Trade Non-Agricultural

\( IS7ONTA = IS7ONTA_{-1} + I7ONTA \)
(K.1) KITOT Industrial Basic Funds (Capital Stock) (Jan. 1)

KITOT +1 = KITOT + KNDI

(K.2) KIA Adjusted Industrial Basic Funds (Jan. 1)

KIA +1 = KITOT +1 - KIT589 - KIH629

(K.3) KNDI Industrial Capital Formation

KNDI + 0.05 KITOT = 1.09890 QFYP + 0.00886 IIN
(1.89) (0.03) (22.197)

+ 0.3278 IIN -1 + 0.4327 IIN -2
(16.57) (2.15)

+ 0.3234 IIN -3
(1.66)

$R^2 = 0.980 \quad S.E. = 1.119 \quad D.W. = 1.24$

Sample Period 1959-1973

Distributed Lag: Quadratic, 4-Period, Zero-constrained in 5th Period.
(K.4) KCR Construction Basic Funds (Jan. 1)

\[ KCR_{+1} = KCR + KNDC \]

(K.5) KNDC Construction Capital Formation

\[ KNDC + 0.06 \times KCR = 0.33634 \times QPL5 + 0.93224 \times ICRUB \]

\[ (2.008) \quad (2.06) \quad (19.22) \]

\[ R^2 = 0.902 \]

S.E. = 0.335

D.W. = 1.58

Sample Period 1958-1973

(K.6) KTR Transport and Communications Basic Funds (Jan. 1)

\[ KTR_{+1} = KTR + KNDT \]

(K.7) KTA Adjusted Transport and Communications Basic Funds (Jan. 1)

\[ KTA_{+1} = KTR_{+1} + KIT589 \]

(K.8) KNDT Transport and Communications Capital Formation

\[ KNDT + 0.025 \times KTR = 2.48932 \times Q65 + 0.61840 \times (ITRUB + ITRUB_{-1}) \]

\[ (4.93) \quad (58.73) \]

\[ R^2 = 0.954 \]

S.E. = 0.513

D.W. = 1.65

Sample Period 1959-1973
(K.9) **KTCUS** _Freight Car Utilization Rate_

\[
KTCUS = 182.425 \, QSH65 + 3.97263 \, QSH65 \times QT50 \\
\text{(35.46)} \quad \text{(9.42)} \\
\text{E}(241.88)
\]

\[
+ 232.324 \, (1. - QSH65) + 1.02710 \, (1. - QSH65) \times QT50 \\
\text{(39.96)} \quad \text{(3.56)}
\]

\[
- \left\{ \frac{BDN9/PIWH70}{BDN9-1/PIWH70-1} - 1. \right\} \\
\text{E}(1.24)
\]

\[
R^2 = 0.981 \quad \text{S.E.} = 2.23 \quad \text{D.W.} = 2.30 \\
\text{Sample Period 1958-1973}
\]

(K.10.) **KCOM** _Basic Funds, Domestic Trade (Jan. 1)_

\[
KCOM_{t+1} = KCOM + KNCOM
\]

(K.11) **KNCOM** _Capital Formation, Domestic Trade_

\[
KNCOM + 0.02 \, KCOM = 3.62055 \, Q65 + 2.19175 \, Q68 \\
\text{(9.29)} \quad \text{(5.49)} \\
\text{E}(2.245)
\]
(K.11)  \[ \text{KNCOM} = \text{Capital Formation, Domestic Trade, Continued} \]

\[-1.93706 \text{Q69} + 0.096837 (\text{ISER}_{-1} + \text{ISER}_{-2})\]

\[ R^2 = 0.940 \quad \text{S.E.} = 0.379 \quad \text{D.W.} = 1.39 \]

Sample Period 1960-1973

(K.12)  \[ \text{KHBF} = \text{Basic Funds, Housing (Jan. 1)} \]

\[ \text{KHBF}_{+1} \equiv \text{KHBF} + \text{KNDH} \]

(K.13)  \[ \text{KNDH} = \text{Housing Capital Formation} \]

\[ \text{KNDH} + 0.02 \text{KHBF} = -0.61240 \text{QFYP} + 7.89835 \text{Q62} \]

\[ R^2 = 0.914 \quad \text{S.E.} = 0.815 \quad \text{D.W.} = 2.18 \]

Sample Period 1960-1973
(K.14) KHA  Adjusted Housing Basic Funds  (Jan. 1)

\[ KHA_{t+1} = KHBF_{t+1} + \frac{7.84}{1.74} KIH_{t+1} \]

(K.15) KSER  Basic Funds, Services  (Jan. 1)

\[ KSER_{t+1} = KSER + KNSER \]

(K.16) KNSER  Services Capital Formation

\[ KNSER + 0.02 KSER = 0.63499 QFYP + 4.49012 Q63 + 0.63499 Q63 + 4.49012 Q63 \]
\[ (8.839) \]

\[ - 0.41527 Q70 + 0.49879 (ISER_{-3} + ISER_{-4}) \]
\[ (2.90) \]
\[ (19.46) \]

\[ R^2 = 0.890 \quad S.E. = 1.355 \quad D.W. = 1.15 \]
Sample Period 1960-1973

(K.17) KAIR  Agricultural Basic Funds  (excl. Productive Livestock)  (mid-year)

\[ KAIR - 0.95 KAIR_{-1} = 0.55756 QPL7 + 0.67846 \left( \frac{IA+IA_{-1}}{2} \right) \]
\[ (6.45) \]
\[ (2.65) \]
\[ (48.16) \]

\[ R^2 = 0.976 \quad S.E. = 0.430 \quad D.W. = 1.82 \]
Sample Period 1957-1972
(K.18) KIF  Industrial Capital, From Western Imports  (End Year Value)

\[ KIF = 0.95 KIF_{-1} + 0.1 \text{ MIEIN}^{*}_1 \text{PREX}9/(P599/1.1852)_1 \]

(K.19) KIEP  Basic Funds, Electroenergy  (Jan. 1)

\[ KIEP_{+1} = KIEP + KNIIEP \]

(K.20) KNIEP  Capital Formation, Electroenergy

\[ KNIEP + 0.04 KIEP = -0.21295 QFYP + 1.38961 IIEP \]
\[ (0.59) \quad (1.13) \]
\[ (3.432) \]
\[-1.33388 \quad (IIEP_{-1} + IIEP_{-2}) \]
\[ (1.66) \]
\[ + 1.52319 \quad (IIEP_{-3} + IIEP_{-4}) \]
\[ (3.19) \]

\[ R^2 = 0.880 \quad \text{S.E.} = 0.522 \quad \text{D.W.} = 2.34 \]
Sample Period 1959-1973

(K.21) KICP  Basic Funds, Coal Products  (Jan. 1)

\[ KICP_{+1} = KICP + KNICP \]
(K.22) \textbf{KNICP} \quad \textit{Capital Formation, Coal Products}

\[ \text{KNICP} + 0.03 \text{KICP} = 0.11613 \text{QFYP} - 0.30244 \text{Q68} \]

\( (3.68) \quad (4.71) \)

\( (0.790) \)

\[ + 0.18559 \quad (IICP + IICP-1 + IICP-2) \]

\( (37.04) \)

\( R^2 = 0.856 \quad \text{S.E.} = 0.060 \quad \text{D.W.} = 2.32 \)

Sample Period 1959-1973

(K.23) \textbf{KIPP Basic Funds, Petroleum Products} (Jan. 1)

\( \text{KIPP}_+1 \equiv \text{KIPP} + \text{KNIPP} \)

(K.24) \textbf{KNIPP} \quad \textit{Capital Formation, Petroleum Products}

\[ \text{KNIPP} - 0.025 \text{KIPP} = -0.44342 \text{QFYP} - 0.60611 \text{Q6567} \]

\( (2.59) \quad (2.81) \)

\( (1.471) \)

\[ + 0.23246 \quad (IIPP + IIPP-1 + IPP-2) \]

\( (15.84) \)

\( R^2 = 0.868 \quad \text{S.E.} = 0.315 \quad \text{D.W.} = 1.96 \)

Sample Period 1959-1973

(K.25) \textbf{KIFM} \quad \textit{Basic Funds, Ferrous Metallurgy} (Jan. 1)

\( \text{KIFM}_+1 \equiv \text{KIFM} + \text{KNIFM} \)
(K.26) KNIFM Capital Formation, Ferrous Metallurgy

\[ KNIFM + 0.05 \, KIFM = 0.42263 \, (IIFM + IIFM_{-1} + IIFM_{-2}) \]
\[ (2.263) \]

\[ R^2 = 0.736 \quad S.E. = 0.357 \quad D.W. = 2.16 \]
Sample Period 1959-1973

(K.27) KICH Basic Funds, Chemicals and Petrochemicals (Jan. 1)

\[ KICH_{+1} = KICH + KNICH \]

(K.28) KNICH Capital Formation, Chemicals and Petrochemicals

\[ KNICH + 0.04 \, KICH = 0.66416 \, QFYP \]
\[ (2.064) \]

\[ + 0.51752 \, (IICH_{-1} + IICH_{-2}) \]
\[ (12.60) \]

\[ R^2 = 0.772 \quad S.E. = 0.476 \quad D.W. = 2.05 \]
Sample Period 1959-1973

(K.29) KIMB Basic Funds, Machine-Building and Metal-Working (Jan. 1)

\[ KIMB_{+1} = KIMB + KHIMB \]
(K.30) KNIMB  Capital Formation, Machine-Building and Metal-Working

\[ KNIMB + 0.05 KIMB = 0.23512 QFYP + 0.79425 Q66 + 0.57407 (lIMB + lIMB_{-1}) \]
\[ (4.666) \]

\[ R^2 = 0.973 \quad S.E. = 0.361 \quad D.W. = 2.22 \]
Sample Period 1959-1973

(K.31) KIFP  Basic Funds, Forest Products  (Jan. 1)

\[ KIFP_{+1} = KIFP + KNIPP \]

(K.32) KNIFP  Capital Formation, Forest Products

\[ KNIFP + 0.045 KIFP = 0.07759 QFYP + 0.44045 (IIFP + IIFP_{-1}) \]
\[ (0.82) \]
\[ (17.39) \]

\[ R^2 = 0.749 \quad S.E. = 0.183 \quad D.W. = 1.17 \]
Sample Period 1959-1973

(K.33) KICM  Basic Funds, Construction Materials  (Jan. 1)

\[ KICM_{+1} = KICM + KNICM \]
(K.34) KNICM  Capital Formation, Construction Materials

KNICM + 0.04 KICM = 0.18611 Q69
(0.95)
(1.325)

- 1.24738 Q70 + 0.3480 IICM
(6.57)
(1.51)

+ 0.3335 IICM_1 + 0.2707 IICM_2
(22.62)
(2.12)

+ 0.1595 IICM_3
(1.28)

R² = 0.896  S.E. 0.173  D.W. = 1.57  
Sample Period 1959-1973

Distributed Lag estimation: Quadratic, 4-Period, Zero-Constrained in 5th Period.

(K.35) KISG  Basic Funds, Soft Goods  (Jan. 1)

KISG_1 = KISG + KNISG

(K.36) KNISG  Capital Formation, Soft Goods

KNISG + 0.05 KISG = 0.2546 IISG + 0.5098 IISG_1
(0.39)
(1.91)

+ 0.4249 IISG_2
(0.88)
(K.36) KNISG  Capital Formation, Soft Goods, Continued

\[ R^2 = 0.854 \quad \text{S.E.} = 0.163 \quad \text{D.W.} = 2.14 \]
Sample Period 1959-1973

Distributed Lag estimation: Quadratic, 3-Period, Zero
Constrained in 4th Period.

(K.37) KIPF  Basic Funds, Processed Foods  (Jan. 1)

\[ KIPF_{t+1} = KIPF + KNIPF \]

(K.38) KNIPF  Capital Formation, Processed Foods

\[ KNIPF + 0.05 KIPF = 0.95911 Q61 \]
\[ (1.852) \quad (3.63) \]
\[ - 0.93297 Q62 + 0.1984 IIPF \]
\[ (3.25) \quad (0.22) \]
\[ + 0.4942 IIPF_{t-1} + 0.4577 IIPF_{t-2} \]
\[ (2.53) \quad (1.27) \]

\[ R^2 = 0.890 \quad \text{S.E.} = 0.234 \quad \text{D.W.} = 1.52 \]
Sample Period 1959-1973

Distributed Lag estimation: Quadratic, 3-Period,
Zero-constrained in 4th Period.

(K.39) KSUM  Basic Funds, National Economy  (Mean Year)

\[ KSUM = KAIR + \frac{1}{2} (KIA + KCR + KTA + KCOM + KHA + KSER) + 1 \]
\[ + \frac{1}{2} (KIA + KCR + KTA + KCOM + KHA + KSER) \]

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(K.40) **KIPPF Basic Funds, Petroleum Products, World Imports**

\[ KIPPF = 0.95 \cdot KIPPF_{-1} + 0.1 \left( \frac{MTM12}{P599/1.1852} \right)_{-1} \]

(K.41) **KICHF Basic Funds, Chemicals and Petrochemicals, Western Imports**

\[ KICHF = 0.95 \cdot KICHF_{-1} + 0.1 \left( \frac{MIECHS*PREX9}{P599/1.1852} \right)_{-1} \]

(K.42) **KIMBF Basic Funds, Machine-Building, World Imports**

\[ KIMBF = 0.95 \cdot KIMBF_{-1} + 0.1 \left( \frac{MTM10}{P599/1.1852} \right)_{-1} \]
A OTHER AGRICULTURAL VARIABLES

Define RXA = XAT / XATPK - 1.

(A.1) ALVR  Livestock (Value in 1965 Rubles)

ALVR = 0.95 = - 0.12038 - 0.00879 QT50
ALVR = (1.29) (4.05) (0.064)

+ 0.16540 XACTOAL9-1 / 1000. ALVR-1 + 0.61302 KWAL9-1 / 100.
(1.58) (5.0) (2.66)

+ 0.26799 RXA-1 + RXA-2 / 2.
(1.60)

R² = 0.777  S.E. = 0.014  D.W. = 2.46
Sample Period 1959-1972

(A.2) AACI  Index of Agricultural Current Purchases

AACI = 1. = 0.10286 - 0.00191 QT50 + 0.04577 Q65
AACI = (5.78) (2.00) (2.68) (0.074)

+ 0.18955 RXA - 0.22840 RXA-1 + RXA-2 / 2.
(2.22) (1.44)

R² = 0.799  S.E. = 0.014  D.W. = 1.63
Sample Period 1959-1972
X- PRODUCTION

(X.1) XITOT Industrial Output Index

Cobb-Douglas production functions with labor elasticity constrained to 0.560. No technical progress terms included.


Define the following dependent variable:

\[ \mathbb{LXIC} = \ln \text{XITOT} - 0.560 \left( 0.845 \ln \text{NMI-NIF} + 0.155 \ln \text{NIF} \right) \]

\((-1.1249)\)

(a) Capital Disaggregation, Dummy Variable Q6466 (\text{ALT (6)} = 0)

\[ \mathbb{LXIC} = -2.41112 - 0.01896 \text{ Q6466} + 0.22751 \ln \left( \frac{\text{KIF} + \text{KIF} - 1}{2} \right) \]

\[ + 0.37416 \ln \left( \frac{\text{KIA} + 1 + \text{KIA}}{2} - \frac{\text{KIF} + \text{KIF} - 1}{2} \right) \]

\(R^2 = 0.9996 \quad \text{S.E.} = 0.0043 \quad \text{D.W.} = 2.72\)

(b) Capital Disaggregation, No Dummy Variable (\text{ALT (6)} = 1)

\[ \mathbb{LXIC} = -2.38701 + 0.26306 \ln \left( \frac{\text{KIF} + \text{KIF} - 1}{2} \right) \]

\[ + 0.35578 \ln \left( \frac{\text{KIA} + 1 + \text{KIA}}{2} - \frac{\text{KIF} + \text{KIF} - 1}{2} \right) \]

\(R^2 = 0.997 \quad \text{S.E.} = 0.0100 \quad \text{D.W.} = 1.08\)
(c) Aggregate Capital Series, Dummy Variable Q6466 (ALT (5)=2)

\[ \ln XIC = -3.81454 - 0.02207 \times Q6466 + 0.53136 \times \ln \left( \frac{KIA_{t+1} + KIA}{2} \right) \]

\[ (78.24) \quad (3.22) \quad (55.81) \]

\[ R^2 = 0.997 \quad \text{S.E.} = 0.0101 \quad \text{D.W.} = 0.81 \]

(d) Aggregate Capital Series, No Dummy Variable (ALT(6)=3)

\[ \ln XIC = -3.85139 + 0.53753 \times \ln \left( \frac{KIA_{t+1} + KIA}{2} \right) \]

\[ (58.36) \quad (41.39) \]

\[ R^2 = 0.994 \quad \text{S.E.} = 0.0140 \quad \text{D.W.} = 0.51 \]

(X.2) XCRUB Construction Activity, State Enterprises

\[ \ln XCRUB = -7.35112 + 1.07667 \times \ln NMC + 0.06603 \times \ln \left( \frac{KCT_{t+1} + KCR}{2} \right) \]

\[ (6.74) \quad (7.93) \quad (1.26) \]

\[ + 0.24571 \times \ln XICM \]

\[ (4.59) \]

\[ R^2 = 0.999 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 2.71 \]

Sample Period 1958-1972

(X.3) XT7R Transport and Communications Index

\[ \ln XT7R = -3.11578 + 0.76397 \times \ln \left( \frac{KTA_{t+1} + KTA}{2} \right) \]

\[ (3.16) \quad (4.88) \]

(4.25)
(X.3) **Transport and Communications Index, Continued**

\[
\text{XT7R} = 0.14441 \ln \left( \frac{\text{NTSPA} + \text{NTSPA}_1}{2} \right) + 0.59203 \ln \text{KTCUS} \\
\text{R}^2 = 0.999 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 1.08 \\
\text{Sample Period 1958-1973}
\]

(X.4) **Domestic Trade Index**

\[
\ln \text{XTRADE} = -0.88405 + 0.06606 \ln \left( \frac{\text{KCOM} + \text{KCOM}_1}{2} \right) + 1.18384 \ln \left( \frac{\text{XILT} + \text{XILT}_1}{2} \right) \\
\text{R}^2 = 0.996 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 0.77 \\
\text{Sample Period 1960-1972}
\]

Where

\[
\text{XILT} = \frac{0.27744 \text{XISG} + 0.38796 \text{XIPF}}{(0.27744 + 0.38796)} \\
\text{(1970 Value-Added Weights by Branch)}
\]

(X.5) **Services and Administration Output Index**

\[
\ln \text{XSER} = -3.82213 + 0.73040 \ln \text{NMG} + 0.19967 \ln \frac{\text{KHB}F + \text{KHB}F_1 + \text{KSER}_1 + \text{KSER}}{2} \\
\text{R}^2 = 0.996 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 0.77 \\
\text{Sample Period 1958-1973}
\]
(X.5) XSER  Services and Administration Output Index, Continued

\[ R^2 = 0.994 \quad \text{S.E.} = 0.015 \quad \text{D.W.} = 1.97 \]
Sample Period 1960-1972

(X.6) XAT  Agricultural Output

\[ \ln XAT = \ln XATPK + LPRES \]

Where \( \ln XATPK \) is capacity output (linked peak) in agriculture obtained from:

\[ \ln XATPK = 0.74658 + 0.40105 \ln KAIR \]
\[ (4.11) \quad (0.68) \quad (16.37) \]
\[ + 0.48752 \ln NAT - 0.05219 \quad Q6465 \]
\[ (1.76) \quad (3.70) \]

\[ R^2 = .987 \quad \text{S.E.} = 0.018 \quad \text{D.W.} = 1.14 \]
Sample Period 1959-1973

Actual LPRES is defined as

\[ \ln XAT - \text{(fitted) } \ln XATPK \text{ and obtained from:} \]

\[ LPRES = -0.04404 + 0.09305 \text{ JPS9} + 0.51957 \text{ JTW9} \]
\[ (6.52) \quad (5.38) \quad (3.74) \]
\[ (-0.032) \]
\[ + 1.60386 \left( \frac{\text{NAT}}{\text{SAL9}} - 0.39076 \right) + 0.07877 \text{ Q6465} \]
\[ (3.89) \quad (4.17) \]

\[ R^2 = .878 \quad \text{S.E.} = 0.024 \quad \text{D.W.} = 2.35 \]
Sample Period 1959-1973
(X.7a) XIEP Branch Output Index: Electroenergy

\[ \ln XIEP = -0.17125 + 0.61955 \ln XIEP + 0.40462 \ln NMIEP \]
\[ (0.23) \quad (10.03) \quad (2.71) \]

\[ R^2 = 0.996 \quad S.E. = 0.030 \quad D.W. = 0.70 \]
Sample Period 1958-1973

(X.8a) XICP Branch Output Index: Coal Products

\[ \ln XICP = 2.42307 + 0.39983 \ln KICP + 0.11452 \ln NMICP \]
\[ (4.497) \quad (15.56) \quad (1.42) \]

\[ + 0.10095 \ln (NEMIN9 + NEMIN9-1) \]
\[ (4.35) \]

\[ R^2 = 0.993 \quad S.E. = 0.011 \quad D.W. = 1.14 \]
Sample Period 1958-1973

(X.9a) XIPP Branch Output Index: Petroleum Products

\[ \ln XIPP - \frac{667}{10.145} \ln NMIPP = 3.00148 + 0.23498 \ln KIPPF \]
\[ (3.968) \quad (27.61) \quad (8.65) \]

\[ + 0.43336 \ln (XIPP - KIPPF) \]
\[ (9.25) \]

\[ R^2 = 0.997 \quad S.E. = 0.019 \quad D.W. = 1.35 \]
Sample Period 1960-1973
(X.10a) XIFM Branch Output Index: Ferrous Metallurgy

\[
\ln XIFM = 0.30635 + 0.53367 \ln KIFM + 0.36817 \ln NMIFM
\]

\[
(4.330) \quad (0.19) \quad (8.67) \quad (1.51)
\]

\[ R^2 = 0.996 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 1.27 \]

Sample Period 1958-1973

(X.11a) XINF Branch Output Index: Non-Ferrous Metallurgy

\[
\ln XINF = -1.82145 + 0.20921 \ln \frac{IINF + IINF_{-1}}{2} + 0.73740 \ln NMINF
\]

\[
(4.242) \quad (1.31) \quad (2.08) \quad (3.04)
\]

\[ + 0.08038 \ln \frac{NEMET9 + NEMET9_{-1}}{2} \]

\[
(1.08) \quad (1.08)
\]

\[ + 0.04501 QT50 \]

\[
(5.02)
\]

\[ R^2 = 0.999 \quad \text{S.E.} = 0.011 \quad \text{D.W.} = 1.48 \]

Sample Period 1958-1973
(X.12a) **XICM** Branch Output Index: Construction Materials

\[
\text{In } XICM = -6.02570 + 0.08493 \, \text{In} \left( \frac{\text{KICM}_{t+1} + \text{KICM}}{2} \right) \\
(2.34) \quad (2.01)
\]

\[+ 1.29829 \, \text{In} \, \text{NMICM} + 0.02692 \, \text{QT50} \]

\[\text{(3.51)} \quad \text{(2.96)}\]

\[\text{R}^2 = 0.993 \quad \text{S.E.} = 0.032 \quad \text{D.W.} = 0.96\]

Sample Period 1958-1973

(X.13a) **XICH** Branch Output Index: Chemicals & Petrochemicals

\[
\frac{\text{In } XICH}{8953} = \frac{3053}{8953} \, \text{In} \, \text{NMICH} = 1.15104 + 0.49794 \, \text{In} \, \text{KICHF} \\
(1.82) \quad (2.09)
\]

\[+ 0.22697 \, \text{In} \, (\text{KICH-KICHF}) \]

\[\text{(1.78)}\]

\[\text{R}^2 = 0.980 \quad \text{S.E.} = 0.050 \quad \text{D.W.} = 0.44\]

Sample Period 1960-1973

(X.14a) **XIMB** Branch Output Index: Machine-Building & Metal-Working

\[
\text{In } XIMB = 1.05824 + 0.17078 \, \text{In} \, \text{NMIMB} + 0.16203 \, \text{In} \, \text{KIMBF} \\
(0.90) \quad (0.88) \quad (0.83)
\]

\[+ 0.50608 \, \text{In} \, (\text{KIMB-KIMBF}) - 0.02081 \, \text{QT6466} \]

\[(1.93) \quad \text{(1.45)}\]

68
(X.14a) XIMB Branch Output Index: Machine-Building & Metal-Working, Continued

\[ R^2 = 0.999 \quad S.E. = 0.015 \quad D.W. = 2.08 \]
Sample Period 1960-1973

(X.15a) XIFP Branch Output Index: Forest Products

\[
\begin{align*}
\ln XIFP &= \frac{4.343}{7.472} \ln NMIFP - 1.51307 + 0.43466 \ln KIFP \\
&= (-0.605) - 0.05548 Q6566 \\
&= (2.80)
\end{align*}
\]

\[ R^2 = 0.971 \quad S.E. = 0.026 \quad D.W. = 0.84 \]
Sample Period 1960-1973

(X.16a) XIPA Branch Output Index: Paper and Pulp

\[
\begin{align*}
\ln XIPA &= 0.34776 + 0.56182 \ln NMIPA + 0.11573 \ln KIFP \\
&= (4.346) \\
&= 1.15 \quad (7.98) \quad (1.50) \\
&- 0.03722 Q6364 + 0.04098 QT50 \\
&= (4.64) \quad (8.87)
\end{align*}
\]

\[ R^2 = 0.9995 \quad S.E. = 0.008 \quad D.W. = 2.03 \]
Sample Period 1960-1973
(X.17a) **XISG Branch Output Index: Soft Goods**

\[
\ln XISG = -4.83933 + 0.19830 \ln KISG + 0.92222 \ln NMISG + 0.27061 \ln XAT - 0.08130 Q6567
\]

\[
(4.334) \quad (1.82) \quad (3.66) \quad (2.94) \quad (2.56) \quad (6.85)
\]

\[R^2 = 0.995 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 1.82\]

Sample Period 1958-1973

(X.18a) **XIPF Branch Output Index: Processed Foods**

\[
\ln XIPF = -0.82716 + 0.41096 \ln KIPF + 0.41980 \ln NMIPF + 0.21101 \ln XAT - 1
\]

\[
(4.351) \quad (0.59) \quad (6.85) \quad (2.29) \quad (2.10)
\]

\[R^2 = 0.996 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 2.12\]

Sample Period 1958-1973
(X.19) XGR Grain Index, M. Metric Tons (Diamond Series)

(a) Link to Gross Agricultural Output \((\text{ALT} (7) = 0)\)

\[
\ln XGR = 1.11803 \ln XAT + 0.08254 JPS9 \\
\text{(4.550)} \quad \text{(323.90)} \quad \text{(2.47)}
\]

\[
+ 0.67223 J1w9 - 0.21716 Q65 \\
\text{(2.44)} \quad \text{(3.95)}
\]

\(R^2 = 0.965 \quad \text{S.E.} = 0.051 \quad \text{D.W.} = 1.67\)

Sample Period 1959-1973 \ Fit \(R^2 = 0.966\)

1965 is an unusual year in that grain production fell sharply while animal products increased substantially. The net result is a slight increase in XAT for 1965.

(b) Direct Production Function \((\text{ALT} (7) = 1)\)

(i) \(\ln XGR = \ln XGRPK + \text{LGRES}\)

Where

XGRPK is a smoothed "normal" output measure constructed from XGR.
(ii) \( \ln XGRPK = -0.24857 + 0.53782 \ln KAIR \)  
\[ (0.18) \quad (13.10) \]  
\[ (4.629) \]  
\[ + 0.83028 \ln NASK \]  
\[ (2.25) \]  

\( R^2 = 0.989 \) \quad S.E. = 0.020 \quad D.W. = 0.37  
Sample Period 1959-1973

(iii) \( \ln RES = -0.07125 + 0.11648 JPS9 \)  
\[ (4.27) \quad (2.94) \]  
\[ (-0.0790) \]  
\[ + 1.50461 JTW9 - 0.19986 Q65 \]  
\[ (4.58) \quad (3.06) \]

\( R^2 = 0.820 \) \quad S.E. = 0.061 \quad D.W. = 2.72  
Sample Period 1959-1973

The fit \( R^2 \) for the Direct Production Function is 0.963, slightly inferior to the Link Equation (a). The production function for grain differs slightly from that for gross agricultural output since only social sector employment is used and the dummy variable Q65 replaces the man/acre ratio (which was insignificant for grain).
Alternative Production Functions for Industrial Branches

When ALTE(8) ≠ 0, the equations (X.7a) - (X.18a) are suppressed and the following equations used. These production functions include indexes of material inputs by branch, variables which may be exogenous (ALTE(8)=1) or endogenously determined in the U sector of the Model (ALTE(8)=2, 3 or 4).

The equation for chemicals and petrochemicals (X.13b) would not converge when material inputs were determined endogenously with the A Matrix. This was due to the high estimated elasticity with respect to material inputs (0.72) and the large diagonal coefficient in the A Matrix for that branch (0.30). Consequently, in the current version of SOVMOD II equation (X.13b) has been suppressed and equation (X.13a) is used for all determinations of output in the chemicals branch.
(X.7b) XIEP Branch Output Index: Electroenergy

\[
\ln XIEP = -0.5811 \ln NMIEP + 1.226 \ln KIEP + 0.09585 \ln UEP\& \\
(3.760) (17.15) (20.09) (2.79)
\]

\[ R^2 = 0.999 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 1.54 \]
Sample Period 1960-1972

(X.8b) XICP Branch Output Index: Coal Products

\[
\ln XICP = -0.5435 \ln NMICP + 3.579 \ln KICP + 0.00931 \ln UCP\& \\
(1.795) (3.40) (7.80) (0.23)
\]

\[ R^2 = 0.986 \quad \text{S.E.} = 0.014 \quad \text{D.W.} = 1.00 \]
Sample Period 1960-1972

(X.9b) XIPP Branch Output Index: Petroleum Products

\[
\ln XIPP = -0.6125 \ln NMIPP + 3.10026 \ln KIPP\& + 0.18398 \ln KIPPF + 0.03297 \ln UPF\& \\
(4.071) (10.145) (11.08) (4.11) (8.30) (0.47)
\]

\[ R^2 = 0.998 \quad \text{S.E.} = 0.017 \quad \text{D.W.} = 1.39 \]
Sample Period 1960-1972
(X.10b)  

**XIFM Branch Output Index: Ferrous Metallurgy**

\[
\ln XIFM = 0.16526 + 0.39288 \ln KIFM + 0.44823 \ln NMIFM \\
(0.12) \hspace{1cm} (6.00) \hspace{1cm} (2.13) \\
+ 0.11424 \ln UME & \\
\hspace{1cm} (3.61) \\
\]

\[ R^2 = 0.998 \quad S.E. = 0.012 \quad D.W. = 1.70 \]

Sample Period 1959-1972

(X.11b)  

**XINF Branch Output Index: Non-Ferrous Metallurgy**

\[
\ln XINF = 0.61863 + 0.40584 \ln NMINF \\
(4.246) \hspace{1cm} (0.89) \hspace{1cm} (3.58) \\
+ 0.07409 \ln UME & \\
\hspace{1cm} (1.65) \\
+ 0.06093 \ln UME & \\
\hspace{1cm} (11.62) \\
\]

\[ R^2 = 0.999 \quad S.E. = 0.011 \quad D.W. = 1.63 \]

Sample Period 1959-1972

(X.12b)  

**XICM Branch Output Index: Construction Materials**

\[
\ln XICM = 0.4853 + 4.317 \ln NMICM = 1.23330 \\
(2.076) \hspace{1cm} (6.989) \hspace{1cm} (8.60) \\
+ 0.41264 \ln KICM \hspace{1cm} + \hspace{1cm} KICM \\
\hspace{1cm} (7.66) \\
+ 0.26243 \ln UCM & \\
\hspace{1cm} (4.14) \\
\]

\[ R^2 = 0.992 \quad S.E. = 0.025 \quad D.W. = 1.25 \]

Sample Period 1959-1972
(X.13b) XICH Branch Output Index: Chemicals & Petrochemicals

\[
\ln XICH - 0.4068 (3.053) \quad \ln NMICH = 3.25399 + 0.02679 \ln KICHF \\
(3.228) \quad (8.44) \quad (0.10)
\]

This equation was not used due to problems with convergence. Equation 13a was used instead.

\[
\ln\ UCH& = 0.72230 (2.37) \\
PMAT70
\]

\[ R^2 = 0.992 \quad S.E. = 0.037 \quad D.W. = 0.96 \]
Sample Period 1960-1972

(X.14b) XIMB Branch Output Index: Machine-Building & Metal-Working

\[
\ln XIMB - 0.4469 (22.837) \quad \ln NMINMB = 1.64252 + 0.13770 \ln(KIMB- KIMBF) \\
(2.022) \quad (1.87) \quad (0.53)
\]

\[ + 0.18610 (1.13) \quad \ln KIMBF \\
+ 0.25559 (2.00) \quad \ln UMB& \\
PMAT70
\]

\[ R^2 = 0.997 \quad S.E. = 0.015 \quad D.W. = 0.79 \]
Sample Period 1960-1972

(X.15b) XIFP Branch Output Index: Forest Products

\[
\ln XIFP - 0.4370 (4.843) \quad \ln NMINFP = 1.98777 + 0.16838 \ln KIPF \\
(2.242) \quad (13.46) \quad (2.75)
\]

\[ + 0.32318 (4.35) \quad \ln UFP& \\
PMAT70
\]

\[ R^2 = 0.984 \quad S.E. = 0.018 \quad D.W. = 1.18 \]
Sample Period 1960-1972
(X.16b) **XIPA Branch Output Index**

\[
\ln XIPA = 1.23570 + 0.40438 \ln \text{NMIPA} + 0.47880 \ln \text{KIFP} \\
+ 0.31548 \ln \text{UPF} & -0.04329 Q6364 \\
(2.15) & (3.16) & (6.12) & (5.30) & (3.51)
\]

R\(^2\) = 0.999  
S.E. = 0.012  
D.W. = 1.97  
Sample Period 1960-1972

(X.17b) **XISG Branch Output Index: Soft Goods**

\[
\ln XISG = -0.2813 + 7.273 \ln KISG -4.67276 -0.07769 Q6567 \\
- 0.98962 \ln \text{NMISG} + 0.08054 \ln \text{USG} \\
(3.958) & (2.34) & (4.59) & (3.45) & (0.81)
\]

R\(^2\) = 0.976  
S.E. = 0.024  
D.W. = 1.23  
Sample Period 1959-1972

(X.18b) **XIPF Branch Output Index: Processed Foods**

\[
\ln XIPF = -0.92633 + 0.05503 \ln \text{KIPF} + 0.42484 \ln \text{NMIPF} \\
+ 0.42966 \ln \text{UPF} \\
(0.94) & (0.64) & (2.99) & (5.31)
\]

R\(^2\) = 0.998  
S.E. = 0.012  
D.W. = 1.83  
Sample Period 1959-1972
MATERIAL INPUTS

This is an optional sector of SOVMOD II (Alternate (8)=2, 3 or 4) which computes material input indexes in current prices for 16 sectors using the I-O table balanced for the given year; the 16 sectors are listed in Table 1 below. The vector of gross outputs X in the macromodel is first transformed into a simulated vector of gross value of outputs in current prices (XGVO) based to 1966=100.

\[ (U.1-1,16) \quad X_{GVO_i} = RGX_9 * X_i \quad i = 1, 16 \]

The exogenous RGX9 vector for each year 1959-1972 was computed from actual GVO and X observations. Sectoral GVO is moved by corresponding X variables, with two macromodel outputs being aggregated into one GVO variable for metallurgy and forest products (1970 Value-Added weights were used in the aggregation):

Metallurgy \[ X_{IFMN} = \frac{8.575 \times X_{IFM} + 4.193 \times X_{INF}}{12.768} \]

Forest Products \[ X_{IFPPA} = \frac{7.472 \times X_{IFP} + 1.254 \times X_{IPA}}{8.726} \]

The GVO's of Industry NEC and Other Branches are moved by Aggregate Industrial Output and GNP, respectively.

This vector of GVO indexes is then converted to current rubles using levels from the 1966 I-O table:

\[ X_{GVO_i} = CXG_i \times X_{GVO_i} \quad i = 1, 16 \]

CXG is a vector of constant coefficients given in Table 1.
This vector XGVO& is then used to determine material inputs by sector in three alternative ways. First, the B matrix corresponding to the balanced A matrix of the given year may be used directly to form a flow matrix F&(Alternate(8)=2).

\[(UF-2)^*\]

\[F_{ij} = b_{ij} \cdot XGVO_{i} \quad i = 1,16 \]
\[j = 1,16 \]

In the second alternative (Alternate (8)=3), a flow matrix is formed by multiplying each column of the A matrix by the corresponding element in XGVO&:

\[(U.1-17)\]

\[XGVO_{17} = XVAT \cdot RGXVA9 \cdot GNP \]
\[F'_{ij} = a_{ij} \cdot XGVO_{j} \quad i = 1,16 \]
\[j = 1,17 \]

In this case, the row sum of materials requirements (including final demand) will not generally equal gross output. A distribution matrix \(\bar{b} (16,17)\) is then used to distribute those excess demands to obtain a new flow matrix:

\[(UF-3)^*\]

\[F_{ij} = F'_{ij} + \bar{b}_{ij} \cdot (XGVO_{i} - \sum_{j=1}^{17} F'_{ij}) \]
\[i = 1,16 \]
\[j = 1,17 \]
Although we have used the 1966 B matrix for B, the model may be programmed to apply any specific distribution matrix B.

In the third alternative which determines materials inputs endogenously (Alternate(8)=4), the procedure is identical to the second until the final distribution of excess demands. Here, the distribution scheme is a minimization of weighted A coefficient changes using a matrix B of weights:

\[ F'_{ij} = F'_{ij} \cdot (1 + D_{ij}) \quad i = 1,16 \]
\[ j = 1,17 \]

where \( D_{ij} = b_{ij} \frac{F'_{ij}}{R_i} \cdot (XGVE_{i1} - \sum_{j=1}^{17} F'_{ij}) \)

\[ R_i = \sum_{j=1}^{17} b_{ij} \cdot (F'_{ij})^2 \]

Again, we have used the 1966 B matrix as weights for the minimization but the algorithm could be used with other weighting matrices.

When the A matrix is used (Alternate(8)=3 or 4), it is adjusted each iteration as coefficients change. Iterations cease not when the matrix converges but when model outputs and material inputs converge.
Material inputs delivered to each sector are computed by aggregating over each column:

\[ UF_j^i = \sum_{i=1}^{16} F_{ij} \quad j = 1, 16 \]

Finally, this vector of material inputs in current rubles is converted to a vector of material input index values based to 1970=100.

\[ (U.2-1,16) \quad UF_j^i = UF_j^i / CUF_j \quad j = 1, 16 \]

CUF is a vector of constant coefficients based on the 1970 material inputs computed from actual GVO's and the balanced I-O matrix for 1970 and is given in Table 1.

* Starred equations are for reference only and are not counted as model equations.
### TABLE 1.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FMNF Metallurgy</td>
<td>0.21324581</td>
<td>0.23652038</td>
</tr>
<tr>
<td>2.</td>
<td>CP Coal Products</td>
<td>0.05413076</td>
<td>0.04650122</td>
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<tr>
<td>3.</td>
<td>PP Petroleum and Gas</td>
<td>0.05663796</td>
<td>0.05118781</td>
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<tr>
<td>4.</td>
<td>EP Electric Power</td>
<td>0.05895195</td>
<td>0.05002713</td>
</tr>
<tr>
<td>5.</td>
<td>MB Machine-Building &amp; Metal-Working</td>
<td>0.54508163</td>
<td>0.48210769</td>
</tr>
<tr>
<td>6.</td>
<td>CH Chemicals &amp; Petrochemicals</td>
<td>0.14197281</td>
<td>0.12792019</td>
</tr>
<tr>
<td>7.</td>
<td>FPPA Forest Products &amp; Paper</td>
<td>0.12623556</td>
<td>0.10759606</td>
</tr>
<tr>
<td>8.</td>
<td>CM Construction Materials</td>
<td>0.10689850</td>
<td>0.08286788</td>
</tr>
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<td>9.</td>
<td>SG Soft Goods</td>
<td>0.44730625</td>
<td>0.45682106</td>
</tr>
<tr>
<td>10.</td>
<td>PF Processed Foods</td>
<td>0.60772925</td>
<td>0.74888594</td>
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<tr>
<td>11.</td>
<td>NC Industry NEC</td>
<td>0.10324238</td>
<td>0.06832763</td>
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<td>12.</td>
<td>CG Construction</td>
<td>0.43312381</td>
<td>0.34587294</td>
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<td>13.</td>
<td>AF Agriculture &amp; Forestry</td>
<td>0.80061444</td>
<td>0.32588250</td>
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<tr>
<td>14.</td>
<td>TC Transport &amp; Communications</td>
<td>0.19000031</td>
<td>0.05045913</td>
</tr>
<tr>
<td>15.</td>
<td>TD Domestic Trade</td>
<td>0.16150025</td>
<td>0.02810113</td>
</tr>
<tr>
<td>16.</td>
<td>OB Other Branches of Material Production</td>
<td>0.02928288</td>
<td>0.00641645</td>
</tr>
</tbody>
</table>
WAGES

(W.1) \[ WI_t - WI_{t-1} = 0.39342 (28.1927 - DVW)_{t-1} - 0.48571 (-0.127) \]
\[ + 1.77880 QWREF + 1.56531 Q61 \]
\[ R^2 = 0.883 \quad S.E. = 0.326 \quad D.W. = 1.53 \]
Sample Period 1959-1972

Where
\[ DVW = \frac{10 \cdot WI_t / PRC_{t-1}}{1766.28 \times 10^{-7} \times M}{(real \ wage)}{(average \ product)} \]

(W.2) \[ DVWA - DVWA_{t-1} = 1.27835 (DHWA-DVWA_{t-1}) - 0.74025 (1.96) \]
\[ R^2 = 0.731 \quad S.E. = 1.94 \quad D.W. = 1.95 \]
Sample Period 1959-1972

Where
\[ DVWA = \frac{10 \cdot WASK_{t-1} / PRC_{t-1}}{(XAT/NAT)_{t-1}}{(real \ wage)}{(average \ product)} \]
(W.2) WASK\& Average Wage, State and Collective Farms, Continued

$$DHWA = 2.78935 \times QT50 (1.0 - QSH68) + 54.50375 \times QSH68$$
(DVWA Fitted over 1959-1972)

(W.3) WC\& Average Wage, Construction

$$\frac{WCA}{WIC} = 0.34269 \times QLT28 - 0.18268$$
(WC\& fitted) (13.08) (1.91)
(1.0659)

$$R^2 = 0.924 \quad S.E. = 0.013 \quad D.W. = 1.62$$
Sample Period 1958-1973

(W.4) WTC\& Average Wage, Transport and Communications

$$\frac{WTC\&}{WIT} = 0.98313 \times (\frac{WTC\&}{WIT}) + 0.02098 + 0.03188 \times Q61$$
(WT\& fitted) (11.72) (0.26) (3.21)
(WT\& fitted) (0.922)

$$R^2 = 0.922 \quad S.E. = 0.009 \quad D.W. = 2.15$$
Sample Period 1959-1973  \quad D. = 0.31
(W.5) **WS&** Average Wage, Trade and Distribution

\[
\text{WS&} = 0.98957 \left( \frac{\text{WS&}}{\text{WGS&}} \right) + 0.07728 \text{Q65} - 0.01628 \text{Q61} \\
(250.02) (7.32) (1.54)
\]

\[
R^2 = 0.907 \quad S.E. = 0.010 \quad D.W. = 1.63
\]

Sample Period 1959-1973 \( D. = 0.72 \)

(W.6) **WGS&** Average Wage, Government and Services

\[
\text{WGS&} = 1.00336 \left( \frac{\text{WGS&}}{\text{WS&}} \right) + 0.02584 \text{Q6162} \\
(465.40) (4.51)
\]

\[
R^2 = 0.934 \quad S.E. = 0.008 \quad D.W. = 1.77
\]

Sample Period 1959-1973 \( D. = 0.46 \)
(Z.1) **ZWU&W Urban Workers Gross Earnings**

\[ ZWU&W = 0.97565 \times ZWH&W + 11.47676 \times (1. - QSH65) - 0.59859 \times QT50 \times (1. - QSH65) \]

\[ (85.871) \quad (352.30) \quad (8.23) \]

\[ R^2 = 1.000 \quad S.E. = 0.457 \quad D.W. = 0.83 \]

Sample Period 1958–1972

Where \( ZWH&W \equiv (NMI \times WI&W + NMC \times WC&W + NMTC \times WTC&W + NMS \times WS&W + NMG \times WGS&W)/10.6 \)

(Z.2) **ZPWSC&W State and Collective Farm Wage Payments**

\[ ZPWSC&W \equiv NASK \times WASK&W/10.3 \]

(Z.3) **ZPWS&W Income from Sale of Farm Products**

\[ \ln ZPWS&W = -3.44986 + 0.64368 \times (\ln PAFC70 + \ln XAT) - 1.53755 \times (XAT \div XATPK - 1) - 0.21259 \times Q69 \]

\[ (2.032) \quad (6.90) \quad (10.94) \]

\[ R^2 = .919 \quad S.E. = 0.056 \quad D.W. = 1.42 \]

Sample Period 1958–1972
(2.4) **Total Money Income**

\[ ZP = ZWU + ZPWS + ZWPC + ZPPC + ZPWM + BPS \]

(2.5) **Agricultural Income in Kind**

\[ \ln ZPAK = -1.94988 + 1.10702 \ln XAT \]

(2.533) (4.83) (11.12)

\[ R^2 = 0.905 \quad \text{S.E.} = 0.055 \quad \text{D.W.} = 1.44 \]

Sample Period 1958-1972

(2.6) **Real Disposal Income**

\[ ZD = 100 \times \frac{(ZP + ZPAK - TP)/PRC}{XAT} \]

(2.7) **Gross Profits, National Economy**

(a) **Without Anticipation Term**

\[ \frac{ZPG}{ZPG}_{-1} = 1.09277 + 0.12996 Q6668 + 0.10389 Q70 \]

(63.95) (4.25) (2.20)

\[ + 0.39267 \frac{XAT}{XATPK} - 1 \]

(1.50)

\[ R^2 = 0.745 \quad \text{S.E.} = 0.044 \quad \text{D.W.} = 2.19 \]

Sample Period 1959-1973
(Z.7) Gross Profits, National Economy, Continued

(b) With Anticipation Term

\[ \frac{ZPG&}{ZPG&-1} = 1.03931 + 0.14061 Q6668 + 0.11883 Q70 \]
\[ + 0.38681 \left( \frac{XAT}{XATPK} - 1 \right) \]
\[ + 0.18028 \left( \frac{ZFPG&}{ZPG&} - 1.127 \right) \]
\[ R^2 = 0.766 \quad S.E. = 0.044 \quad D.W. = 2.24 \]
Sample Period 1959-1973

(c) With Residual Income Term

\[ \frac{ZPG&}{ZPG&-1} = 1.06260 \frac{ZR&}{ZR&-1} - 0.42123 Q70 \]
\[ - 0.25520 (QSH67-QSH67_{-1}) \]
\[ R^2 = 0.790 \quad S.E. = 0.039 \quad D.W. = 1.42 \]
Sample Period 1959-1972

(Z.8) ZDT& Amortization Funds, National Economy

\[ \frac{ZDT&}{ZDT&-1} = 1.02532 + 0.07104 KSUM/KSUM_{-1} \]
\[ + 0.27301 Q63 + 0.03168 (QSH67-QSH67_{-1}) \]
\[ R^2 = 0.984 \quad S.E. = 0.011 \quad D.W. = 1.45 \]
Sample Period 1959-1972
(Z.9)  
ZR& Income Residual

ZR& ≡ PI1 * (GYP - ZD)/100. - TT& - ZDT&
(P.1) PNF70 State Retail Price, Non-Food Goods

\[
P_{PNF70} = \frac{PNF70}{1 + RTTD9} - \left( \frac{PNF70}{1 + RTTD9} - 1 \right) = -0.29527 + 2.10261 Q6668
\]

\[
(0.260)
\]

\[+ 0.11012 (PWQN - \frac{PNF70}{1 + RTTD9 - 1})
\]

\[p^2 = 0.837 \quad S.E. = 0.519 \quad D.W. = 1.70
\]

Sample Period 1961-1972

Where

\[PWQN = K \cdot WIQN \text{ (marked-up industrial wage)}\]

\[WIQN = \frac{100 \cdot WI8}{1766.28 \times ITOT/(.001 NMI)}\]

\[K = -0.41978 + 1.15080 QLT28 - 0.19918 QSH68\]

Estimated over sample period 1958-1972

(P.2) PIRF70 State Retail Price, Food Goods

\[
P_{PIRF70} = \frac{PIRF70}{1 + RTTD9} - \left( \frac{PIRF70}{1 + RTTD9} - 1 \right) = 0.64672 + 1.77265 Q6668
\]

\[(2.20) \quad (3.00) \]

\[(1.049)\]
(P.2) PIRF70 State Retail Price, Food Goods, Continued

\[ + 0.21488 (0.85 \text{ PWIQN} + 0.15 \text{ PAFC70}_{-1} \]
\[ (1.69) \]
\[ (\text{PIRF70} - 1 + \text{RTD9}_{-1}) \]

\[ R^2 = 0.551 \quad \text{S.E.} = 0.882 \quad \text{D.W.} = 2.05 \]
Sample Period 1961-1972

(P.3) PAFC70 "Negotiated" Agricultural Price

(Food sold by collective farms to consumer cooperatives.)

\[ \ln \text{PAFC70} - \ln \text{PAFC70}_{-1} = 0.03485 + 0.04370 \text{ Q6869} \]
\[ (2.01) \quad (1.53) \]
\[ - 0.02045 \text{ MGRDWS} - 0.97120 \left( \frac{\text{XAT}_{-1}}{\text{XATPK}_{-1}} - 1 \right) \]
\[ (3.35) \quad (4.62) \]
\[ - 0.65908 (1. - \text{QSH65}) \left( \frac{\text{XAT}}{\text{XATPK}} - 1 \right) \]
\[ (2.11) \]

\[ R^2 = 0.791 \quad \text{S.E.} = 0.032 \quad \text{D.W.} = 3.01 \]
Sample Period 1961-1973

(P.4) PFCC Consumption Price, Food

\[ \text{PFCC} \equiv 0.875 \text{ PIRF70} + 0.125 \text{ PAFC70} \]

(P.5) PRC Consumption Price, Total

\[ \text{PRC} \equiv 0.60 \text{ PFCC} + 0.40 \text{ PNP70} \]
(P.6) **PIWL70 Wholesale Price, Light Industry**

\[
PIWL70 - PIWL70_{-1} = -0.25850 - 1.86950 Q67 + 0.75035 Q61 (-0.056) \\
(0.98) (2.30) (0.93)
\]

\[+ 0.10872 (PWIQN - PIWL70_{-1}) \]

\[r^2 = .438 \quad S.E. = 0.775 \quad D.W. = 2.11 \]

Sample Period 1958-1972

(P.7) **PIWH70 Wholesale Price, Heavy Industry**

\[
PIWH70 - PIWH70_{-1} = -0.45455 - 4.09088 Q61 (0.379) \\
(1.41) (3.81)
\]

\[+ 14.09091 Q67 (13.14) \]

\[r^2 = .957 \quad S.E. = 1.023 \quad D.W. = 1.77 \]

Sample Period 1961-1972

(P.8) **PII Investment Deflator, Industry**

\[
PII = 0.81500 PXCON9 + 0.20588 PIWH70 \quad (87.9) (3.73)
\]

\[r^2 = .934 \quad S.E. = 1.62 \quad D.W. = 0.36 \]

Sample Period 1957-1972
(P.9) PIC  Investment Deflator, Construction

PIC = 0.32125 PXCON9 + 0.68619 PIWH70
(91.1) (2.40)

R^2 = .727  S.E. = 3.56  D.W. = 2.13
Sample Period 1957-1972

(P.10) PIT  Investment Deflator, Transport and Communications

PIT = 0.67878 PXCON9 + 0.32086 PIWH70
(87.0) (4.10)

R^2 = .699  S.E. = 4.40  D.W. = 0.34
Sample Period 1957-1972

(P.11) PIS  Investment Deflator, Government, Trade, Services, etc. (excl. Housing)

PIS = 0.78015 PXCON9 + 0.24469 PIWH70
(88.6) (11.04)

R^2 = .899  S.E. = 1.88  D.W. = 0.36
Sample Period 1957-1972
(P.12) \( \text{PIHS} \) Investment Deflator, Housing

\[
\text{PIHS} = 0.82329 \text{ PXCON9} + 0.19220 \text{ PIWH70}
\]

\[= (87.3) \text{ (19.76)} \]

\[R^2 = 0.971 \text{ S.E.} = 1.11 \text{ D.W.} = 0.53 \]

Sample Period 1957-1972

(P.13) \( \text{PIA} \) Investment Deflator, Agriculture

\[
\text{PIA} = 0.34481 \text{ PXCON9} + 0.06897 \text{ PIWH70} + 58.03934
\]

\[= (3.00) \text{ (30.86)} \]

\[R^2 = 0.983 \text{ S.E.} = 0.410 \text{ D.W.} = 1.16 \]

Sample Period 1957-1972
C Consumption

(C.1) CR Total Consumption

(C.1a) Identity Determination

\[
\text{CR} = \text{CRF} + \text{CRND} + \text{CRD} + \text{CRS}
\]

(C.1b) Direct Determination

\[
\frac{\text{ZD}}{\text{ZD}} = 1.82930 - 0.34160 \text{ QLT28} + 0.27182 \frac{\text{XAT}-1}{\text{ZD}} (3.04) (2.66) (1.37)
\]

\[
+ 1.36466 \left( \frac{\text{27744 XISG} + \text{.38796 XIPF}}{\text{ZD}} \right) (3.82)
\]

\[
\hat{R}^2 = 0.977 \quad \text{S.E.} = 0.017 \quad \text{D.W.} = 1.97
\]

Sample Period 1956-1972

(C.1c) Residual Determination

\[
\text{CR} = \text{GNP} + \frac{\text{MTW70}}{1000} - \frac{\text{ETW70}}{1000} - \text{GRESEM} - \text{I70T}
\]

\[
- \text{I7ONTA} - \text{ITOTAL} - .17391 \text{ GIKREP}
- \{ \text{BAD} + \frac{6.954}{49.5} (\text{BSC} - \text{BNAUK}) \} / (0.65 \frac{\text{WGS}}{1246.8})
+ .35 \frac{\text{PIWH70}}{100}
\]
Residual Determination, Continued

\[
\begin{align*}
&- (BD_{99} - BD_{99}) - \frac{100 \, BD_{99}}{PWH_{70}} \\
&- \frac{BNAUK_{6} / (1.2 \, XG^2 + 0.8 \, PWH_{70})}{100}
\end{align*}
\]

Food Consumption

Direct Determination

\[
\begin{align*}
CRF_{ZD} &= 1.67893 - 0.34206 \frac{ZD}{ZD_{-1}} - 0.98667 \frac{PFCC}{PFN_{70}} \\
&\quad + 0.24344 \frac{XAT}{ZD} + 0.62497 \frac{0.38796 \times XIPF}{ZD} \\
R^2 &= 0.981 \quad S.E. = 0.013 \quad D.W. = 1.94 \\
\text{Sample Period 1956-1972}
\end{align*}
\]

Share Determination

\[
\begin{align*}
\frac{CRF}{CR} &= 0.50614 \frac{CRF}{CR} - 1 + 0.90761 \frac{CRD}{CR} - 1 \\
&\quad - 0.81116 \frac{CRD}{CR} - 1 + 1.25255 \frac{CRS}{CR} - 1 \\
&\quad - 0.19716 \frac{PFCC}{PFN_{70}} + 0.03253 \frac{XISG}{XISG_{-1}} \\
&\quad + 0.10525 \frac{100 \, BD_{99}/PWH_{70}}{ZD} \\
&\quad (0.511) (2.89) (4.51) (1.04) (4.96) (1.98) (0.74) (0.92)
\end{align*}
\]
(C.2b) Share Determination, Continued

\[ + 0.05603 \left( \frac{\text{INA}}{\text{INA}_{-1}} - 1 \right) \]

\( (1.53) \)

\[ R^2 = 0.991 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 2.30 \]

Sample Period 1957-1972 \( D. = 0.84 \)

(C.3) CRND Softgoods

(C.3a) Direct Determination

\[
\frac{\text{CRND}}{\text{ZD}} = 0.32920 + 0.26531 \frac{\text{QT}50}{100} - 0.29562 \frac{\text{PFCC}}{\text{PNP}70} \\
(0.276) \quad (4.32) \quad (2.81) \quad (3.43)
\]

\[ + 1.15378 \frac{\text{XISG}}{\text{ZD}} \]

\( (8.94) \)

\[ R^2 = 0.978 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 1.53 \]

Sample Period 1956-1972

(C.3b) Share Determination

\[
\frac{\text{CRND}}{\text{CR}} = 0.26163 \frac{\text{CRE}}{\text{CR}} - 1 + 0.61716 \frac{\text{CRND}}{\text{CR}} - 1 + 0.72767 \frac{\text{CRD}_{-1}}{\text{CR}} - 1 \\
(2.11) \quad (4.33) \quad (1.32)
\]

\[ - 0.37389 \frac{\text{CRS}}{\text{CR}} - 1 \]

\( (0.222) \quad (2.09) \)
(C.3b) Share Determination, Continued

\[ + 0.00548 \frac{PFCC}{PNF70} + 0.00453 \frac{XISG}{XISG_1} - 1.0 \]

\[ - 0.18249 \frac{100.BDN69/PIWH70}{ZD} \]

\[ - 0.00659 \frac{INA}{INA_1} - 1.0 \]

\[ R^2 = 0.936 \quad S.E. = 0.002 \quad D.W. = 1.96 \]

Sample Period 1957-1972

\[ D.W. = 0.10 \]
(C.4) CRD Durables

(C.4a) Direct Determination

\[
\frac{\text{CRD}}{\text{ZD}} = -1.42926 - 1.02849 \frac{\text{QT50}}{\text{IUU}} + 0.45360 \frac{\text{QLT28}}{(6.97) (5.90) (6.93)} \\
+ 0.11033 \frac{0.40575}{\text{ZD}} \frac{\text{XIMB}}{(1.92)} - 0.11888 \frac{100.\text{BDN}69/\text{PIWH70}}{(2.20) \text{ZD}}
\]

\[
R^2 = 0.990 \quad \text{S.E.} = 0.001 \quad \text{D.W.} = 1.65
\]
Sample Period 1957-1972

(C.4b) Share Determination

\[
\frac{\text{CRD}}{\text{CR}} = 0.018201 \left(\frac{\text{CRF}}{\text{CR}} - 1\right) - 0.150996 \left(\frac{\text{CRND}}{\text{CR}} - 1\right) + 0.760549 \left(\frac{\text{CRD}}{\text{CR}} - 1\right)
\]

\[
- 0.110318 \left(\frac{\text{CRS}}{\text{CR}} - 1\right)
\]

\[
+ 0.069496 \frac{\text{PPCC}}{\text{PNF70}} - 0.007663 \left(\frac{\text{XISG}}{\text{XISG}-1}\right)
\]

\[
- 0.030335 \frac{100.\text{BDN}69/\text{PIWH70}}{\text{ZD}}
\]

\[
- 0.017899 \left(\frac{\text{INA}}{\text{INA}-1} - 1\right)
\]

(1.28) (2.04) (0.51) (0.78) (1.43)
(C.4b) Share Determination, Continued

\[ R^2 = 0.996 \quad \text{S.E.} = 0.001 \quad \text{D.W.} = 1.95 \]
Sample Period 1957-1972 \quad \text{D.} = *

(C.5) CRS Services

(C.5a) Direct Determination

\[
\frac{\text{CRS}}{\text{ZD}} = -1.20889 - 1.02855 \frac{\text{QT50}}{\text{100}} + 0.40920 \frac{\text{QLT28}}{(4.09) \quad (4.09) \quad (4.47)}
\]

\[ + 0.55668 \frac{\text{XSER}}{\text{ZD}} \]

\[ (7.41) \]

\[ R^2 = 0.962 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 1.84 \]
Sample Period 1956-1972

(C.5b) Share Determination

\[
\frac{\text{CRS}}{\text{CR}} = 0.21404 \frac{\text{CRF}}{\text{CR} - 1} - 0.37376 \frac{\text{CRND}}{\text{CR} - 1} + 0.32307 \frac{\text{CRD}}{\text{CR} - 1}
\]

\[ (2.57) \quad (3.90) \quad (0.87) \]

\[ + 0.23163 \frac{\text{CRS}}{\text{CR} - 1} \]

\[ (1.93) \]
(C.5b) Share Determination, Continued

\[ + 0.12218 \frac{PFCC}{PNF70} - 0.04473 \left( \frac{XISG}{XISG_{-1}} - 1. \right) \]
\[ (2.58) \quad (2.14) \]

\[ + 0.10758 \frac{100.BDN&9/PIWH70}{2D} \]
\[ (1.98) \]

\[ - 0.03154 \left( \frac{INA}{INA_{-1}} - 1. \right) \]
\[ (1.81) \]

\[ R^2 = 0.986 \quad S.E. = 0.001 \quad D.W. = 2.73 \]
Sample Period 1957-1972 \[ D.W. = 1.66 \]
T BUDGET REVENUES

DDF \equiv \frac{BD}{BCN} - 0.132 \quad \text{Defense Share, Deviation from Mean}

DPRC \equiv \frac{PRC}{PRC-1} - 1. \quad \text{Consumption Price Deflator, Rate of Change}

ZW \equiv ZWU + ZPWSC + ZPWC \quad \text{Total Money Wage Income}

(T.1) TDP \quad \text{Deductions from Gross Profits}

\[ TDP = 1.02793 RTDP + 1.60270 DDF - 0.10077 Q68 \]
\[ (0.731) \quad (2.49) \quad (2.46) \]

\[ R^2 = 0.780 \quad \text{S.E.} = 0.039 \quad \text{D.W.} = 1.30 \]
Sample Period 1958-1972

(T.2) TT \quad \text{Turnover Tax}

\[ TT = 0.69335 (1 - QSH68) + 0.31965 QSH68 \]
\[ (49.62) \quad (66.08) \]
\[ (0.400) \]

\[ - 0.01895 (1 - QSH68) \ast QT50 + 0.95172 DPRC-1 \]
\[ (19.33) \quad (4.25) \]
(T.2) 

**Turnover Tax, Continued**

\[-0.82918 \text{ DDF} \]

\[\begin{array}{rll}
R^2 = 0.989 & \text{S.E.} = 0.008 & \text{D.W.} = 2.10 \\
\text{Sample Period 1958-1972}
\end{array}\]

(T.3) 

**Other Revenues from Social Sector (including Social Insurance Deductions)**

\[
\begin{align*}
\text{TOSS}_t &= 0.47409 + 0.20879 \text{Q6}_165 + 0.36882 \text{Q5}_860 \\
\text{ZPG}_t &= (42.51) \quad (12.08) \quad (18.11) \\
(0.618)
\end{align*}
\]

\[\begin{array}{rll}
R^2 = 0.968 & \text{S.E.} = 0.030 & \text{D.W.} = 2.96 \\
\text{Sample Period 1958-1972}
\end{array}\]
(T.4) **Social Insurance Deductions**

\[
\text{TSD\&} = 0.05720 + 0.00246 \times Q59 \\
(311.48) \quad (3.45)
\]

\(0.057\)

\[R^2 = 0.480 \quad \text{S.E.} = 0.001 \quad \text{D.W.} = 1.25\]

Sample Period 1958-1972

(T.5) **Taxes on the Population**

\[
\text{TPOP\&} = 0.09193 + 0.02018 \times Q5859 - 0.01174 \times Q6467 \\
(85.03) \quad (7.96) \quad (6.02)
\]

\(0.092\)

\[R^2 = 0.915 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 1.52\]

Sample Period 1958-1972

(T.6) **Personal Taxes (for Disposable Income)**

\[\text{TP\&} = \text{TPOP\&} + \text{TPA\&9}\]

(T.7) **Total Revenues, State Budget**

\[\text{TR\&} = \text{TDP\&} + \text{TT\&} + \text{TOSS\&} + \text{TPOP\&}\]
State Budget Outlays

\[
\text{DDF} = \frac{\text{BDG}}{\text{BGN}} - 0.132
\]
Defense Share, Deviation from Mean

\[
\text{DWG} = \frac{\text{WGS}}{\text{WGS}_{-1}} - 1.03536
\]
Rate of Change of Government Wage, Deviation from Mean

Q6768 Industrial Price Reform Dummy
Q65 Governmental Financial Reorganization

\[(B.1)\]

\[
\text{BF}_{\text{N}} = 1.07119 - 0.11518 \text{Q61} + 0.06875 \text{Q6768} + 0.12432 \text{Q70}
\]
\[
\begin{align*}
\text{BF}_{\text{N}}-1 & = (107.82) \\
& = (3.35) \\
& = (2.71) \\
& = (3.61)
\end{align*}
\]
\[1.081\]
\[
R^2 = 0.755 \quad \text{S.E.} = 0.033 \quad \text{D.W.} = 2.91
\]
Sample Period 1959-1973

\[(B.2)\]

\[
\text{BSC}_{\text{S}} = 1.07203 + 0.07511 \text{Q65} + 0.0381 \text{Q68}
\]
\[
\begin{align*}
\text{BSC}_{\text{S}}-1 & = (439.73) \\
& = (8.23) \\
& = (4.20)
\end{align*}
\]
\[1.080\]
\[
R^2 = 0.871 \quad \text{S.E.} = 0.009 \quad \text{D.W.} = 1.74
\]
Sample Period 1959-1973
(B.3) BNAUK Science

\[
\frac{\text{BNAUK}}{\text{BNAUK-1}} = 1.25618 - 0.008904 \text{ QT50} \\
(63.24) (7.86) (1.105)
\]

\[ R^2 = 0.826 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 2.44 \]
Sample Period 1959-1973

(B.4) BAD Administration

\[
\frac{\text{BAD}}{\text{BAD-1}} = 1.01199 + 0.16510 \text{ Q65} + 0.05381 \text{ Q6768} \\
(85.58) (3.91) (1.74) (1.033)
\]

\[ - 0.78529 \text{ DDF} \]

\[ (1.91) \]

\[ R^2 = 0.638 \quad \text{S.E.} = 0.041 \quad \text{D.W.} = 1.71 \]
Sample Period 1959-1973

(B.5) BRES Expenditure Residual

\[
\frac{\text{BRES}}{\text{BGN}} = 0.08371 - 0.002605 \text{ QT50} - 0.01610 \text{ Q63} \\
(13.49) (6.72) (3.47) (0.038)
\]

\[ - 0.01115 \text{ Q6768} + 0.005766 \text{ DWG} - 0.20697 \text{ DDF} \]

\[ (3.86) (1.41) (1.96) \]

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(B.5) BRES\& Expenditure Residual, Continued

\[ R^2 = 0.932 \quad S.E. = 0.004 \quad D.W. = 2.68 \]
Sample Period 1958-1973

(B.6) BGN\& Total Expenditures

\[ BGN\& = BF\& + BSC\& + BAD\& + BRES\& + BD69 \]

(B.7) BPS\& Transfer Payments (for Disposable Income)

\[
\begin{align*}
\text{BPS}\& & = 0.49375 + 0.01005 Q5861 - 0.02438 Q6368 \\
\text{BSC\&-BNAUK}\& & \quad (129.34) \quad (1.75) \quad (4.72) \\
(0.487) & \\
\end{align*}
\]

\[ R^2 = 0.787 \quad S.E. = 0.009 \quad D.W. = 2.32 \]
Sample Period 1958-1972
E Exports

(E.1) ERMCM& Export of Raw Materials and Semifabricates to CMEA

\[
\frac{\text{ERMCM}}{\text{PERMCM}_9} = -937.22 + 30.983 \ Y_{\text{CMEA}}  \\
\left(3.63\right) \left(15.5\right)
\]

\[
\text{ERMCM} = 100 \left(\frac{\text{PRM}_9}{\text{PTW}_9} - \frac{\text{PRM}_9}{\text{PTW}_9-1}\right) \\
\left(1.26\right)
\]

\[
\text{ERMCM} = 100 \left(\frac{\text{PRM}_9}{\text{PTW}_9} - \frac{\text{PRM}_9}{\text{PTW}_9-1}\right) - \left(\text{PERMCM}_9 - \text{PERMCM}_{9-1}\right)
\]

\[
R^2 = 0.964 \quad \text{S.E.} = 195 \quad \text{D.W.} = 1.23 \\
\text{Sample Period 1961-1973}
\]

(E.2) EMACM& Exports of Machinery, to CMEA

\[
\text{EMACM} = -712.392 + 0.658452 \ \text{ERMCM} - 125.552 \ Q_{4590} \\
\left(10.65\right) \left(26.57\right) \left(4.65\right)
\]

\[
R^2 = 0.985 \quad \text{S.E.} = 66 \quad \text{D.W.} = 1.51 \\
\text{Sample Period 1960-1973}
\]
(E.3) **EGRCM& Exports of Grain, to CMEA**

\[
\frac{EGRCM&}{NPOP9} = \frac{2.06493}{(10.97)} + \frac{2.45125 \times (XGR_{NPOP9} - XGRCM9_{NPOP9})}{(3.49)} \\
+ \frac{3.3278}{(3.80)} \frac{XGR_{-1}}{NPOP9_{-1}} - \frac{XGRCM9_{-1}}{NCM9_{-1}} \\
+ \frac{2.23734}{(2.99)} \frac{GRSTK}{NPOP9}
\]

\[R^2 = 0.808 \quad S.E. = 0.14 \quad D.W. = 2.29\]

Sample Period 1960-1972

Where \(GRSTK = \sum \frac{1}{i} (XGR_{-i} - XGRP_{-i})\)

(E.4) **ECOCM& Exports of Consumption Goods; other than Grain**

\[
ECOCM& = 178.607 + 7.49858 \times XAT_{-1} - 6.39453 \times XGRCM9_{-1} \\
(2.42) \quad (2.10) \quad (1.80)
\]

\[R^2 = 0.315 \quad S.E. = 37 \quad D.W. = 0.91\]

Sample Period 1960-1973
(E.5) ETCM\& Total Exports to CMEA

ETCM\& = ERMCM\& + EMACM\& + EGRCM\& + ECOCM\& + EUSCM\&

(E.6) ENETCM\& Balance of Trade with CMEA

ENETCM\& = ETCM\& - MTCM\&

(E.7) ENFDWS Non-food Exports to the Developed West

\[
\frac{\text{ENFDWS}}{\text{ENFDWS}_{-1}} = -0.07584 + 0.27125 \left( \frac{\text{MDW} - \text{ENETDWS}_{-1}}{\text{MDW}_{-1}} \right) + 1.27199 \left( \frac{\text{WTDW} \cdot \text{PENFDW}}{\text{WTDW}_{-1} \cdot \text{PENFDW}_{-1}} \right)
\]

\[
R^2 = 0.820 \quad \text{S.E.} = 0.083 \quad \text{D.W.} = 1.34
\]

Sample Period 1961 - 1973

Revised 11/11/75
(E.8) \[ \frac{100 \text{ EGRDW} \$}{	ext{PGR9 NPOP9}} = 1.73703 - 3.88386 \frac{\text{XGRWE9}}{\text{NWE9}} + 2.06302 \frac{\text{GRSTK}}{\text{NPOP9}} \]

\[ (0.217) \]

\[ (4.74) \]

\[ \text{R}^2 = 0.786 \quad \text{S.E.} = 0.091 \quad \text{D.W.} = 1.98 \]

Sample Period 1960-1972

Where \( \text{GRSTK} \) is defined below (E.3)

(E.9) \[ \text{EFODWS} = -125.30 + 3.5929 \frac{\text{XAT-1}}{(131)} \quad \text{R}^2 = 0.724 \quad \text{S.E.} = 20 \quad \text{D.W.} = 1.02 \]

Sample Period 1960-1972
(E.10) \[ \text{ETDWS} \quad \text{Total exports to the Developed West} \]

\[
\text{ETDWS} = \text{ENFDWS} + \text{EGRDWS} + \text{EFODWS}
\]

(E.11) \[ \text{ENETGR} \quad \text{Net Balance of Grain Trade} \]

\[
\text{ENETGR} = 1.1111 \frac{\text{EGRC\$}}{\text{PGR9}} + 100 \cdot \frac{(\text{EGRD\$} + \text{EGRLD\$} - \text{MGRD\$})}{\text{PGR9}}
\]

Revised 11/11/75 Now an identity

(E.12) \[ \text{ENETDWS} \quad \text{Balance of Trade with the DW} \]

\[
\text{ENETDWS} = \text{ETDWS} - \text{MTDWS}
\]
(E.13)  \( \text{ETLDC}_t \) Total Exports to the Less Developed Countries
(including grain \( \text{EGRLDC}_t \))

\[
\text{ETLDC}_t = -137.69 + 0.213556 \times \text{WTLDC}_{t-1} \\
+ 0.339775 \times \text{ETLDC}_{t-1}
\]

\( (1035) \)

\( R^2 = 0.954 \quad \text{S.E.} = 93 \quad \text{D.W.} = 2.07 \)
Sample Period 1961-1973 \( D. = 0.22 \)

(E.14)  \( \text{EGRLDC}_t \) Exports of Grain to the LDC's

\[
\frac{\text{EGRLDC}_t \times 100}{\text{NPOP}_t \times \text{PGR}_t} = 2.47943 + 1.42838 \times \text{GRSTK}_t \\
- 9.95524 \times \frac{\text{XGRLDC}_{t-1}}{\text{NLDG}_{t-1}}
\]

\( (0.33) \)

\( R^2 = 0.404 \quad \text{S.E.} = 0.12 \quad \text{D.W.} = 1.57 \)
Sample Period 1960-1972

where \( \text{GRSTK} \) see at Equ. (E.3)

(E.15)  \( \text{EOSC}_t \) Exports to Yugoslavia and the Far Eastern Socialite Countries (except China and Cuba)

\[
\text{EOSC}_t = -174.24 + 4.26099 \times \text{WTG}_t + 0.38366 \times \text{EOSC}_{t-1}
\]

\( (690) \)

\( R^2 = 0.970 \quad \text{S.E.} = 62 \quad \text{D.W.} = 1.80 \)
Sample Period 1961-1973 \( D. = 1.35 \)
(E.16) **EMACH$** Exports of Machinery to China

\[ EMACH$ = 17.40668 + 0.35579 \text{ GNPCH9} - 39.3286 \text{ Q6870} \]
\[ (0.48) \quad (1.02) \quad (2.84) \]
\[ r^2 = 0.509 \quad \text{S.E.} = 20 \quad \text{D.W.} = 1.80 \]
Sample Period 1962-1972

(E.17) **EOCH$** Exports of Other than Machinery to China

\[ EOCH$ = -9.2943 + 0.48417 \text{ EMACH$} + 0.66898 \text{ EOCH$}_1 \]
\[ (0.56) \quad (1.57) \quad (7.20) \]
\[ r^2 = 0.898 \quad \text{S.E.} = 28 \quad \text{D.W.} = 2.83 \]
Sample Period 1961-1973 \( D. = 1.66 \)

(E.18) **ETCH$** Total Exports to China

\[ ETCH$ = EMACH$ + EOCH$ \]
(E.19)  **ECUBA$ Exports to Cuba**

\[ ECUBA$ = -12.8513 + 3.71639 WT9 + 37.719 Q6263 \]

\[ (0.26) \quad (12.38) \quad (0.96) \]

\[ R^2 = 0.948 \quad S.E. = 46 \quad D.W. = 0.93 \]

(E.20) **ETW$ Exports to the World**

\[ ETW$ \equiv ETDW$ + ETCM$ + PREX9 + ETCH$ + EOSC$ \]

\[ + ECUBA$ + ETLD$ + EUSW$9 \]

(E.21) **ETW70 Exports to the World at Domestic Constant Prices**

\[ ETW70 \equiv 1.5 \times PREX9 \times PTX9 \]
M Imports

(M.1) \[ MRMCM_\& = \frac{502.182 + 0.073422}{PMRMCM_9} + 0.13713 \cdot DEVMMACM_\& - 1 \]

\[ \frac{100 \cdot MRMCM_\&}{PMRMCM_9} = 100 \cdot \frac{ERMCM_\&}{PERMCM_9} \]

\[ (717) \]

\[ R^2 = 0.755 \quad S.E. = 42 \quad D.W. = 1.61 \]
Sample Period 1960-1973

Where \[ DEVMMACM_\& = (MMACM_\& - (-983.61 + 179.55 QT50)) \]

(M.2) \[ MMACM_\& = -756.457 + 1.09899 \cdot ERMCM_\& + 1.714289 \cdot DEVEMACM_\& - 1 \]

\[ (2.50) \quad (4.88) \quad (19.09) \]

\[ R^2 = 0.972 \quad S.E. = 145 \quad D.W. = 1.47 \]
Sample Period 1960-1973

Where \[ DEVEMACM_\& = (EMACM_\& - (-915.905 + 109.89 QT50)) \]
(M.3) **MFOCM & Imports of Food from CMEA**

\[
\text{MFOCM} = -327.438 + 6.62172 \text{ CRF} \\
\quad + 0.407572 \text{ MFOCM}_{-1}
\]

\[\begin{array}{c}
(2.81) \\
(3.09) \\
(1.91)
\end{array}\]

\[R^2 = 0.971 \quad \text{S.E.} = 30 \quad \text{D.W.} = 2.15 \]
Sample Period 1960-1972 \[D. = 0.42\]

(M.4) **MCOCM & Imports of Manufactured Consumer Goods from CMEA**

\[
\text{MCOCM} = -253.2914 + 12.8992 \text{ CRND} \\
\quad + 0.20878 \text{ ENETCM}_{-1} \\
\quad + 0.81653 \text{ MCOCM}_{-1}
\]

\[\begin{array}{c}
(1.58) \\
(1.35) \\
(1.41) \\
(3.39)
\end{array}\]

\[R^2 = 0.983 \quad \text{S.E.} = 60 \quad \text{D.W.} = 1.84 \]
Sample Period 1960-1972 \[D. = 0.58\]

(M.5) **MTCM & Total Imports from CMEA**

\[
\text{MTCM} \equiv \text{MRMC} + \text{MMAC} + \text{MFOCM} + \text{MCOCM} + \text{MUSC}
\]
(M.6) **MNGDWS** Imports Other Than Grain from the Developed West

\[
100 \cdot \text{MNGDWS} = -2803.8 + 47.80074 \cdot \text{XITOT} + \\
\frac{PMAW9}{(5.04)} + (9.75)
\]

\[
601.24 \left( \frac{\text{FGOLD9} \cdot \text{FGOLD} + \text{FSTK$ - \text{FDEBT}$}}{\text{MTDW$}} \right)^{1}
\]

\[R^2 = .955 \quad \text{S.E.} = 162. \quad \text{DW} = 1.64\]

Sample Period 1961 - 1973
Revised 11/11/75

(M.7) **MMADWS** Imports of Machinery from the DW

\[
100 \cdot \text{MMADWS} = -621.19 + 61.9896211 \cdot P71GE9
\]

\[
\frac{1}{(1.09)} + (3.68)
\]

\[
+197.984 \left( \frac{\text{FGOLD9} \cdot \text{FGOLD} + \text{FSTK$ - \text{FDEBT}$}}{\text{MTDW$}} \right)^{1}
\]

\[
+69.596 \left( \frac{\text{FDHC$}}{\text{FDEBT$}} \right)^{1} - 33.122 \cdot \frac{\text{MGRDWS}}{\text{PGR9}}
\]

\[R^2 = 0.786 \quad \text{S.E.} = 170. \quad \text{DW} = 1.58\]

Sample Period 1961 - 1973
Revised 11/11/75

(M.8) **MCODWS** Imports of Consumer Goods other than Grain form the DW

\[
\frac{\text{MCODWS}}{\text{MNGDWS} - \text{MUSDWS}^9} = -0.221545 + 0.634093 \cdot \frac{\text{CR} - \text{CR}_1}{(5.75)} + (2.10)
\]

\[
(0.0748)
\]

\[
+4.68463 \cdot \text{CRD} - 0.11211 \cdot \text{MGRDWS}
\]

\[
(7.29) \quad \frac{\text{CR}}{(2.01)} \quad \text{MTDW$}
\]

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(M.8) MCODWS Imports of Consumer Goods other than Grain from the DW, Continued

\[ R^2 = 0.871 \quad S.E. = 0.020 \quad DW = 1.77 \]
Sample Period 1960 - 1972

(M.9) MRMDWS Imports of Raw Materials from the DW

\[ MRMDWS = NMGDWS \quad MMADWS \quad MCOI\$ - MUSDW\$9 \]

(M.10) MGRDWS Imports of Grain from the DW

\[ 10^4 \left( \frac{MGRDWS}{FGR9\cdot GRAVE + MGRDWS_{-1}} \right) = 133.01 - 1794.959 \left( \frac{GRSTK + GRSTK_{-1}}{GRAVE \cdot GRAVE} \right) \]
\[ -106.585 \left( \frac{PGOLD9\cdot FGOLD + FSTKS - FDEBTs}{MTDW\$} \right)^{-1} \]

\[ R^2 = .663 \quad S.E. = 79.6 \quad DW = 2.04 \]
GRAVE = XGR + XGR_{-1} + XGR_{-2}
Sample Period 1961 - 1973
Revised 11/11/75 (now a behavioral eq'n)
(M.12) \[ \text{MTLDC$} \text{ Total Imports from the Less Developed Countries} \]

\[ \text{MTLDC$} = -99.3283 + 0.507074 \text{ ETLDCS} \]

\[ (1.43) \quad (2.66) \]

\[ + 1538.13 \quad \frac{\text{PRMW9} - \text{PRMW9-1}}{\text{PMAW9} - \text{PMAW9-1}} \]

\[ (3.78) \]

\[ - 136.922 \quad \text{Q67} + 0.674961 \quad \text{MTLDCS-1} \]

\[ (1.86) \quad (3.23) \]

\[ R^2 = 0.989 \quad \text{S.E.} = 67 \quad \text{D.W.} = 2.04 \]

Sample Period 1960-1973 \( D. = 0.11 \)

(M.13) \[ \text{MOSC$} \text{ Total Imports from Yugoslavia and the Far Eastern Socialist Countries (Except China)} \]

\[ \text{MOSC$} = 95.07715 + 0.46756 \quad \text{EOSC$} \]

\[ (2.50) \quad (9.33) \]

\[ R^2 = 0.888 \quad \text{S.E.} = 57 \quad \text{D.W.} = 0.76 \]

Sample Period 1961-1973

(M.14) \[ \text{MTCH$} \text{ Imports from China} \]

\[ \text{MTCH$} = -3.81454 + 1.03969 \quad \text{ETCH$} + 212.664 \quad \text{Q6164} \]

\[ (0.30) \quad (23.99) \quad (11.14) \]

(259)
(M.14) **MTCHS** Imports from China, Continued

\[ R^2 = 0.987 \quad \text{S.E.} = 31 \quad \text{D.W.} = 3.01 \]
Sample Period 1960-1972

(M.15) **MCUBAS** Imports from Cuba

\[
100. \quad \frac{\text{MCUBAS}}{\text{PSUGSU9}} = 347.80 + 5.31084 \times \text{XSUGS9} - 0.86734 \times \text{WT9} \\
(2.10) \quad (2.83) \quad (1.69)
\]

(311)

\[
- 213.32 \quad \frac{\text{PSUGW9}}{\text{PSUGSU9}} \quad (1.56)
\]

\[ R^2 = 0.519 \quad \text{S.E.} = 81 \quad \text{D.W.} = 2.81 \]
Sample Period 1960-1973

(M.16) **MTWS** Imports from the World

\[
\text{MTWS} = \text{MTDW}$ + \text{MTCM} + \text{PREX9} + \text{MTLDC}$ + \text{MOSC}$ + \text{MTCH}$ + \text{MCUBAS} + \text{MUSWS}$9
\]

(M.17) **MTW70** Imports from the World at Constant Domestic Prices

\[
\text{MTW70} = 2.00 \quad \frac{100 \times \text{MTWS}}{\text{PREX9} \times \text{PM9}}
\]
(M.18) MIEIN$ Imports from Developed West, Machinery and Equipment (less Transport Equipment)

\[
\ln \frac{100 \times \text{MIEIN$}}{\text{IIN*PAW9 -1}} = 3.16642 + 0.13621 \ln \text{FLIQ}_1
\]

(3.210)

\[
- 0.31936 Q6466 + 0.02056 \text{QSH68*QT50}
\]

(3.20) (3.10)

\[ R^2 = 0.377 \quad \text{S.E.} = 0.114 \quad \text{D.W.} = 2.16 \]

Sample Period 1961-1973

(M.19) MTM10& Machinery Imports, Total, FTN10: Metal-Working

\[
\ln \frac{100 \times \text{MTM10&}}{\text{ITMB*P71GE9 -1}} = 3.95025 + 0.24639 \ln \text{FLIQ}_1
\]

(3.936)

\[
+ 0.60787 Q70 + 0.008716 \text{QSH68*QT50}
\]

(5.98) (1.99)

\[ R^2 = 0.886 \quad \text{S.E.} = 0.091 \quad \text{D.W.} = 1.78 \]

Sample Period 1961-1972

(M.20) MTM12& Machinery Imports, Total, FTN12: Mining, Metallurgy and Petroleum

\[
\ln \frac{100 \times \text{MTM12&}}{\text{ITPP*P71GE9 -1}} = 4.38313 + 0.19781 \ln \text{FLIQ}_1
\]

(4.334)

\[
+ 0.12809 \text{QFYP}
\]

(1.40)

\[ R^2 = 0.649 \quad \text{S.E.} = 0.158 \quad \text{D.W.} = 1.35 \]

Sample Period 1961-1972
(M.21) MIECHS  Machinery Imports, West, Chemical Equipment

\[ \ln \frac{100 \cdot MIECHS}{\text{ICH*P71GE9}-1} = 4.74609 + 0.36499 \ln \text{FLIQ}_1 + 0.47258 \text{QFYP} + 0.01588 \text{QSH68*QT50} \]

\[ (4.454) \]

\[ (3.60) \]

\[ \text{D.W.} = 2.35 \]

\[ \text{Sample Period 1961-1973} \]

\[ R^2 = 0.666 \quad \text{S.E.} = 0.222 \quad \text{D.W.} = 2.35 \]
Hard Currency

(F.1) FNETHC - Hard Currency Balance of Trade

\[
FNETHC = -60.7805 + 1.21162 \text{ ENETDW} \\
\text{R}^2 = 0.945 \quad \text{S.E.} = 123 \quad \text{D.W.} = 2.12
\]
Sample Period 1960-1973

(F.2) FCREPS - Credit Repayments

\[
FCREPS = 0.73024 + 0.28217 \text{ FCDR}\$_{-1} \\
\text{R}^2 = 0.976 \quad \text{S.E.} = 28 \quad \text{D.W.} = 1.26
\]
Sample Period 1960-1973

(F.3) FDEBT$ - Outstanding Debt

\[
FDEBT$ = FDEBT$_{-1} + FCDR$9 - FCREPS$
\]
(F.4) FINT$ Interest Payments

\[
FINT$ = -4.0578 + 0.055122 \frac{FDEBT$ + FDEBT$-1}{2}
\]

\[(5.32) \quad (76.97)\]

\(R^2 = 0.998\) S.E. = 1.6 D.W. = 1.96
Sample Period 1960-1972

(F.5) FDHCS Hard Currency Inflow (Balance of Payments)

\[
FDHCS \equiv FNETHCS + FSER$9 + FCDS$9 + FGSALE$ - FINT$ - FCREP$
\]

(F.6) FSTKS Hard Currency Holdings

\[
FSTKS \equiv FSTKS-1 + FDHCS
\]

(F.7) FGSALES Gold Sales

\[
FGSALES = 263.274 - 0.14013 \frac{FNETHCS + FNETHCS-1}{2}
\]

\[(3.49) \quad (1.00)\]

\[(261)\]

\[-0.45661 (FSTKS - FGSALES) \quad (4.24)\]
(F.7) \( FGSales \) Gold Sales, Continued

\[ p^2 = 0.828 \quad \text{S.E.} = 141 \quad \text{D.W.} = 2.27 \]
Sample Period 1961-1973

(F.8) \( FGOLD \) Gold Reserves

\[ FGOLD = FGOLD_{-1} + XGOLD9 - \frac{FGSALES}{PGOLD9} \]

(F.9) \( FLIQ \) Liquidity Ratio

\[ FLIQ = \frac{FGOLD \cdot PGOLD9 - FDEBS}{MTDW} \]
G AGGREGATE IDENTITIES AND BALANCES

(G.1) GNPNA  Non-agricultural Gross National Product

\[ GNPNA = 1.76628 \times \text{TOT} + 0.59943 \times \text{CRUB} + 0.34390 \times \text{TR7R} + 0.17099 \times \text{TRADE} + 0.43808 \times \text{SER} \]
\[ \text{R}^2 = 1.156 \]

(G.2) GNPA  Agricultural Gross National Product

\[ GNPA = XAT - 11.230 \times \text{TOT} \]
\[ \text{R}^2 = 1.156 \]

(G.3) GNP  Gross National Product

\[ GNP = GNPNA + GNPA \]

(G.4) GIKREP  Capital Repair

\[ 0.17391 \times \frac{\text{GIKREP}}{\text{KSUM}} = 0.02942 - 0.00021 \times \text{T50} \]
\[ (52.21) \quad (6.48) \]

\[ \text{R}^2 = .792 \quad \text{S.E.} = 0.0004 \quad \text{D.W.} = 1.60 \]

Sample Period 1960 - 1973
(G.5) **GEUSUM**  
End-Use Sum, Excluding Foreign Trade and Consumption

\[
GEUSUM = \left\{ \frac{BAD + 6.954}{49.5} \left( BSC\&-BNAUK\& \right) \right\} / (0.65 \frac{WGS\&}{1246.8} + 0.35 \frac{PIWH70}{100})
\]

\[
+ \frac{BNAUK\&}{(0.2 \frac{WGS\&}{1246.8} + 0.8 \frac{PIWH70}{100})}
\]

\[
+ (BD\&9 - BD\&9) + 100.\frac{BD\&9}{PIWH70}
\]

\[
+ ITOTAL + I70T + I70NTA + 0.17391 \text{ GIKREP}
\]

(Administration + Science + Defense + New Investment + Inventory Change + Capital Repair)

(G.6) **GRESEM**  
End-Use Residual

\[
GRESEM = 0.03219 \text{ GNP} - 1.25214 \text{ QSH65}
\]

\[
(7.77)
\]

\[
+ 0.5092 \text{ (XAT-XATPK)}
\]

\[
(2.13)
\]

\[
R^2 = 0.634 \quad \text{S.E.} = 2.51 \quad D.W = 2.20
\]

Sample Period 1960 - 1972

Note: Actual Values for GRESEM defined by

\[
GRESEM \equiv \text{ GNP} + 0.001 \text{ (MTW70 - ETW70) - GEUSUM-CR}
\]
(G.7) \[ GSIMRES = GNP + .001 \times (MTW70 - ETW70) - GEUSUM - CR - GRESEM \]

**NOTE:** Actual values for GSIMRES are identically zero. Solution values represent the difference between "production" and "end use" determinations of GNP when consumption is not obtained by residual identity.
Appendix B

DOCUMENTATION FOR THE SRI-MEFA ECONOMETRIC MODEL OF THE SOVIET UNION

- SOVMOD III -
I. Structure and Scale:

In its fully endogenous mode, the model consists of 189 stochastic relationships (behavioral and technical) and 106 identities arranged in the sectors given below. Each sector is identified by a single letter which is then used as the initial letter in the names of all variables determined in that sector.

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<thead>
<tr>
<th>SECTOR IDENTIFIER</th>
<th>EQUATIONS</th>
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<td>Investment</td>
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<td>K</td>
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<td>Incomes</td>
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<tr>
<td>P</td>
<td>Prices</td>
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<td>Consumption</td>
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<td>Budget Revenues</td>
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<td>Budget Outlays</td>
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<td>Hard Currency</td>
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<td>G</td>
<td>Aggregate Identities &amp; Balances</td>
</tr>
</tbody>
</table>

TOTAL | 189 | 106 |
II. Simulation of SOVMOD III:

The model is encoded into a simulation program using the WEFA general model solution system SOLVEM. This program has standard facilities to convert the status of any variable from endogenous to exogenous and to apply additive adjustments to any behavioral variable. In addition it has the facility to exogenize entire BLOCKS of equations. In SOVMOD III the equations have been grouped in the following way:

<table>
<thead>
<tr>
<th>BLOCK NUMBER</th>
<th>DESCRIPTION</th>
<th>CONSISTING OF SECTORS</th>
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</thead>
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<td>Population and Employment</td>
<td>N</td>
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<tr>
<td>2 B</td>
<td>Capital Formation</td>
<td>K</td>
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<tr>
<td>3 C</td>
<td>Production, Non-Agricultural</td>
<td>X.1-X.23</td>
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<tr>
<td>4 D</td>
<td>Wages, Incomes and Prices</td>
<td>W,P</td>
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<tr>
<td>5 E</td>
<td>Investment</td>
<td>I</td>
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<tr>
<td>6 F</td>
<td>Consumption</td>
<td>C</td>
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<tr>
<td>7 G</td>
<td>State Budget</td>
<td>T,B</td>
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<tr>
<td>8 H</td>
<td>Foreign Sector</td>
<td>E,M,F</td>
</tr>
<tr>
<td>9 I</td>
<td>Aggregates</td>
<td>G</td>
</tr>
<tr>
<td>10 J</td>
<td>Material Inputs</td>
<td>U</td>
</tr>
<tr>
<td>11 K</td>
<td>Agriculture</td>
<td>A,X.1-X.6</td>
</tr>
</tbody>
</table>

Most of the simultaneity in the model occurs in Blocks 1-5 and 10-11; the other four Blocks are virtually post-recursive except for certain import equations (grain and machinery) in Block 8.

SOLVEM also has the facility to allow the user to select different alternatives of an equation or a set of equations, thus establishing different variants of the model. The alternative switches encoded in SOVMOD II are given on the following page where ZERO is the initial default option.

The coding of SOVMOD III was done by Raymond Chien. We are indebted to George Schink and Bill Brown, the developers of SOLVEM, for guidance in using it for this model.
<table>
<thead>
<tr>
<th>ALTERNATE</th>
<th>SWITC# NUMBER</th>
<th>SETTING</th>
<th>ALTERNATIVE</th>
<th>EQUATION NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISECTOR</td>
<td>0</td>
<td>Non-agricultural investment by adding components.</td>
<td>I.1a-6a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Non-agricultural investment by direct function (components by exogenous ratios).</td>
<td>I.1b-6b</td>
<td></td>
</tr>
<tr>
<td>IBRANCH</td>
<td>0</td>
<td>Industrial branch investment by direct function.</td>
<td>I.10a-1.20a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Industrial branch investment determined from aggregate level by exogenous shares.</td>
<td>I.10b-1.20b</td>
<td></td>
</tr>
<tr>
<td>PROFIT</td>
<td>0</td>
<td>Gross profits, non-residual.</td>
<td>Z.9a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Gross profits, residual income.</td>
<td>Z.9b</td>
<td></td>
</tr>
<tr>
<td>CTOTAL</td>
<td>0</td>
<td>Total consumption by adding components.</td>
<td>C.1a, C.6a or C.6b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Total consumption by direct function.</td>
<td>C.1b, C.6b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Total consumption by residual function.</td>
<td>C.1c, C.6b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Consumption components by direct functions.</td>
<td>C.2a-C.5a</td>
<td></td>
</tr>
<tr>
<td>CSHARE</td>
<td>1</td>
<td>Consumption components by share functions.</td>
<td>C.2b-C.5b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Output determination of services and share determination of non-services components.</td>
<td>C.2c-C.5c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Industrial output, aggregation identity.</td>
<td>X.19a</td>
<td></td>
</tr>
<tr>
<td>XIND</td>
<td>1</td>
<td>Industrial output, no foreign capital stock.</td>
<td>X.19b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Industrial output, foreign and domestic capital stocks.</td>
<td>X.19c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Direct production functions for industrial branches using only primary inputs.</td>
<td>X.7a-X.18a</td>
<td></td>
</tr>
<tr>
<td>XFACT</td>
<td>1</td>
<td>Production functions using exogenous material input series from I-O data.</td>
<td>X.7b-X.18b</td>
<td></td>
</tr>
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</table>
### ALTERNATE

<table>
<thead>
<tr>
<th>SWITCH NUMBER</th>
<th>SETTING</th>
<th>ALTERNATIVE</th>
<th>EQUATION NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>XFACT(con't) 2</td>
<td>Same production functions as ONE with material inputs determined endogenously with exogenous B matrix.</td>
<td></td>
<td>X.7b-X.18b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same production functions as ONE with material inputs given endogenously using B matrix determined by Hickman-Lau system.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Except in the form in which total consumption is residually determined (Alt. 4=TW0), GNP is determined both from the side of production (eq. G.3) and from the side of use (by adding components). The difference is a simulation residual defined in equation G.7.

### III. Variables:

Variables in the model are contained in the attached alphabetical list; there are 295 endogenous and 164 exogenous variables. The following naming conventions have been employed. The reader is urged to study these conventions prior to consulting the equations of the model as an understanding of them will greatly facilitate that process.

*There are six additional variables presently in SOVMOD III which are vestiges of SOVMOD II and are inoperative in the new model.*
<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>CONVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Symbol</strong></td>
<td></td>
</tr>
<tr>
<td>Sector Symbols</td>
<td>Sector of model (see above list) in which endogenous variable is determined.</td>
</tr>
<tr>
<td>Q</td>
<td>Dummy or time trend variables (figures following generally denote year(s), e.g., Q65 is a dummy variable for 1965).</td>
</tr>
<tr>
<td><strong>Final Symbol</strong></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Exogenous variable other than Q-type.</td>
</tr>
<tr>
<td><strong>Embedded or Trailing Symbols</strong></td>
<td></td>
</tr>
<tr>
<td>Industries</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Industry</td>
</tr>
<tr>
<td>C</td>
<td>Construction</td>
</tr>
<tr>
<td>T</td>
<td>Transport and Communication</td>
</tr>
<tr>
<td>S</td>
<td>Domestic Trade</td>
</tr>
<tr>
<td>G</td>
<td>Government and Services</td>
</tr>
<tr>
<td>A</td>
<td>Agriculture</td>
</tr>
<tr>
<td>Industrial Branches</td>
<td></td>
</tr>
<tr>
<td>EP</td>
<td>Electro Energy</td>
</tr>
<tr>
<td>CP</td>
<td>Coal Products</td>
</tr>
<tr>
<td>PP</td>
<td>Petroleum Products</td>
</tr>
<tr>
<td>FM</td>
<td>Ferrous Metallurgy</td>
</tr>
<tr>
<td>NF</td>
<td>Nonferrous Metallurgy</td>
</tr>
<tr>
<td>CH</td>
<td>Chemicals and Petrochemicals</td>
</tr>
<tr>
<td>FP</td>
<td>Forest Products</td>
</tr>
<tr>
<td>PA</td>
<td>Paper and Pulp</td>
</tr>
<tr>
<td>CM</td>
<td>Construction Materials</td>
</tr>
<tr>
<td>MB</td>
<td>Machine-Building and Metal-Working</td>
</tr>
<tr>
<td>SG</td>
<td>Soft Goods</td>
</tr>
<tr>
<td>PF</td>
<td>Processed Foods</td>
</tr>
<tr>
<td>NC</td>
<td>Not-Classified Elsewhere (Residual)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>Current ruble value (always used)</td>
</tr>
<tr>
<td>$</td>
<td>Current dollar value (always used)</td>
</tr>
<tr>
<td>70</td>
<td>1970 Ruble basis (not always used)</td>
</tr>
</tbody>
</table>

**NOTE:** A variable is exogenous if and only if its name ends in 9 or begins with Q.
Data file management programs developed at WEFA were used to construct maintain and utilize a databank for the model. The structure of the list of variables is largely self-explanatory. The set of model variables is a subset of the complete Soviet data-bank.

IV. Technical Progress Feature:

SOVMOD III has been coded so that the analyst may vary the rate of Hicks-neutral technical progress by sector and branch in a convenient way. The period desired for the variation is defined by setting the exogenous variable QLIM equal to 1 for those years. The magnitude of the variation in technical progress is set by changing the following model coefficients:

<table>
<thead>
<tr>
<th>BRANCH</th>
<th>TECHNICAL PROGRESS VARIATION COEFFICIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate Industry</td>
<td>1000</td>
</tr>
<tr>
<td>EP</td>
<td>878</td>
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<tr>
<td>CP</td>
<td>876</td>
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<tr>
<td>PP</td>
<td>877</td>
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<td>FM</td>
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<tr>
<td>NF</td>
<td>880</td>
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<td>CH</td>
<td>882</td>
</tr>
<tr>
<td>MB</td>
<td>883</td>
</tr>
<tr>
<td>FP</td>
<td>884</td>
</tr>
<tr>
<td>PA</td>
<td>887</td>
</tr>
<tr>
<td>CM</td>
<td>881</td>
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<tr>
<td>SG</td>
<td>885</td>
</tr>
<tr>
<td>PF</td>
<td>886</td>
</tr>
<tr>
<td>Construction</td>
<td>1002</td>
</tr>
<tr>
<td>Transport/Communications</td>
<td>1003</td>
</tr>
<tr>
<td>Domestic Trade</td>
<td>1004</td>
</tr>
<tr>
<td>Services</td>
<td>1005</td>
</tr>
<tr>
<td>Total Agriculture</td>
<td>1006</td>
</tr>
<tr>
<td>Total Crops</td>
<td>1007</td>
</tr>
<tr>
<td>Animal Products</td>
<td>1008</td>
</tr>
<tr>
<td>Meat</td>
<td>1009</td>
</tr>
<tr>
<td>Grain (official)</td>
<td>1010</td>
</tr>
<tr>
<td>Grain (Western)</td>
<td>1011</td>
</tr>
</tbody>
</table>

*We are indebted to Virginia Long for assistance in setting up these programs for our purposes. The present SOVMOD Databank has evolved through several generations of software under the patient guidance of Betsy Donovan.
If, for example, the analyst wishes to augment the rate of Hicks-neutral technical progress in machine-building and metal-working by 2% over the forecast period 1976-1980, he should set QLIM=1 for 1976-1980 by exogenous assumption and set C(883) = .02. Such an adjustment may be made in the downward direction as well by setting C(883) = -.02.

V. Equations:

Equations are arranged by sector in the sector-order given above. Behavioral equations are written in the form used for estimation with the sample mean value of the dependent variable shown in parentheses beneath it. In some cases auxiliary variables have been defined below the equation in which they appear. Such auxiliary variables serve only this presentation purpose and do not have model variable numbers.

Figures in parentheses under coefficients are t-statistics; absence thereof implies extraneous estimate. $R^2$ is the multiple correlation coefficient (unadjusted for degrees of freedom); S.E. is the standard error of estimate and D.W. the Durbin-Watson statistic; D is the normal variate devised by Durbin to test for first order serial correlation in the presence of a lagged dependent variable.

Final questions were estimable by ordinary least squares using T.S.P. (Time Series Processor).‡/

*\ In the estimation of SOVMOD III, valuable research assistance was provided by Raymond Chiên and Tayyeb Shabbir.

‡/We are indebted to Jean-Pierre LeMaitre, Douglas Bracy and Colin Wordley for assistance in adapting this program to our data files.
<table>
<thead>
<tr>
<th>SERIES LABEL</th>
<th>VARIOUS DESCRIPTION</th>
<th>UNITS</th>
<th>SOURCE</th>
<th>PRECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A31.XX00</td>
<td>VALUE OF MEAT FEED TO LIVESTOCK, 1970 PRICES</td>
<td>M1970 KUBLES</td>
<td>SATURN</td>
<td>5</td>
</tr>
<tr>
<td>A32.XX00</td>
<td>VALUE OF PROLIFIC MEAT FEED TO LIVESTOCK, 1970 PRICES</td>
<td>M1970 KUBLES</td>
<td>SATURN</td>
<td>5</td>
</tr>
<tr>
<td>A33.XX00</td>
<td>VALUE OF MEAT FEED TO GRASS</td>
<td>M1970 KUBLES</td>
<td>SATURN</td>
<td>5</td>
</tr>
<tr>
<td>D40.XX00</td>
<td>STATE BUDGET EXPENDITURES, ADMINISTRATION</td>
<td>M1970 KUBLES</td>
<td>SATURN</td>
<td>5</td>
</tr>
<tr>
<td>D40.XX00</td>
<td>INDEX OF ADMINISTRATION &amp; MISC, SERVICES (EST, PRICES)</td>
<td>1970.00</td>
<td>COMMTS</td>
<td>5</td>
</tr>
<tr>
<td>D41.XX00</td>
<td>STATE BUDGET EXPENDITURES, DEFENSE</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D42.XX00</td>
<td>DEFENSE NONPENSIONS EXPENDITURES IN CURRENT PRICES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D43.XX00</td>
<td>DEFENSE PAY EXPENDITURES IN CURRENT PRICES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D44.XX00</td>
<td>EXPENDITURES IN STATE RESERVES, MILITARY PROCUREMENT ESTIMATE</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D45.XX00</td>
<td>DEFENSE AND STATE RESERVES, CURRENT KUBLES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D46.XX00</td>
<td>DEFENSE AND STATE RESERVES, 1970 KUBLES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D47.XX00</td>
<td>STATE BUDGET EXPENDITURES, FINANCING THE NATIONAL ECONOMY, TOTAL</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D48.XX00</td>
<td>INDEX OF RESEARCH AND DEVELOPMENT (EST, PRICES)</td>
<td>1970.00</td>
<td>COMMTS</td>
<td>5</td>
</tr>
<tr>
<td>D49.XX00</td>
<td>STATE BUDGET EXPENDITURES, SOCIAL AND CULTURAL MEASURES INCL.</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D50.XX00</td>
<td>STATE BUDGET EXPENDITURES, OTHER GOVERNMENTAL SERVICES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D51.XX00</td>
<td>TOTAL CONSUMPTION, 1970 EST, PRICES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D52.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY I COMMODITIES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D53.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY II COMMODITIES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D54.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY III AND IV</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
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<tr>
<td>D55.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY II</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D56.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY III</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D57.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA CATEGORY IV</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D58.XX00</td>
<td>TOTAL EXPENDITURES TO CHEA</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>D59.XX00</td>
<td>TOTAL EXPENDITURES TO THE WORLD</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>E10.XX00</td>
<td>SPECIFIC EXPORTS TO CHEA</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>E11.XX00</td>
<td>SPECIFIC EXPORTS TO THE WORLD</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>E12.XX00</td>
<td>EXPORTS OF CREDIT IN FOREIGN CURRENCIES</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
<tr>
<td>E13.XX00</td>
<td>EXPORTS OF CREDIT IN HAND CURRENCY</td>
<td>M1970 KUBLES</td>
<td>CHINMTS</td>
<td>5</td>
</tr>
</tbody>
</table>
SERIES LABEL | VARIABLE DESCRIPTION | UNITS | SOURCE | PRECISION
---|---|---|---|---
POLITS | OUTSTANDING DEBT AT END OF YEAR | M$US | G975 | 3
RHUE | HARD CURRENCY BALANCE OF FOREIGN EXCHANGE ACCOUNT, IN millions | M$US | G975 | 3
GOLD | GOLD RESERVES AT END OF YEAR | M$US | G975 | 3
PCXEL | GOLD SALES | M$US | G975 | 3
FLO | INTEREST PAYMENTS IN CURRENCY | M$US | G975 | 3
FENEX | HARD CURRENCY LIQUIDITY (GOLD/GOLD+FOREIGNS)/M$US | M$US | G975 | 3
FISNEX | CURRENCY BALANCE OF PAYMENTS | M$US | G975 | 3
AT5 | ACCUMULATED HG HOLDINGS SINCE 1959 | M$US | G975 | 3
STHOM | ENDUSE SUM (EXCLUDING CONSUMPTION, NET EXPORTS | M$US | G975 | 3
GSP | SOVIET NET MATERIAL PRODUCT, EST. PRICE 1970 | M$US | G975 | 3
GOLP | AGRICULTURAL GDP, NET OUTPUT LESS CURRENT PURCHASES | M$US | G975 | 3
ICEX | GDP OF CHINA | INR | NAK91 | 3
GPOEM | GNP OF CHINA, EXPONENTIAL INDEX | INR | NAK91 | 3
GPM3 | GNP ENDUSE RESIDUAL & GNP-GPCESSUS-CX70-A01(CX70-M170) | INR | NAK91 | 3
GSP | SERIES TO USE AS ACTUAL VALUES FOR SIMULATION RESIDUAL | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
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ICEXH | CAPITAL INVESTMENT IN AGRICULTURE 79% | INR | NAK91 | 3
<table>
<thead>
<tr>
<th>SERIES LABEL</th>
<th>VARP DESCRIPTION</th>
<th>UNITS</th>
<th>SOURCE</th>
<th>PRECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRESH</td>
<td>BRANCH INVESTMENT SHARE: NON-FERROUS (RESIDUAL SHARE)</td>
<td>NUNH</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>IRESO</td>
<td>BRANCH INVESTMENT SHARE: PROCESSED GOODS</td>
<td>NUNH</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>ISREA</td>
<td>BRANCH INVESTMENT SHARE: PETROLEUM PRODUCTS</td>
<td>NUNH</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>ISREO</td>
<td>BRANCH INVESTMENT SHARE: SOFT GOODS</td>
<td>NUNH</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>ISEH</td>
<td>CAPITAL INVESTMENT: SERVICES</td>
<td>B RUB</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>ISH</td>
<td>TOTAL ACCUMULATION FUND: FIXED CAPITAL, INVENT., LIVESTOCK</td>
<td>B,1970R</td>
<td>NNM,GIN,LEN-TRAN</td>
<td>3</td>
</tr>
<tr>
<td>ISTONTA</td>
<td>INVENTORY STOCK, END YEAR, NON-TRADE, NON-AGRI, 1970 PRICES</td>
<td>B,197</td>
<td>TRAN</td>
<td>3</td>
</tr>
<tr>
<td>ISTOT</td>
<td>INVENTORY STOCK, END YEAR, DOMESTIC TRADE, 1970 PRICES</td>
<td>B,197</td>
<td>TRAN</td>
<td>3</td>
</tr>
<tr>
<td>IT</td>
<td>INVESTMENT, NATIONAL ECONOMY</td>
<td>B RUB</td>
<td>NNM-TRA</td>
<td>3</td>
</tr>
<tr>
<td>ITIM</td>
<td>CAPITAL INVESTMENT: TRANSPORT &amp; COMMUNICATIONS</td>
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**SOURCE:** M. C. H. MARKUZ

**PRECISION:**
- 1: One decimal place
- 2: Two decimal places
- 3: Three decimal places
- 4: Four decimal places

**UNITS:**
- DG: Dollars
- DM: Deutsch Mark
- TR: Trillion
- X: Exponential notation
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**SOURCE:**
- NKMOZ: National Income and Product Accounts
- NARHIZ: National Accounts Research Institute Zvezda
- VSIEMP: Wages, Salaries, and Employment
- GERTS: Global Economic Research Team
- INTEMP: International Economic Research Team

**PRECISION:**
- 1: Exact
- 3: Estimated
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<td>M TUNS</td>
<td>MARKHO</td>
<td>3</td>
</tr>
<tr>
<td>XKGM4</td>
<td>293 GRAIN PRODUCTION IN THE EUROPEAN CMEA</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XKGLC9</td>
<td>293 GRAIN PRODUCTION IN THE LDCS</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XKGM2</td>
<td>295 SECOND PEAK GRAIN OUTPUT</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XKGM1</td>
<td>296 NORMAL GRAIN OUTPUT</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGM1</td>
<td>296 SOVIET GRAIN PRODUCTION, GROSS GRAIN AGGREGATE</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMY4</td>
<td>300 GRAIN PRODUCTION IN WESTERN EUROPE</td>
<td>M TUNS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYA</td>
<td>357 INDEX OF AGRICULTURE/FORESTRY GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYC</td>
<td>356 INDEX OF CONSTRUCTION GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYD</td>
<td>355 INDEX OF CHEMICALS AND PETROCHEMICALS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYE</td>
<td>354 INDEX OF MINING MANUFACTURING GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYF</td>
<td>353 INDEX OF TRANSPORT/COMMUNICATIONS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYG</td>
<td>352 INDEX OF AGRICULTURE/FORESTRY GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYH</td>
<td>351 INDEX OF CONSTRUCTION GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYI</td>
<td>350 INDEX OF CHEMICALS AND PETROCHEMICALS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYJ</td>
<td>349 INDEX OF MINING MANUFACTURING GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYK</td>
<td>348 INDEX OF TRANSPORT/COMMUNICATIONS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYL</td>
<td>347 INDEX OF AGRICULTURE/FORESTRY GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYM</td>
<td>346 INDEX OF CONSTRUCTION GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYN</td>
<td>345 INDEX OF CHEMICALS AND PETROCHEMICALS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYO</td>
<td>344 INDEX OF MINING MANUFACTURING GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYP</td>
<td>343 INDEX OF TRANSPORT/COMMUNICATIONS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYQ</td>
<td>342 INDEX OF AGRICULTURE/FORESTRY GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYR</td>
<td>341 INDEX OF CONSTRUCTION GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYS</td>
<td>340 INDEX OF CHEMICALS AND PETROCHEMICALS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYT</td>
<td>339 INDEX OF MINING MANUFACTURING GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYU</td>
<td>338 INDEX OF TRANSPORT/COMMUNICATIONS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYV</td>
<td>337 INDEX OF AGRICULTURE/FORESTRY GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYW</td>
<td>336 INDEX OF CONSTRUCTION GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
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<tr>
<td>XGMYX</td>
<td>335 INDEX OF CHEMICALS AND PETROCHEMICALS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYY</td>
<td>334 INDEX OF MINING MANUFACTURING GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>XGMYZ</td>
<td>333 INDEX OF TRANSPORT/COMMUNICATIONS GVD IN CURRENT PRICES</td>
<td>TONS</td>
<td>DIA MOND</td>
<td>3</td>
</tr>
<tr>
<td>SERIES LABEL</td>
<td>VAR DESCRIPTION</td>
<td>UNITS</td>
<td>SOURCE</td>
<td>PRECISION</td>
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<tr>
<td>--------------</td>
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<td>-------</td>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td>XT12N</td>
<td>91 TRANS-COMM INDEX, 1970 HEIGHTS, RUBLE SERIES FOR COMM</td>
<td>1970x100</td>
<td>0-6</td>
<td>5</td>
</tr>
<tr>
<td>YMHEA</td>
<td>192 NET MATERIAL PRODUCT IN CONSTANT PRICES, EMEA</td>
<td>1963x10</td>
<td>UNCTAD</td>
<td>5</td>
</tr>
<tr>
<td>ZO05</td>
<td>110 TOTAL AMORTIZATION FUNDS, NATIONAL ECONOMY</td>
<td>B,CUR,W</td>
<td>NAM</td>
<td>0</td>
</tr>
<tr>
<td>ZO05</td>
<td>116 REAL DISPOSABLE HOUSEHOLD INCOME</td>
<td>B,1940 RUBLES</td>
<td>TRAN</td>
<td>3</td>
</tr>
<tr>
<td>ZFPO4</td>
<td>119 PLANNED GROSS PROFITS, NATIONAL ECONOMY</td>
<td>B,1940 RUBLES</td>
<td>MAVDA</td>
<td>0</td>
</tr>
<tr>
<td>ZO05</td>
<td>111 GROSS EARNINGS, MAN AND SALARY WORKERS</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI630</td>
<td>115 AGRICULTURAL INCOME IN KIND</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI630</td>
<td>117 MILITARY PAY AND ALLOWANCES</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZIEC1</td>
<td>118 PROFITS DISTRIBUTED TO COOPERATIVE MEMBERS</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZIEC1</td>
<td>119 RESIDUAL INCOME + SOVMOD II</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI33A</td>
<td>113 NET HOUSEHOLD INCOME FROM AGRICULTURAL SALES</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI33A</td>
<td>114 DISPOSABLE HOUSEHOLD MONEY INCOME</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI33A</td>
<td>115 GROSS HOUSEHOLD MONEY INCOME</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
<tr>
<td>ZI33A</td>
<td>116 MAGE PAYMENTS TO COLLECTIVE FARM MEMBERS</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
<td>3</td>
</tr>
</tbody>
</table>
N. POPULATION AND EMPLOYMENT

(N.1) NPOPU Urban Population

\[
\frac{100 \cdot \text{NPOPU}}{\text{NPOP9}} = -91.8791 + 38.8772 \text{QLT28} \\
(13.73) \quad (23.50)
\]

\[
+ 2.44336 \left( \frac{\text{IHS}}{\text{IHS}_{-1}} \right)^{2} \\
(2.59) \quad (1.1)_{-2}
\]

\[
+ 2.08339 \left( \frac{\text{W1*/(WAK* + 1000. ZSAG*/NAKOL)}}{\text{IHS}} \right)^{2} \\
(5.82)
\]

\[
- 3.67684 \left( \frac{\text{XAG70}}{\text{XAGS70}} - 1 \right)^{2} \\
(2.39) \quad (1.0)_{-2} \quad \text{XAG270}_{-2}^{2}/2.
\]

\[
\text{R}^2 = 0.998 \\
\text{S.E.} = 0.17 \\
\text{D.W.} = 1.85
\]

Sample Period 1960-1974

(N.2) NPOP R Rural Population

\[
\text{NPOP} = \text{NPOP9} - \text{NPOPU}
\]

(N.3) NMNA Nonagricultural Employment

\[
\frac{0.1 \cdot \text{NMNA}}{(\text{NPOP}_{-1} + \text{NPOPU})/2} = 23.11108 \text{QLT28} (1 - \text{Q69ON}) \\
(12.27) \\
(56.32)
\]

\[
+ 87.085 \text{Q69ON} + 18.17 \text{NPAB9*NPAB9} \\
(13.01) \quad (1.31)
\]

\[
+ 8.79513 \left( \frac{\text{W1*/PRC}}{\text{W1*/PRC}_{-1}} \right) \\
(1.41) \quad (1.41)
\]
(N.3) NMNA Nonagricultural Employment, Continued

\[ -45.94724 \left\{ \frac{(NPOP_U + NPOP_U_{-1}) + (NPOP_U_{-1} + NPOP_U_{-2})}{(NPOP_U_{-1} + NPOP_U_{-2}) + (NPOP_U_{-2} + NPOP_U_{-3})} \right\} \]

\[ R^2 = 0.994 \quad S.E. = 0.24 \quad D.W. = 1.46 \]
Sample Period 1959-1974

(N.4) NMI Industrial Employment

\[ \frac{100 \cdot NMI}{(NMNA)} = 0.87296 \left( \frac{100 \cdot NMI}{NMNA} \right) - 0.04442 \left( \frac{100 \cdot NMC}{NMNA} \right) \]

\[ + 0.37857 \left( \frac{100 \cdot NMTC}{NMNA} \right) \]

\[ - 1.98480 \left( \frac{100 \cdot NMS}{NMNA} \right) + 0.70431 \left( \frac{100 \cdot NMG}{NMNA} \right) \]

\[ - 1.78871 \left( \frac{INA}{INA - 1} \right) \]

\[ R^2 = 0.997 \quad S.E. = 0.097 \quad D.W. = 2.08 \]
Sample Period 1957-1974

(N.5) NMC Construction Employment

\[ \frac{100 \cdot NMC}{NMNA} = 0.09038 \left( \frac{100 \cdot NMI}{NMNA} \right) + 0.73745 \left( \frac{100 \cdot NMC}{NMNA} \right) \]

\[ - 0.19102 \left( \frac{100 \cdot NMTC}{NMNA} \right) + 1.63650 \left( \frac{100 \cdot NMS}{NMNA} \right) \]

\[ - 0.50138 \left( \frac{100 \cdot NMG}{NMNA} \right) + 3.21306 \left( \frac{INA}{INA - 1} \right) \]

\[ 151 \]
(N.5) NMC Construction Employment (Continued)

\[ R^2 = 0.909 \quad S.E. = 0.138 \quad D.W. = 2.21 \]

Sample Period 1957-1974

D. = 0.57

(N.6) NMTC Transport and Communications Employment

\[
\frac{100 \text{ NMTC}}{\text{NMNA}} = 0.02306 \left( \frac{100 \text{ NMI}}{\text{NMNA}} \right) - 1 + 0.03637 \left( \frac{100 \text{ NMC}}{\text{NMNA}} \right) - 1
\]

\[ (12.045) \]

\[
+ 0.90413 \left( \frac{100 \text{ NMTC}}{\text{NMNA}} \right) - 1 + 1.01435 \left( \frac{100 \text{ NMS}}{\text{NMNA}} \right) - 1
\]

\[ (10.50) \quad (3.15) \]

\[
- 0.35525 \left( \frac{100 \text{ NMG}}{\text{NMNA}} \right) - 1 + 1.03789 \left( \frac{\text{INA}}{\text{INA}} \right) - 1
\]

\[ (3.39) \quad (2.32) \]

\[ R^2 = 0.989 \quad S.E. = 0.060 \quad D.W. = 2.01 \]

Sample Period 1957-1974

D. = 0.02

(N.7) NMS Domestic Trade Employment

\[
\frac{100 \text{ NMS}}{\text{NMNA}} = 0.03509 \left( \frac{100 \text{ NMI}}{\text{NMNA}} \right) - 1 + 0.07217 \left( \frac{100 \text{ NMC}}{\text{NMNA}} \right) - 1
\]

\[ (8.937) \]

\[
- 0.13088 \left( \frac{100 \text{ NMTC}}{\text{NMNA}} \right) - 1 + 0.74102 \left( \frac{100 \text{ NMS}}{\text{NMNA}} \right) - 1
\]

\[ (2.24) \quad (3.40) \]

\[
+ 0.06892 \left( \frac{100 \text{ NMG}}{\text{NMNA}} \right) - 1 - 0.69642 \left( \frac{\text{INA}}{\text{INA}} \right) - 1
\]

\[ (0.97) \quad (2.30) \]

\[ R^2 = 0.993 \quad S.E. = 0.041 \quad D.W. = 1.61 \]

Sample Period 1957-1974

D. = 2.19
(N.8) **NMG Services Employment**

\[
\frac{100 \cdot \text{NMG}}{\text{NMA}} = 0.00386 \left( \frac{100 \cdot \text{NMI}}{\text{NMA}} \right)_{-1} + 0.12899 \left( \frac{100 \cdot \text{NMC}}{\text{NMA}} \right)_{-1}
\]

(26.370)

\[-0.01908 \left( \frac{100 \cdot \text{NMTC}}{\text{NMA}} \right)_{-1} - 0.22907 \left( \frac{100 \cdot \text{NMS}}{\text{NMA}} \right)_{-1}
\]

(0.20) (0.65)

\[+ 1.04081 \left( \frac{100 \cdot \text{NMG}}{\text{NMA}} \right)_{-1} - 2.44017 \left( \frac{\text{INA}}{\text{INA}} \right)_{-1}
\]

(9.10) (5.00)

\[R^2 = 0.998 \quad \text{S.E.} = 0.066 \quad \text{D.W.} = 2.74 \]

Sample Period 1957-1974

(N.9) **NMF Forestry Employment**

\[
\frac{100 \cdot \text{NMF}}{\text{NMA}} = 0.00904 \left( \frac{100 \cdot \text{NMI}}{\text{NMA}} \right)_{-1} - 0.06383 \left( \frac{100 \cdot \text{NMC}}{\text{NMA}} \right)_{-1}
\]

(0.600)

\[+ 0.09507 \left( \frac{100 \cdot \text{NMTC}}{\text{NMA}} \right)_{-1} + 0.22944 \left( \frac{100 \cdot \text{NMS}}{\text{NMA}} \right)_{-1}
\]

(3.06) (1.97)

\[-0.08646 \left( \frac{100 \cdot \text{NMG}}{\text{NMA}} \right)_{-1} + 0.16292 \left( \frac{\text{INA}}{\text{INA}} \right)_{-1}
\]

(2.28) (1.01)

\[R^2 = 0.949 \quad \text{S.E.} = 0.022 \quad \text{D.W.} = 1.17 \]

Sample Period 1957-1974
(N.10) NMO Other Branch Employment

\[
\frac{100 \cdot \text{NMO}}{\text{NMNA}} = -0.02437 \left( \frac{100 \cdot \text{NMI}}{\text{NMNA}} \right) + 0.24879 \left( \frac{100 \cdot \text{NMC}}{\text{NMNA}} \right) -1
\]

(0.53) \quad (2.26) \quad (1.027)

\[
-0.23239 \left( \frac{100 \cdot \text{NMTC}}{\text{NMNA}} \right) - 1.49635 \left( \frac{100 \cdot \text{NMS}}{\text{NMNA}} \right) -1
\]

(1.56) \quad (2.70)

\[
+ 0.58977 \left( \frac{100 \cdot \text{NMG}}{\text{NMNA}} \right) - 1.00696 \left( \frac{\text{INA}}{\text{INA}} \right) -1
\]

(3.25) \quad (1.30)

R^2 = 0.906 \quad \text{S.E.} = 0.104 \quad \text{D.W.} = 1.19

Sample Period 1957-1974

(N.11) NASOV Annual Employment, State Farms

\[
\frac{200 \cdot \text{NASOV}}{\text{NPOPR+NPORP}} = -30.91035 + 10.59870 \text{QLT28}
\]

NPOPR+NPORP -1 \quad (17.01) \quad (21.38)

(7.880)

\[
-3.01564 \left( \frac{\text{XAGT70}}{\text{XAGTN}} \right) -1 \quad + \quad \frac{\text{XAGT70}}{\text{XAGTN}} -2 \right) -2) / 2.
\]

(2.21) \quad (2.21)

R^2 = 0.970 \quad \text{S.E.} = 0.256 \quad \text{D.W.} = 1.70

Sample Period = 1958-1974

(N.12) NAKOL Annual Employment, Collective Farms

\[
\frac{200 \cdot \text{NAKOL}}{\text{NPOPR+NPORP}} = 15.23652 - 19.17145 \text{QSH72} -1 \quad (\text{QLT28}-3.807)
\]

NPOPR+NPORP -1 \quad (65.62) \quad (11.74)

(17.825)

\[
-0.55980 \text{QSH65} + 4.29917 \left( \frac{\text{XAGT70}}{\text{XAGTN}} \right) -1.
\]

(1.15) \quad (1.47)

\[
+ 8.61402 \left( \frac{\text{XAGT70}}{\text{XAGTN}} \right) -1 \quad + \quad \frac{\text{XAGT70}}{\text{XAGTN}} -2 \right) -2) / 2.
\]

(2.74) \quad (2.74)
(N.12) NAKOL Annual Employment, Collective Farms (Continued)

\[ R^2 = 0.948 \quad S.E. = 0.585 \quad D.W. = 1.10 \]
Sample Period 1958-1974

(N.13) NAPRV Annual Employment, Private Agriculture

\[
200\text{.NAPRV} = 10.71520 - 2.18579 \text{QSH72}_{-1} + (QLT28-3.807) \\
\text{NPOPR} + \text{NPOPR} - 1 \quad (161.35) \quad (4.67) \\
10.684
\]

\[
- 0.98828 \text{QSH65} + 1.55859 \left( \frac{\text{XAGT70}}{\text{XAGTN}} - 1 \right) \\
7.08 \quad 1.86
\]

\[ R^2 = 0.887 \quad S.E. = 0.168 \quad D.W. = 1.63 \]
Sample Period 1958-1974

(N.14) NASK Annual Employment, State and Collective Farms

NASK = NASOV + NAKOL

(N.15) NAT Total Agricultural Employment

NAT = NASK + NAPRV

(N.16) NMIEP Employment, Electroenergy

\[
\frac{100\text{.NMIEP}}{\text{NMI}} = -10.09184 + 0.04427 \left( \frac{100\text{.NMIMB}}{\text{NMI}} - 1 \right) \\
2.83 \quad 1.14
\]

\[
+ 1.08600 \left( \frac{100\text{.NMIFM}}{\text{NMI}} - 1 \right) + 0.02812 \left( \frac{100\text{.NMICM}}{\text{NMI}} - 1 \right) \\
5.18 \quad 0.53
\]

\[
+ 0.58897 \left( \frac{100\text{.NMIPP}}{\text{NMI}} - 1 \right) - 0.10171 \left( \frac{\text{INA}}{\text{INA}} - 1 \right) \\
1.15 \quad 0.29
\]

\[ + 1.35418 \text{QLT28} \]

1.23 155
(N.16) NMIEP Employment, Electroenergy (Continued)

\[ R^2 = 0.974 \quad \text{S.E.} = 0.034 \quad \text{D.W.} = 2.02 \]
Sample Period 1957-1974

(N.17) NMICP Employment, Coal Products

\[
\frac{100.\text{NMICP}}{\text{NMI}} = 24.65546 + 0.06046 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right) \]
\[
+ 0.06757 \left( \frac{100.\text{NMIFM}}{\text{NMI}} \right) + 0.024710 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right) \]
\[
+ 3.19908 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right) + 1.82804 \left( \frac{\text{INA}}{\text{INA}_1} \right) \]
\[
- 7.06813 \text{ QLT28} \]
\[
(3.73) \quad (0.84) \quad (0.17) \quad (0.25) \quad (3.37) \quad (2.83) \]
\[ R^2 = 0.997 \quad \text{S.E.} = 0.063 \quad \text{D.W.} = 2.31 \]
Sample Period 1957-1974

(N.18) NMIPP Employment, Petroleum Products

\[
\frac{100.\text{NMIPP}}{\text{NMI}} = 1.48911 + 0.01470 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right) \]
\[
+ 0.01194 \left( \frac{100.\text{NMIFM}}{\text{NMI}} \right) - 0.00157 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right) \]
\[
+ 0.24956 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right) + 0.29014 \left( \frac{\text{INA}}{\text{INA}_1} \right) \]
\[
- 0.39523 \text{ QLT28} \]
\[
(1.39) \quad (1.26) \quad (0.19) \quad (0.10) \quad (1.62) \quad (2.77) \]
\[ R^2 = 0.926 \quad \text{S.E.} = 0.010 \quad \text{D.W.} = 2.94 \]
Sample Period 1957-1974
(N.19) **NMIFM Employment, Ferrous Metallurgy**

\[
\frac{100\text{.NMIFM}}{\text{NMI}} = 2.27949 + 0.01082 \left( \frac{100\text{.NMIMB}}{\text{NMI}} \right)_{-1} \\
(0.81) \quad (0.35) \\
(4.426)
\]

\[
+ 0.84345 \left( \frac{100\text{.NMIFM}}{\text{NMI}} \right)_{-1} - 0.38480 \left( \frac{100\text{.NMIFP}}{\text{NMI}} \right)_{-1} - 0.55554 \text{QLT28} \\
(5.11) \quad (0.95) \quad (0.64)
\]

\[R^2 = 0.986 \quad \text{S.E.} = 0.027 \quad \text{D.W.} = 2.01 \]

Sample Period 1957-1974

(N.20) **NMINF Employment, Non Ferrous Metallurgy**

\[
\frac{100\text{.NMINF}}{\text{NMI}} = 13.55024 + 0.09415 \left( \frac{100\text{.NMIMB}}{\text{NMI}} \right)_{-1} \\
(8.42) \quad (5.37) \\
(2.545)
\]

\[- 0.14900 \left( \frac{100\text{.NMIFM}}{\text{NMI}} \right)_{-1} - 0.51352 \left( \frac{100\text{.NMIFP}}{\text{NMI}} \right)_{-1} - 3.62895 \text{QLT28} \\
(1.58) \quad (2.22) \quad (7.31)
\]

\[R^2 = 0.994 \quad \text{S.E.} = 0.015 \quad \text{D.W.} = 1.69 \]

Sample Period 1957-1974
(N.21) **NMICH** Employment, Chemical and Petrochemical

\[
\frac{100.\text{NMICH}}{\text{NMI}} = -24.48975 + 0.07709 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right) -1
\]

(4.367)

\[+ 2.16354 \left( \frac{100.\text{NMIFM}}{\text{NMI}} \right) - 0.35113 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right) -1\]

(8.86)

\[-0.35861 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right) + 0.19999 \text{ (INA) } \text{ (INA-1-1.)}\]

(0.60)

\[+ 5.22978 \text{ QLT28} \]

(4.08)

\[R^2 = 0.998 \quad S.E. = 0.039 \quad D.W. = 2.03\]

Sample Period 1957-1974

(N.22) **NMIMB** Employment, Machine-Building and Metal-Working

\[
\frac{100.\text{NMIMB}}{\text{NMI}} = -5.39107 + 0.69292 \left( \frac{100.\text{NMIMB}}{\text{NMI}} \right) -1
\]

(35.527)

\[+ 0.53933 \left( \frac{100.\text{NMIFM}}{\text{NMI}} \right) - 0.09105 \left( \frac{100.\text{NMICM}}{\text{NMI}} \right) -1\]

(0.47)

\[-8.73862 \left( \frac{100.\text{NMIPP}}{\text{NMI}} \right) + 1.30840 \text{ (INA) } \text{ (INA-1-1.)}\]

(3.11)

\[+ 6.08597 \text{ QLT28} \]

(1.01)

\[R^2 = 0.998 \quad S.E. = 0.185 \quad D.W. = 1.98 \quad D. = 0.10\]

Sample Period 1957-1974
(N.23) **NMIFP Employment, Forest Products**

\[
\frac{100\text{.NMIFP}}{\text{NMI}} = 74.54399 + 0.15354 \left( \frac{100\text{.NMIMB}}{\text{NMI}} \right)_{-1} \]

\(9.82\) \(1.86\)

\(-2.45279 \left( \frac{100\text{.NMIFM}}{\text{NMI}} \right)_{-1} + 0.53978 \left( \frac{100\text{.NMICM}}{\text{NMI}} \right)_{-1}\)

\(5.50\) \(4.79\)

\(-2.22294 \left( \frac{100\text{.NMIPP}}{\text{NMI}} \right)_{-1} + 1.17166 \left( \frac{\text{INA}}{\text{INA}_1} \right)\)

\(2.04\) \(1.58\)

\(-16.78932 \text{ QLT28}\)

\(7.17\)

\(R^2 = 0.998\)

\text{S.E.} = 0.072\)

\text{D.W.} = 1.95

Sample Period 1957-1974

(N.24) **NMIPA Employment, Paper and Pulp**

\[
\frac{100\text{.NMIPA}}{\text{NMI}} = -0.70658 - 0.00366 \left( \frac{100\text{.NMIMB}}{\text{NMI}} \right)_{-1} \]

\(0.58\) \(0.28\)

\(+ 0.11410 \left( \frac{100\text{.NMIFM}}{\text{NMI}} \right)_{-1} - 0.07953 \left( \frac{100\text{.NMICM}}{\text{NMI}} \right)_{-1}\)

\(1.59\) \(4.38\)

\(+ 0.38651 \left( \frac{100\text{.NMIPP}}{\text{NMI}} \right)_{-1} - 0.04584 \left( \frac{\text{INA}}{\text{INA}_1} \right)\)

\(2.21\) \(0.39\)

\(+ 0.35829 \text{ QLT28}\)

\(0.95\)

\(R^2 = 0.869\)

\text{S.E.} = 0.012\)

\text{D.W.} = 2.27

Sample Period 1957-1974
(N.25) NMICM Employment, Construction Materials

\[
\frac{100.\text{NMICM}}{NMI} = 4.890314 - 0.01524 \left( \frac{100.\text{NMIMB}}{NMI} \right) -1
\]

\[
(6.403)
\]

\[
- 0.83764 \left( \frac{100.\text{NMIFM}}{NMI} \right) -1 + 0.83163 \left( \frac{100.\text{NMICM}}{NMI} \right) -1
\]

\[
(1.56) \quad (6.11)
\]

\[
+ 2.69426 \left( \frac{100.\text{NMIPP}}{NMI} \right) + 0.89869 \left( \frac{\text{INA}}{\text{INA}_1} \right) -1
\]

\[
(2.04) \quad (1.00)
\]

\[- 0.51361 \text{ QLT28}
\]

\[
(0.18)
\]

\[
R^2 = 0.902 \quad \text{S.E.} = 0.087 \quad \text{D.W.} = 2.39
\]

Sample Period 1957-1974

\[
\text{D.} = 1.01
\]

(N.26) NMISG Employment, Soft Goods

\[
\frac{100.\text{NMISG}}{NMI} = 8.72831 - 0.37769 \left( \frac{100.\text{NMIMB}}{NMI} \right) -1
\]

\[
(16.121)
\]

\[
- 0.80490 \left( \frac{100.\text{NMIFM}}{NMI} \right) -1 - 0.18900 \left( \frac{100.\text{NMICM}}{NMI} \right) -1
\]

\[
(0.82) \quad (0.76)
\]

\[
+ 8.61730 \left( \frac{100.\text{NMIPP}}{NMI} \right) + 2.36205 \left( \frac{\text{INA}}{\text{INA}_1} \right) -1
\]

\[
(3.58) \quad (1.44)
\]

\[
+ 4.91710 \text{ QLT28}
\]

\[
(0.95)
\]

\[
R^2 = 0.969 \quad \text{S.E.} = 0.159 \quad \text{D.W.} = 1.95
\]

Sample Period 1957-1974

(160)
(N.27) NMIPF Employment, Processed Foods

\[
\frac{100 \cdot \text{NMIPF}}{\text{NMI}} = 2.16373 + 0.01298 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right) - 1
\]
\[\text{(9.380)}\]
\[+ 1.36013 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right) - 0.26066 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right) - 1\]
\[\text{(3.49)} \quad \text{(2.64)}\]
\[+ 3.00805 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right) + 0.03012 \left( \frac{\text{INA}}{\text{INA}} \right) - 1\]
\[\text{(3.15)} \quad \text{(0.05)}\]
\[- 0.05106 \text{ QLT28}
\[\text{(0.02)}\]

\[R^2 = 0.966 \quad \text{S.E.} = 0.063 \quad \text{D.W.} = 1.77\]
Sample Period 1957-1974

(N.28) NMINC Employment, Industry NCE (Residual Branch)

\[
\frac{100 \cdot \text{NMINC}}{\text{NMI}} = 8.30185 - 0.76564 \left( \frac{100 \cdot \text{NMIMB}}{\text{NMI}} \right) - 1\]
\[\text{(3.463)}\]
\[- 1.93307 \left( \frac{100 \cdot \text{NMIFM}}{\text{NMI}} \right) - 0.51849 \left( \frac{100 \cdot \text{NMICM}}{\text{NMI}} \right) - 1\]
\[\text{(0.99)} \quad \text{(1.05)}\]
\[- 6.52880 \left( \frac{100 \cdot \text{NMIPP}}{\text{NMI}} \right) - 7.63250 \left( \frac{\text{INA}}{\text{INA}} \right) - 1\]
\[\text{(1.37)} \quad \text{(2.36)}\]
\[+ 11.08810 \text{ QLT28}
\[\text{(1.08)}\]

\[R^2 = 0.793 \quad \text{S.E.} = 0.314 \quad \text{D.W.} = 2.08\]
Sample Period 1957-1974
(N.29) **NIET Engineering - Technical Employees in Industry** (End Year)

\[
\text{NIET-NIET}_{-1} = 0.16841 \frac{\text{NEIND9} + \text{NEIND9}_{-1} + \text{NEIND9}_{-2}}{3} \\
\text{(149.43)}
\]

\[
- 159.08954 \text{Q69ON} \\
\text{(4.68)}
\]

\[
+ 154.93 \\
\text{(0.68)}
\]

\[
\frac{2 \times (\text{NIET}_{-1} - \text{NIET}_{-2}) - 0.13548}{\text{NEIND9}_{-1} + \text{NEIND9}_{-2}}
\]

\[
R^2 = 0.726 \quad \text{S.E.} = 32.39 \quad \text{D.W.} = 1.26
\]

Sample Period 1960-1974

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(N.30) **NTSPA Specialists Employed in Transport and Communications**

\[
\text{NTSPA-NTSPA}_{-1} = 0.48120 \frac{\text{NETRA9}_{-1} + \text{NETRA9}_{-2}}{2} \\
\text{(46.57)}
\]

\[
+ 43.69719 \frac{2 \times (\text{NTSPA}_{-1} - \text{NTSPA}_{-2})}{\text{NETRA9}_{-1} + \text{NETRA9}_{-2}} - 0.46308
\]

\[
R^2 = 0.895 \quad \text{S.E.} = 5.00 \quad \text{D.W.} = 1.60
\]

Sample Period 1960-1974
I. Investment

(a) Non-Agricultural Investment, Sector Equations

(1.1a) IIN Capital Investment in Industry

\[
IIN - 1 = 0.05466 - 0.05963 (Q6567-3 \cdot 0.0625) \\
IIN_{-1} (5.99) (4.85) \\
- 0.03976 (QFIN-2 \cdot 0.065) \\
(3.16) \\
+ 0.19254 GFI + 0.17444 GPG - 0.20077 GDP \\
(1.84) (3.54) (5.47)
\]

\[ R^2 = 0.850 \quad S.E. = 0.016 \quad D.W. = 2.25 \]
Sample Period 1959-1974

Where:

\[
GFI = \frac{IFAJ^*}{PII_{-1}} - 1 \\
GPG = \frac{ZPG^*}{ZPG_{-1}} - 1 \\
GDP = \frac{BDN^*9}{PIWH70} - 1
\]

(1.2a) ICRUB Capital Investment in Construction

\[
ICRUB - 1 = -0.02885 QFYP - 0.2937 + 0.04733 QSH72 \\
ICRUB_{-1} (0.99) (0.62) (1.39) \\
(0.093) \\
+ 0.29562 (XAGT70_{-1}) + 1.73640 GINA \\
XAGTN_{-1} (1.16) (2.71)
\]

\[ R^2 = 0.666 \quad S.E. = 0.050 \quad D.W. = 2.85 \]
Sample Period 1961-1974

Where:

\[ GINA = \frac{INA}{INA_{-1}} - 1. \]
(1.3a) ITRUB  Capital Investment in Transport and Communications

\[
\begin{align*}
\text{ITRUB} & \quad -1. = 0.10484 - 0.04073 \text{ GFY} - 0.08481 (Q6567-3.\cdot 0.0625) \\
\text{ITRUB}_{-1} & \quad (8.43) \quad (2.88) \quad (4.28) \\
& \quad - 0.04235 (QFIN-2.\cdot 0.0625) + 0.15933 \text{ GFT} - 0.28087 \text{ GDF} \\
& \quad (2.24) \quad (2.57) \quad (4.89)
\end{align*}
\]

\[R^2 = 0.814 \quad \text{S.E.} = 0.024 \quad \text{D.W.} = 2.02\]
Sample Period 1959-1974

Where:

GDP defined above under (I.1a)

\[
\frac{\text{ITRUB}^{*9}}{\text{PYT} - 1} = \frac{\text{GFT}}{\text{ITRUB}^{*9}_{-1}/\text{PYT} - 2}
\]

(1.4a) IHS  Capital Investment in Housing

\[
\begin{align*}
\text{IHS} & \quad -1. = 0.03603 - 0.00973 \text{ QSH72} (Q50-23.) - 0.14148 Q6064 \\
\text{IHS}_{-1} & \quad (5.45) \quad (5.44) \quad (9.70) \\
& \quad - 0.03536 (Q69-.0625) - 0.05472 \text{ GDF} \\
& \quad (2.37) \quad (1.52)
\end{align*}
\]

\[R^2 = 0.935 \quad \text{S.E.} = 0.014 \quad \text{D.W.} = 2.20\]
Sample Period 1961-1974

GDF defined above under (1.1a)

(1.5a) ISER  Capital Investment in Services and Domestic Trade

\[
\begin{align*}
\text{ISER} & \quad -1. = 0.06012 - 0.07136 \text{ QSH68} + 0.86893 \text{ GINA} \\
\text{ISER}_{-1} & \quad (2.31) \quad (4.58) \quad (3.14) \\
& \quad + 0.45488 \left(\frac{\text{XACT70}}{\text{XACTN}} + \frac{\text{XACT70}}{\text{XACTN}_{-1}} - 2\right) / 2.
\end{align*}
\]

\[R^2 = 0.801 \quad \text{S.E.} = 0.030 \quad \text{D.W.} = 2.34\]
Sample Period 1959-1974

GINA defined above under (1.2a)
(I.6a) **INA Capital Investment, Total Non-Agricultural**  
\[ \text{INA} = \text{IIN} + \text{ICRUB} + \text{ITRUB} + \text{IHS} + \text{ISER} \]

(b) **Alternate Investment Model**  
Total Non-Agricultural Investment determined by equation (I.6b). Sectoral Investment determined by exogenous share variables in equations (I.1b) - (I.5b).

(I.1b) \[ \text{IIN} \equiv \text{IRI}19^{*}\text{INA}/100. \]
(I.2b) \[ \text{ICRUB} \equiv \text{IRIC9}^{*}\text{INA}/100. \]
(I.3b) \[ \text{ITRUB} \equiv \text{IRIT9}^{*}\text{INA}/100. \]
(I.4b) \[ \text{IHS} \equiv \text{IRIH9}^{*}\text{INA}/100. \]
(I.5b) \[ \text{ISER} \equiv \text{IRIS9}^{*}\text{INA}/100. \]

(I.6b) **INA Total Non-Agricultural Investment**

\[
\frac{\text{INA}}{\text{INA}_1} - 1 = 0.07275 - 0.01958 \text{QFYP} - 0.02834 (Q6567-3.*.0625) \\
- 0.04271 (QFIN-2.*.0625) + 0.12956 \text{GPG} - 0.14968 \text{GDF} \\
\text{S.E.} = 0.020 \quad \text{D.W.} = 1.58
\]

\[ r^2 = 0.713 \quad \text{Sample Period 1959-1974} \]

GPG and GDF defined above under (I.1a)
\( \dot{\text{IA}} = 0.05067 + 0.51408 \text{GFA} - 0.19307 \text{GDF} \)

\( \frac{\dot{\text{IA}} - \text{IA}}{\text{IA}} = (4.67) \quad (5.14) \quad (3.84) \)

\( (0.105) \)

\[ + 0.31392 \frac{\dot{\text{XAGT70}}}{\text{XAGTN}} - 1.) - 0.12747 \frac{\dot{\text{XAGT70}}}{\text{XAGTN}} - 1.) \]

\( (3.30) \quad (1.38) \)

\( \text{R}^2 = 0.847 \quad \text{S.E.} = 0.018 \quad \text{D.W.} = 2.41 \)

Sample Period 1961-1974

GDF defined above under (I.1a)

Where:

\[ \text{GFA} = \frac{\text{IFAG}^*}{\text{PIA}_{-1}} \frac{\text{PIA}_{-1}}{\text{PIA}_{-2}} - 1. \]

\( \text{(I.8) IFAJ}^* \) Adjusted Finance for Centralized Capital Investment

\( \text{IFAJ}^* = \text{IFIN}^* - 4.9 \text{QSH68}_{-1} \)

\( \text{(I.9) ITOTAL Total New Capital Investment in the National Economy} \)

\( \text{ITOTAL} = \text{INA} + \text{IA} \)

(a) Branch Investment, Direct Functions

\( \text{(I.10a) IIEP Capital Investment, Electroenergy} \)

\[ \text{IIEP} - 1. = 0.02935 + 0.05151 \text{QFYP} - 0.06037 (\text{Q6869-2} \cdot 0.0625) \]

\( (3.26) \quad (3.69) \quad (3.00) \)

\( (0.052) \)

\[ - 0.06243 (\text{Q74-0625}) \]

\( (2.17) \)

\( \text{R}^2 = 0.644 \quad \text{S.E.} = 0.026 \quad \text{D.W.} = 1.75 \)

Sample Period 1959-1974
(1.11a) IIICP Capital Investment, Coal Products

\[
\text{IIICP} = \beta_0 + \beta_1 \text{QFYP} + \beta_2 \text{QFYP}_1 - \beta_3 \text{GDF} - \beta_4 \text{GDF}_1 + \epsilon
\]

\[
\begin{align*}
\beta_0 &= 0.03133, \\
\beta_1 &= 0.04369 QFYP, \\
\beta_2 &= 0.07639 (Q69+Q74 - 2 \times 0.0625), \\
\beta_3 &= 0.29462 GDF, \\
\beta_4 &= 0.24949 \text{GDP}.
\end{align*}
\]

\[
R^2 = 0.849, \quad \text{S.E.} = 0.023, \quad \text{D.W.} = 1.48
\]

Sample Period 1961-1974

GDF defined above under (1.1a).

(1.12a) IIIPP Capital Investment, Petroleum Products

\[
\begin{align*}
\text{IIIPP} &= \beta_0 + \beta_1 \text{QFYP} + \beta_2 \text{QFYP}_1 - \beta_3 \text{GDF} - \beta_4 \text{GDF}_1 + \epsilon \\
\text{IIIPP} &= 0.02115 + 0.05256 QFYP - 0.13867 (Q69 - 0.0625) \\
&\quad + 0.89909 \text{GFI} - 0.23682 \text{GDF} - 0.06849 (Q74 - 0.0625)
\end{align*}
\]

\[
R^2 = 0.804, \quad \text{S.E.} = 0.026, \quad \text{D.W.} = 2.26
\]

Sample Period 1961-1974

GFI and GDF defined above under (1.1a).

(1.13a) IIIPM Capital Investment, Ferrous Metallurgy

\[
\begin{align*}
\text{IIIPM} &= \beta_0 + \beta_1 \text{QFYP} + \beta_2 \text{QFYP}_1 - \beta_3 \text{GDF} - \beta_4 \text{GDF}_1 + \epsilon \\
\text{IIIPM} &= 0.13818 - 0.12914 QFYP - 0.09812 (Q6567-3 \times 0.0625) \\
&\quad - 0.07294 (Q69 - 0.0625) - 0.15492 \text{GDF}
\end{align*}
\]

\[
R^2 = 0.582, \quad \text{S.E.} = 0.065, \quad \text{D.W.} = 2.72
\]

Sample Period 1959-1974

GDF defined above under (1.1a).
(I.14a) IIINF  Capital Investment, Non-Ferrous Metallurgy
and Industry NEC

\[
\text{IIINF} = 0.03360 - 0.08412 (Q6567-3*0.0625) \\
\text{IIINF}_{-1} \\
\quad (1.29) \\
\quad (1.77) \\
\quad (0.059) \\
- 0.04944 (QFIN-2*0.0625) + 0.41587 GPG - 0.28059 GDF \\
\quad (1.00) \\
\quad (2.16) \\
\quad (2.04) \\
\]

\[R^2 = 0.458 \quad \text{S.E.} = 0.064 \quad \text{D.W.} = 2.80\]

Sample Period 1959-1974

GPG and GDF defined above under (I.1a).

(I.15a) IIICH  Capital Investment, Chemicals and Petrochemicals

\[
\text{IIICH} = 0.02821 + 0.16538 QSH65 - 0.13196 (Q6567-3*0.0625) \\
\text{IIICH}_{-1} \\
\quad (0.97) \\
\quad (4.13) \\
\quad (3.41) \\
+ 0.73257 GFI - 0.39119 GDF \\
\quad (1.72) \\
\quad (2.65) \\
\]

\[R^2 = 0.837 \quad \text{S.E.} = 0.055 \quad \text{D.W.} = 2.36\]

Sample Period 1961-1974

GFI and GDF defined above under (I.1a).

(I.16a) IIIMB  Capital Investment, Machine-Building and Metal-Working

\[
\text{IIIMB} = 0.03686 - 0.03133 (Q6567-3*0.0625) \\
\text{IIIMB}_{-1} \\
\quad (1.27) \\
\quad (1.16) \\
\quad (0.102) \\
+ 0.08004 (Q70 - 0.0625) \\
\quad (1.97) \\
+ 0.37440 GPG + 0.26504 \left(\frac{\text{IIIMB}}{\text{IIIMB}_{-1}} - 1\right) - 1 \\
\quad (3.00) \\
\quad (1.40) \\
\]

\[R^2 = 0.714 \quad \text{S.E.} = 0.035 \quad \text{D.W.} = 2.28\]

Sample Period 1961-1974

GPG defined above under (I.1a)
\((1.17a)\) IIFP Capital Investment, Forest Products

\[
\begin{align*}
\text{IIFP} & - 1. = 0.08938 - 0.13170 (Q6567 - 3 \cdot 0.0625) \\
& + 0.10780 (QFIN + Q74 - 3 \cdot 0.0625) - 0.31721 \text{ GDF} \\
& - 0.32203 (\frac{\text{IIFP}}{\text{IIFP}-1}) -1 \\
R^2 & = 0.812 \\
\text{S.E.} & = 0.033 \\
\text{D.W.} & = 2.91 \\
\text{Sample Period} & = 1959-1974
\end{align*}
\]

GDP defined above under (1.1a).

\((1.18a)\) IICM Capital Investment, Construction Materials

\[
\begin{align*}
\text{IICM} & - 1. = 0.00092 - 0.07839 (Q6264 - 3 \cdot 0.0625) \\
& + 0.15350 (Q6869 - 2 \cdot 0.0625) + 0.64446 (\frac{\text{INA}}{\text{INA}-1}) \\
R^2 & = 0.750 \\
\text{S.E.} & = 0.047 \\
\text{D.W.} & = 2.47 \\
\text{Sample Period} & = 1961-1974
\end{align*}
\]

\((1.19a)\) IISG Capital Investment, Soft Goods

\[
\begin{align*}
\text{IISG} & - 1. = 0.14023 - 0.10800 (QFIN + Q74 - 3 \cdot 0.0625) \\
& + 0.10268 \text{ GPG} + 0.16611 (Q66 - 0.0625) \\
& - 0.20767 \text{ GDF} - 0.40822 (\frac{\text{IISG}}{\text{IISG}-1}) -1 \\
R^2 & = 0.867 \\
\text{S.E.} & = 0.036 \\
\text{D.W.} & = 1.21 \\
\text{Sample Period} & = 1959-1974
\end{align*}
\]

GPG and GDP defined above under (1.1a).
\[(I.20a)\] IIPF Capital Investment, Processed Foods

\[
\frac{\text{IIPF}}{\text{IIPF}_{-1}} = 0.05281 - 0.04234 (Q6567 - 3 \times 0.0625) \\
\begin{array}{c}
(3.71) \\
(1.57)
\end{array}
\]

\[
(0.048) \\
- 0.04223 (Q69 - 0.0625) + 0.27581 \text{GPG} \\
\begin{array}{c}
(1.16) \\
(2.59)
\end{array}
\]

\[- 0.46106 \text{GDF} \\
\begin{array}{c}
(5.99)
\end{array}
\]

\[R^2 = 0.823 \quad \text{S.E.} = 0.035 \quad \text{D.W.} = 2.15\]

Sample Period 1961-1974

GPG and GDF defined above under (I.1a).

(b) Branch Investment, Share Equations

\[(I.10b)\] IIEP = IREP9\*IIN

\[(I.11b)\] IICP = IRCP9\*IIN

\[(I.12b)\] IIPP = IRPP9\*IIN

\[(I.13b)\] IIFM = IRFM9\*IIN

\[(I.14b)\] IINF = IRNF9\*IIN

\[(I.15b)\] IICH = IRCH9\*IIN

\[(I.16b)\] IIMB = IRB9\*IIN

\[(I.17b)\] IIPP = IRFP9\*IIN

\[(I.18b)\] IICM = IRCM9\*IIN

\[(I.19b)\] IISG = IRSG9\*IIN

\[(I.20b)\] IIPF = IRPF9\*IIN
(I.21) \( I70T \) Change in Inventories, Domestic Trade

\[ I70T = -2.27542 - 0.50968 \text{IS}70T_{-1} + 0.39720 \text{XILT}^* \]
\[ = 0.14637 (\text{XILT} - \text{CRD}70 - \text{CRD}70) \]
\[ - 0.06053 (\text{XAGT}70_{-1} - \text{XAGTN}_{-1}) \]
\[ + 0.14637 (\text{XILT} - \text{CRD}70 - \text{CRD}70) \]
\[ - 0.37225 \left( \frac{100.\text{BDN}^*9}{\text{PIWH}70} - \frac{100.\text{BDN}^*9_{-1}}{\text{PIWH}70_{-1}} \right) - 0.48824 \]

\[ R^2 = 0.824 \quad \text{S.E.} = 0.443 \quad \text{D.W.} = 2.49 \]

Sample Period 1958-1972

Where: \( \text{XILT} = 0.27291 \text{XISG} + 0.39034 \text{XIPF} \),

and:

\[ x^* = x_{-1} (.1 \frac{x_{-1}}{x_{-2}} + .4 \frac{x_{-2}}{x_{-3}} + .4 \frac{x_{-3}}{x_{-4}} + .1 \frac{x_{-4}}{x_{-5}}) \]

a projection based on four previous growth rates.

(I.22) \( IS70T \) Stock of Inventories, Domestic Trade (End Year)

\[ IS70T = IS70T_{-1} + I70T \]

(I.23) \( I70NTA \) Change in Inventories, Non-Trade, Non-Agriculture

\[ I70NTA = 2.37632 - 0.41277 \text{IS}70NTA_{-1} + 0.47275 \text{XIH}^* \]
\[ = 0.84795 (\text{XIH}^* - \text{XIH} - .2342) + 5.60397 \text{Q66} \]

\[ R^2 = 0.692 \quad \text{S.E.} = 1.811 \quad \text{D.W.} = 1.51 \]

Sample Period 1958-1972
(I.23) **I7ONTA** Change in Inventories, Non-Trade, Non-Agriculture  
(Continued)

Where:  
\[ X_{1H} = 1.71449 X_{1T} - 0.27291 X_{1S G} - 0.39034 X_{1P F} \]

and:  
\[ X_{1H} \] defined under (I.21) above.

(I.24) **IS7ONTA** Stock of Inventories, Non-Trade, Non-Agricultural  
(End-Year)

\[ IS7ONTA = IS7ONTA_{-1} + I7ONTA \]

(I.25) **ICAPREP** Capital Repair: Index

\[ \frac{18.611 ICAPREP}{KSUM} = 2.76293 - 0.01728 (QT50-22.) QS71 \]
\[ (208.8) \quad (8.39) \]

\[ - 0.09793 Q62 - 0.12222 Q6870 \]
\[ (3.51) \quad (6.81) \]

\[ R^2 = 0.945 \quad S.E. = 0.025 \quad D.W. = 1.64 \]

Sample Period 1960-1973

(I.26) **ISUM** Total Investment, National Economy

\[ ISUM = ITOTAL + 0.18611 ICAPREP + I7ONTA + I7OT \]

\[ + (ALVR70 - ALVR70_{-1}) \]
(K.1) KITOT  Industrial Basic Funds (Capital Stock) (Jan. 1)

\[ \text{KITOT}_{t+1} = \text{KITOT}_t + \text{KNDI}_t \]

(K.2) KIA  Adjusted Industrial Basic Funds (Jan. 1)

\[ \text{KIA}_{t+1} = \text{KITOT}_{t+1} - \text{KIS89}_t - \text{KIH629}_t \]

(K.3) KNDI  Industrial Capital Formation

\[ \text{KNDI}_t + 0.05 \text{KITOT}_t = 1.29293 (\text{QFYP}_t - 0.4375) + 0.1275 \text{IIN}_t \\
\quad \text{(23.120)} \quad \text{(2.51)} \quad \text{(0.40)} \\
+ 0.3274 \text{IIN}_{t-1} + 0.3728 \text{IIN}_{t-2} \\
\quad \text{(18.70)} \quad \text{(2.04)} \]

\[ + 0.2637 \text{IIN}_{t-3} \]

\[ R^2 = .986 \quad \text{S.E.} = 1.006 \quad \text{D.W.} = 1.86 \]

Sample Period 1959-1974

Distributed Lag: Quadratic, 4-Period, Zero-constrained in 5th Period.
(K.4) KCR Construction Basic Funds (Jan. 1)

\[ KCR_{t+1} = KCR + KNDC \]

(K.5) KNDC Construction Capital Formation

\[ KNDC + 0.06 KCR = 0.27781 (QPL5 - 0.47) + 1.02686 ICRUB \\
\text{(2.178)} \quad \text{(1.82)} \quad \text{(31.82)} \]

\[ R^2 = 0.934 \quad \text{S.E.} = 0.313 \quad \text{D.W.} = 2.21 \]

Sample Period 1958-1974

(K.6) KTR Transport and Communications Basic Funds (Jan. 1)

\[ KTR_{t+1} = KTR + KNDT \]

(K.7) KTA Adjusted Transport and Communications Basic Funds (Jan. 1)

\[ KTA_{t+1} = KTR_{t+1} + KIT589 \]

(K.8) KNDT Transport and Communications Capital Formation

\[ KNDT + 0.025 KTR = 2.50957 (Q65 - 0.0625) + 0.61852 (ITRUB + ITRUB_{t-1}) \\
\text{(7.844)} \quad \text{(3.79)} \quad \text{(51.07)} \]

\[ R^2 = 0.938 \quad \text{S.E.} = 0.640 \quad \text{D.W.} = 1.09 \]

Sample Period 1959-1974
(K.9) KTCUS: Freight Car Utilization Rate

$$KTCUS = 182.420 \text{ QSH65} + 3.97245 \text{ QSH65} \times \text{ QT50}$$

$$+ 233.239 \times (1. - \text{ QSH65}) + 0.97800 \times (1. - \text{ QSH65}) \times \text{ QT50}$$

$$- 15.84557 \times \frac{\text{BDN}^9/\text{PIWH70}}{\text{BDN}^9-1/\text{PIWH70}-1}$$

$$R^2 = 0.982 \quad \text{S.E.} = 2.15 \quad \text{D.W.} = 2.28$$

Sample Period 1958-1974

(K.10) KCOM: Basic Funds, Domestic Trade (Jan. 1)

$$KCOM_{+1} = KCOM + \text{ KNCOM}$$

(K.11) KNCOM: Capital Formation, Domestic Trade

$$\text{KNCOM} + 0.02 \times KCOM = 3.51814 \text{ Q65} + 2.06880 \times (\text{Q68-Q69})$$

$$+ (2.367) \quad + (7.36) \quad + (6.24)$$
(K.11) **KNCOM** Capital Formation, Domestic Trade, Continued

\[
+ 0.102886 (\text{ISER} + \text{ISER}) \\
(18.25) ~ -1 ~ -2
\]

\[ R^2 = 0.903 \quad \text{S.E.} = 0.469 \quad \text{D.W.} = 1.43 \]
Sample Period 1960-1974

(K.12) **KHB** Basic Funds, Housing (Jan. 1)

\[ \text{KHBF}_t = \text{KHBF} + \text{KNDH} \]

(K.13) **KNDH** Housing Capital Formation

\[
\text{KNDH} + 0.02 \text{KHBF} = -0.62710 (\text{QFY}P-0.467) + 7.74913 \text{Q62} \\
(10.945) \quad (1.36) \quad (8.83)
\]

\[ + 0.45700 (\text{IHS} + \text{IHS}_{-1}) - 6.45250 (\text{Q74}-0.067) \]
\[ (49.31) \quad (7.21) \]

\[ R^2 = 0.925 \quad \text{S.E.} = 0.811 \quad \text{D.W.} = 2.60 \]
Sample Period 1960-1974
(K.14) KHA \_ Adjusted Housing Basic Funds (Jan. 1)

\[ KHA_{t+1} = KHB_{t+1} + \frac{7.84}{1.74} KIH \]

(K.15) KSER \_ Basic Funds, Services (Jan. 1)

\[ KSER_{t+1} = KSER + KNSER \]

(K.16) KNSER \_ Services Capital Formation

\[ KNSER + 0.02 KSER = 0.84631 (QFYD - 0.467) + 4.32465 Q63 \]
\[ (0.94) \]
\[ (2.68) \]
\[ (9.168) \]
\[ - 2.81349 (QFIN_{-1} - 0.133) + 0.49679 (ISER_{-3} + ISER_{-4}) \]
\[ (2.17) \]
\[ (24.39) \]

\[ R^2 = 0.875 \quad S.E. = 1.469 \quad D.W. = 1.19 \]
Sample Period 1960–1974

(K.17) KAIR \_ Agricultural Basic Funds (excl. Productive Livestock) (mid-year)

\[ KAIR - 0.95 KAIR_{-1} = 0.55756 QPL7 + 0.67846 \left( \frac{IA+IA_{-1}}{2} \right) \]
\[ (6.45) \]

\[ R^2 = 0.976 \quad S.E. = 0.430 \quad D.W. = 1.82 \]
Sample Period 1957–1972
(K.18) \( \text{KIW} \quad \text{Industrial Capital, Western Machinery (End Year Value)} \)

\[ \text{KIW} = 0.95 \text{KIW}_{-1} + 0.0712 (\text{MIEIN$/PREX9.P71GE9})_{-1} \]

(K.19) \( \text{KIEP} \quad \text{Basic Funds, Electroenergy (Jan. 1)} \)

\[ \text{KIEP}_{+1} = \text{KIEP} + \text{KNIIEP} \]

(K.20) \( \text{KNIIEP} \quad \text{Capital Formation, Electroenergy} \)

\[ \text{KNIIEP} + 0.04 \text{KIEP} = -0.12905 (\text{QFYP} - 0.4375) + 2.07170 \text{IIEP} \]

\[ (3.476) \]

\[ -1.47324 \quad (\text{IIEP}_{-1} + \text{IIEP}_{-2}) \]

\[ (2.26) \]

\[ +1.22625 \quad (\text{IIEP}_{-3} + \text{IIEP}_{-4}) \]

\[ (3.33) \]

\[ R^2 = 0.898 \quad \text{S.E.} = 0.459 \quad \text{D.W.} = 2.80 \]

Sample Period 1959-1974

(K.21) \( \text{KICP} \quad \text{Basic Funds, Coal Products (Jan. 1)} \)

\[ \text{KICP}_{+1} = \text{KICP} + \text{KNICP} \]
(K.22) KNICP  Capital Formation, Coal Products

\[
\text{KNICP} + 0.03 \text{ KICP} = 0.12458 (QFYP - 0.4375) - 0.30790 Q68
\]
\[
(4.04) \quad (4.85)
\]
\[
(0.812)
\]
\[
+ 0.19906 (IICP + IICP_{-1} + IICP_{-2})
\]
\[
(54.31)
\]
\[
R^2 = 0.893 \quad \text{S.E.} = 0.060 \quad \text{D.W.} = 2.38
\]
Sample Period 1959-1973

(K.23) KIPP Basic Funds, Petroleum Products (Jan. 1)

\[
\text{KIPP} + 1 = \text{KIPP} + \text{KNIPP}
\]

(K.24) KNIPP  Capital Formation, Petroleum Products

\[
\text{KNIPP} - 0.025 \text{ KIPP} = -0.36390 (QFYP - 0.4375)
\]
\[
(1.90)
\]
\[
(1.564)
\]
\[
- 0.56143 (Q567 - 0.1875)
\]
\[
(2.31)
\]
\[
+ 0.20093 (IIPP + IIPP_{-1} + IPP_{-2})
\]
\[
(20.19)
\]
\[
R^2 = 0.361 \quad \text{S.E.} = 0.344 \quad \text{D.W.} = 1.56
\]
Sample Period 1959-1974

(K.25) KIFM  Basic Funds, Ferrous Metallurgy (Jan. 1)

\[
\text{KIFM} = \text{KIFM} + \text{KNIFM}
\]
(K.26) **KNIFM** Capital Formation, Ferrous Metallurgy

\[ \text{KNIFM} + 0.05 \text{KIFM} = 0.41777 \quad (\text{IIFM} + \text{IIFM}_{-1} + \text{IIFM}_{-2}) \]

\[ (2.316) \quad (33.36) \]

R\(^2\) = 0.824  S.E. = 0.287  D.W. = 2.68  
Sample Period 1959-1974

(K.27) **KICH** Basic Funds, Chemicals and Petrochemicals (Jan. 1)

\[ \text{KICH}_{+1} = \text{KICH} + \text{KNICH} \]

(K.28) **KNICH** Capital Formation, Chemicals and Petrochemicals

\[ \text{KNICH} + 0.04 \text{KICH} = 0.68586 \quad (\text{QFY} - 0.4375) \]

\[ (2.152) \quad (3.14) \]

\[ + 0.58158 \quad (\text{IICH} - 1 + \text{IICH} - 2) \]

\[ (20.99) \]

R\(^2\) = 0.823  S.E. = 0.433  D.W. = 2.35  
Sample Period 1959-1974

(K.29) **KIMB** Basic Funds, Machine-Building and Metal-Working (Jan. 1)

\[ \text{KIMB}_{+1} = \text{KIMB} + \text{KNIMB} \]
(K.30) **KNIMB**  **Capital Formation, Machine-Building and Metal-Working**

KNIMB + 0.05 KIMB = 0.27786 (QFYP - 0.4275)  
(4.952)  
+ 0.81632 (Q66 - 0.0625)  
(2.11)  
+ 0.59136 (IIMB + IIMB-1)  
(59.06)  
R² = 0.978  
S.E. = 0.364  
D.W. = 1.85  
Sample Period 1959 - 1974

(K.31) **KIFFP**  **Basic Funds, Forest Products**  (Jan. 1)

KIFFP+1 = KIFFP + KNIFFP

(K.32) **KNIFFP**  **Capital Formation, Forest Products**

KNIFFP + 0.045 KIFFP = 0.15823 (QFYP - 0.4375)  
(1.068)  
+ 0.45471 (IIFP + IIFP-1)  
(29.76)  
R² = 0.841  
S.E. = 0.149  
D.W. = 1.32  
Sample Period 1959-1974

(K.33) **KICM**  **Basic Funds, Construction Materials**  (Jan. 1)

KICM+1 = KICM + KNICM
(K.34) \textbf{KNICM} \hspace{0.5cm} \textit{Capital Formation, Construction Materials}

\[
\text{KNICM} + 0.04 \text{ KICM} = -1.25157 (Q70 - 0.0625) \\
\hspace{0.5cm} (6.87) \\
\hspace{2cm} + 0.4167 \text{ IICM} \\
\hspace{2.5cm} (2.02) \\
\hspace{2cm} + 0.3131 \text{ IICM}_1 + 0.2092 \text{ IICM}_2 \\
\hspace{2.5cm} (22.87) \hspace{0.5cm} (1.80) \\
\hspace{2cm} + 0.1048 \text{ IICM}_3 \\
\hspace{2.5cm} (0.93)
\]

\[R^2 = 0.897 \hspace{0.5cm} \text{S.E.} 0.171 \hspace{0.5cm} \text{D.W.} = 1.71\]

Sample Period 1959-1974

Distributed Lag estimation: Quadratic, 4-Period, Zero-Constrained in 5th Period.

(K.35) \textbf{KISG} \hspace{0.5cm} \textit{Basic Funds, Soft Goods} \hspace{0.5cm} (Jan. 1)

\[\text{KISG}_t = \text{KISG} + \text{KNISG}\]

(K.36) \textbf{KNISG} \hspace{0.5cm} \textit{Capital Formation, Soft Goods}

\[
\text{KNISG} + 0.05 \text{ KISG} = 0.6133 \text{ IISG} + 0.3529 \text{ IISG}_1 \\
\hspace{0.5cm} (1.06) \hspace{0.5cm} (1.53) \\
\hspace{2cm} (1.046) \\
\hspace{2cm} + 0.1485 \text{ IISG}_2 \\
\hspace{2.5cm} (0.35) \]
(K.36) KNISG  Capital Formation, Soft Goods, Continued

\[ R^2 = 0.857 \quad S.E. = 0.162 \quad D.W. = 2.13 \]
Sample Period 1959-1974

Distributed Lag estimation: Quadratic, 3-Period, Zero
Constrained in 4th Period.

(K.37) KIPF  Basic Funds, Processed Foods  (Jan. 1)

\[ \text{KIPF}_{t+1} = \text{KIPF} + \text{KNIPF} \]

(K.38) KNIPF  Capital Formation, Processed Foods

\[ \text{KNIPF} + 0.05 \text{KIPF} = 0.94467 \quad (Q61 - Q62) \]
\[ (1.852) \quad (6.01) \]
\[ + 0.1405 \quad \text{IIPF} \]
\[ (0.39) \]
\[ + 0.4867 \quad \text{IIPF}_{t-1} + 0.4399 \quad \text{IIPF}_{t-2} \]
\[ (3.46) \quad (1.68) \]

\[ R^2 = 0.903 \quad S.E. = 0.221 \quad D.W. = 1.58 \]
Sample Period 1959-1974

Distributed Lag estimation: Quadratic, 3-Period,
Zero-constrained in 4th Period.

(K.39) KSUM  Basic Funds, National Economy  (Mean Year)

\[ \text{KSUM} = \text{KAIR} + \frac{1}{3} (\text{KIA} + \text{KCR} + \text{KTA} + \text{KCOM} + \text{KHA} + \text{KSER}) + 1 \]
\[ + \frac{1}{3} (\text{KIA} + \text{KCR} + \text{KTA} + \text{KCOM} + \text{KHA} + \text{KSER}) \]

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(K.40)  KIPPM  Basic Funds: Petroleum Products, Machinery Imports

\[ KIPPM = 0.95 \text{ KIPPM}_{-1} + 0.0712 \left( \frac{MTM120-9}{P71GE9} \right)_{-1} \]

(K.41)  KICHW  Basic Funds: Chemicals and Petrochemicals, Western Machinery Imports

\[ KICHW = 0.95 \text{ KICHW}_{-1} + 0.0712 \left( \frac{MIECH$/PREX9}{P71GE9} \right)_{-1} \]

(K.42)  KIMBM  Basic Funds: Machine-Building, Machinery Imports

\[ KIMBM = 0.95 \text{ KIMBM}_{-1} + 0.0712 \left( \frac{MTM100-5}{P71GE9} \right)_{-1} \]
A. Agricultural Variables

(A.1) ALVR70  Value of Productive Livestock (End-Year)

\[
\frac{ALVR70}{ALVR70_{-1}} - 0.95 = 1.55785 - 0.67837 \text{QLT28} \\
(3.24) (3.21)
\]
\[
+ 0.01668 \text{KWAL9} + 2.05350 \frac{AFEED70}{ALVR70_{-1}} \\
(2.34) \hspace{2cm} (2.84)
\]

\[ R^2 = 0.470 \quad \text{S.E.} = 0.039 \quad \text{D.W.} = 2.10 \]
Sample Period 1959-1974

(A.2) AVCP70  Value of Agricultural Current Purchases

\[
\frac{100.AVCP70}{XACGTN} = 2.50195 + 0.42954 \text{QT50} \\
(8.91) (28.21)
\]
\[
+ 2.08567 \left( \frac{XACGTN}{XACGTN_{-1}} \right) \\
(1.86)
\]

\[ R^2 = 0.988 \quad \text{S.E.} = 0.25 \quad \text{D.W.} = 1.13 \]
Sample Period 1959-1974

(A.3) AFEED70  Value of Feed Fed to Livestock

\[
100. \frac{AFEED70}{ALV} = -12.15528 + 5.58824 \text{QLT28} \\
(2.83) (4.82)
\]
\[
+ 6.60336 \left( \frac{XAC70}{XAC7N_{-1}} + \frac{XAC70}{XAC7N_{-2}} \right) \\
(4.43)
\]

\[ R^2 = 0.850 \quad \text{S.E.} = 0.496 \quad \text{D.W.} = 1.75 \]
Sample Period 1959-1974

Where: \ ALV = ALVR70_{-1} + ALVR70
X. Production

(X.1) XAGT70 Total Agricultural Output (Two-Stage Determination)

(i) Normal Output: Linked Second-Peak XAGT70

\[
\ln XAGTN = 0.30 \ln NAT - 0.03 \ln AVLR70 - 0.12 \ln AVCP70
\]

\[
= 1.95612 + 0.21378 \ln KAIR
\]

\[
R^2 = 0.973 \quad \text{S.E.} = 0.015 \quad \text{D.W.} = 0.71
\]

Sample Period 1959-1974

Actual Output: Fitted Values for XAGTN used in Second-stage

(ii) In XAGT70 - In XAGTN = -0.02514 + 0.09505 JPS9 + 0.66702 JTW9

\[
\begin{align*}
&(-0.016) \\
&\quad (3.08) \quad (4.89) \quad (3.91)
\end{align*}
\]

\[
R^2 = 0.790 \quad \text{S.E.} = 0.032 \quad \text{D.W.} = 1.98
\]

Sample Period 1959-1974

XAGT70

Accuracy of Fit: 0.972
Mean Abs. Error: 1.49 B. 1970 Rubles

(X.2) XCRP70 Value of Total Crops

Normal Output: Linked Second-Peak XCRP70

(i) In XACN = 0.30 \ln NAT = 1.23866

\[
= 2.382 \quad (9.23)
\]

\[
+ 0.17318 \ln KAIR + 0.23310 \ln AVCP70
\]

\[
= 2.19 \quad (2.44)
\]

\[
R^2 = 0.995 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 0.91
\]

Sample Period 1959-1974
Actual Output: Fitted XACN used in Second-stage Estimation

(ii) \( \ln \text{XCROP70} - \ln \text{XACN} = -0.04463 + 0.09866 \text{JPS9} \)
\[ (-0.0355) \quad (2.85) \quad (2.64) \]
\[ + 0.55960 \ln \text{JTW9} \]
\[ (1.71) \]

\( R^2 = 0.485 \quad \text{S.E.} = 0.061 \quad \text{D.W.} = 2.39 \)

Sample Period 1959-1974

\text{XCROP70}

Accuracy of Fit: 0.892
Mean Absolute Errors: 1.49 B. 1970 Rubles

(X.3) \text{XANIM70} Gross Livestock Production

Normal Output: First-stage Estimation

(i) \( \ln \text{XAN} = 0.95622 + 0.51808 \ln \text{ALV} \)
\[ (3.854) \quad (1.97) \quad (3.84) \]
\[ + 5.17423 \frac{\text{APEED70}}{\text{ALV}} \]
\[ (8.37) \]

\( R^2 = 0.937 \quad \text{S.E.} = 0.046 \quad \text{D.W.} = 1.76 \)

Sample Period 1959-1974

Where: \( \frac{\text{ALVR70}_1 + \text{ALVR70}}{2} \)

Actual Output: Residuals of (i) used in Second-stage Estimation

(ii) \( \ln \text{XANIM70} - \ln \text{XAN} = 0.00746 + 0.20561 \frac{\text{XGRT}}{\text{XGRTN} - 1} \)
\[ (0.00) \quad (0.72) \quad (2.04) \]

\( R^2 = 0.229 \quad \text{S.E.} = 0.039 \quad \text{D.W.} = 1.62 \)

Sample Period 1959-1974

\text{XANIM70}

Accuracy of Fit: 0.948
Mean Absolute Error: 1.55 B. 1970 Rubles
Largest Sample Error: -3.90 B. 1970 Rubles (1973)
(X.4) XMEAT70 Value of Meat Produced

Normal Output: First-stage Estimation

\[ \ln XAM = -1.64513 + 1.09080 \ln ALV + 3.26202 \frac{AFEED70}{ALV} \]

\[ (3.238) \quad (2.67) \quad (6.38) \]

\[ R^2 = 0.916 \quad \text{S.E.} = 0.058 \quad \text{D.W.} = 2.06 \]

Sample Period 1959-1974

Where: \( ALV = \frac{ALVR70 - 1 + ALVR70}{2} \)

Actual Output: Residuals of (i) used in Second-stage Estimation

\[ \ln XMEAT70 - \ln XAM = -0.01023 - 0.31995 \left( \frac{XGRT70}{XACN} \right)^{-1.} \]

\[ (0.00) \quad (0.76) \quad (1.91) \]

\[ R^2 = 0.207 \quad \text{S.E.} = 0.050 \quad \text{D.W.} = 1.65 \]

Sample Period 1959-1974

XMEAT70

Accuracy of Fit: 0.948
Mean Absolute Error: 0.805 B. 1970 Rubles
Largest Sample Error: -2.78 B. 1970 Rubles (1964)

(X.5) XGRT Total Grain Production (Official Series)

Normal Output (Interpolated Second-peak series)

\[ \ln XGRTN = 0.30 \ln \left[ \frac{NASK+NASK}{3} + NASK^{-2} \right] = 0.53238 \]

\[ + 0.36430 \ln ASGR9 + 0.43005 \ln KAIR \]

\[ (4.063) \quad (1.75) \quad (6.15) \quad (48.60) \]

\[ R^2 = 0.995 \quad \text{S.E.} = 0.013 \quad \text{D.W.} = 1.18 \]

Sample Period 1959-1973
Actual Output (Fitted values used for XGRTN)

(ii) \[ \ln XGRT - \ln XGRTN = -0.03595 + 0.10922 \text{ JPS9} \]
\[ (-0.042) \quad (2.17) \quad (2.73) \]
\[ + 1.30996 \text{ JTW9} - 0.16894 \text{ Q65} \]
\[ (4.01) \quad (2.60) \]

\[ R^2 = 0.781 \quad \text{S.E.} = 0.061 \quad \text{D.W.} = 1.91 \]
Sample Period 1959-1973

Fit Statistic for XGR: 0.938
Mean Absolute Error: 6.2 M. Metric Tons

(X.6) XGR Net Grain Production (Western Estimate)

Capacity Output: Linked Second-Peak XGR

(i) \[ \ln XGRPK = -0.24857 + 0.53782 \ln KAIR \]
\[ (4.629) \quad (0.18) \quad (13.10) \]
\[ + 0.83028 \ln NASK \]
\[ (2.25) \]

\[ R^2 = 0.989 \quad \text{S.E.} = 0.020 \quad \text{D.W.} = 0.37 \]
Sample Period 1959-1973

Actual Output: Fitted values of (i) used in Regression

(ii) \[ \ln XGR - \ln XGRPK = -0.07125 + 0.11648 \text{ JPS9} \]
\[ (-.079) \quad (4.27) \quad (2.94) \]
\[ + 1.50461 \text{ JTW9} - 0.19986 \text{ Q65} \]
\[ (4.58) \quad (3.06) \]

\[ R^2 = 0.820 \quad \text{S.E.} = 0.061 \quad \text{D.W.} = 2.72 \]
Sample Period 1959-1973
(X.7) EP Branch Output: Electroenergy

(a) Primary Factors

\[
(XIEP/XIEP_{-1}) - 0.03 = 0.69574 (NMIIEP/NMIIEP_{-1}) \\
(0.063)
\]

\[
+ 0.28360 (KIEP/KIEP_{-1}) - 0.04202 Q66 \\
(7.18) \quad (3.48)
\]

\[ R^2 = 0.761 \quad S.E. = 0.011 \quad D.W. = 1.57 \]
Sample Period 1959-1974

(b) Material Inputs

\[
(XIEP/XIEP_{-1}) = 0.89931 (NMIIEP/NMIIEP_{-1}) \\
(0.094)
\]

\[
+ 0.29315 (KIEP/KIEP_{-1}) \\
(4.19)
\]

\[
+ 0.05127 (UEP/UEP_{-1}) + 0.03123 QSH68 \\
(1.28) \quad (3.69)
\]

\[ R^2 = 0.546 \quad S.E. = 0.015 \quad D.W. = 1.90 \]
Sample Period 1960-1972

(X.8) XICP Branch Output: Coal Products

(a) Primary Factors

\[
(XICP/XICP_{-1}) - 0.01 = 0.18342 (NMICP/NMICP_{-1}) \\
(0.014)
\]

\[
+ 0.34038 (KICP/KICP_{-1}) - 0.02939 Q61 \\
(6.93) \quad (3.42)
\]

\[ R^2 = 0.488 \quad S.E. = 0.008 \quad D.W. = 2.11 \]
Sample Period 1960-1974

Fit = 0.9954
(b) Material Inputs

\[
\begin{align*}
(XICP/XICP_{-1}) &= 0.17498 \ (NMICP/NMICP_{-1}) \\
&+ 0.46738 \ (KICP/KICP_{-1}) \\
&+ 0.04753 \ (UCP/UCP_{-1}) - 0.03066 \ Q61
\end{align*}
\]

\[
(0.024) \quad (4.96) \quad (0.69) \quad (2.82)
\]

\[
R^2 = 0.396 \quad S.E. = 0.010 \quad D.W. = 1.90 \quad Fit = 0.9919
\]

Sample Period 1960-1972

(X.9) XIPP Branch Output: Petroleum Products

(a) Primary Factors

\[
(XIPP/XIPP_{-1}) = .373 \ (NMIPP/NMIPP_{-1})
\]

\[
= 0.46455 \ \frac{KIPP-KIPPM} {KIPP_{-1}-KIPPM_{-1}}
\]

\[
(0.081) \quad (6.10)
\]

\[
+ 0.09537 \ (KIPPM/KIPPM_{-1}) + 0.04830 \ Q5963
\]

\[
(1.53) \quad (3.72)
\]

\[
R^2 = 0.550 \quad S.E. = 0.018 \quad D.W. = 2.34 \quad Fit = .9971
\]

Sample Period 1959-1974

(b) Material Inputs

\[
(XIPP/XIPP_{-1}) = .373 \ (.604) \ (NMIPP/NMIPP_{-1})
\]

\[
= 0.42862 \ \frac{KIPP-KIPPM} {KIPP_{-1}-KIPPM_{-1}}
\]

\[
(0.083) \quad (3.63)
\]

\[
+ 0.07810 \ (KIPPM/KIPPM_{-1})
\]

\[
(1.16)
\]

\[
+ 0.14335 \ (UPP/UPP_{-1}) + 0.04774 \ Q5963
\]

\[
(1.79) \quad (3.95)
\]

\[
R^2 = 0.594 \quad S.E. = 0.016 \quad D.W. = 2.75 \quad Fit = .9978
\]

Sample Period 1960-1972
(X.10) XIFM Branch Output: Ferrous Metallurgy

(a) Primary Factors

\[
\frac{XIFM}{XIFM_{-1}} - 0.02 = 1.05757 \left(\frac{NMIFM}{NMIFM_{-1}} - 1\right)
\]

\[
(3.18)
\]

\[
(0.042)
\]

\[+ 0.16381 \left(\frac{KIFM}{KIFM_{-1}} - 1\right)\]

\[
(1.91)
\]

\[R^2 = 0.453\quad S.E. = 0.017\quad D.W. = 1.96\]

Sample Period 1959-1974

Fit = 0.9977

(b) Material Inputs

\[
\frac{XIFM}{XIFM_{-1}} - 0.02 = 0.81606 \left(\frac{NMIFM}{NMIFM_{-1}} - 1\right)
\]

\[
(3.58)
\]

\[
(0.042)
\]

\[+ 0.03550 \left(\frac{KIFM}{KIFM_{-1}} - 1\right)
\]

\[
(0.42)
\]

\[+ 0.26690 \left(\frac{UME}{UME_{-1}} - 1\right)
\]

\[
(2.64)
\]

\[R^2 = 0.738\quad S.E. = 0.010\quad D.W. = 2.70\]

Sample Period 1960-1972

Fit = 0.9982

(X.11) XINF Branch Output: Nonferrous Metallurgy

(a) Primary Factors

\[
\frac{XINF}{XINF_{-1}} - 0.02 = 0.60945 \left(\frac{NMINF}{NMINF_{-1}} - 1\right)
\]

\[
(1.72)
\]

\[
(0.056)
\]

\[+ 0.32526 \left(\frac{KIFM}{KIFM_{-1}} - 1\right) + 0.03195 Q6670
\]

\[
(3.83)
\]

\[
(3.99)
\]

\[R^2 = 0.090\quad S.E. = 0.016\quad D.W. = 2.01\]

Sample Period 1959-1974

Fit = 0.9981
(b) Material Inputs

\[
\frac{X_{\text{INF}}}{X_{\text{INF}} - 1} = 0.02 = 0.38023 \left(\frac{N_{\text{MINF}}}{N_{\text{MINF}} - 1}\right) \\
(1.16) \\
(0.058)
\]

\[+ 0.29229 \left(\frac{K_{\text{IFM}}}{K_{\text{FM}} - 1}\right) \\
(2.65)
\]

\[+ 0.10963 \left(\frac{U_{\text{ME}}}{U_{\text{ME}} - 1}\right) + 0.02934 \left(\frac{Q_{\text{66}}}{Q_{\text{66}} - 1}\right) \\
(0.71) \\
(3.58)
\]

\[R^2 = .361 \quad S.E. = 0.014 \quad D.W. = 2.53 \quad \text{Fit} = 0.9984
\]

Sample Period 1960-1972

(X.12) XICH Branch Output: Chemicals and Petrochemicals

(a) Primary Factors

\[
\frac{X_{\text{ICH}}}{X_{\text{ICH}} - 1} = 0.359 \left(\frac{N_{\text{MICF}}}{N_{\text{MICF}} - 1}\right) \\
(0.077)
\]

\[= 0.19157 \left(\frac{K_{\text{ICH}}}{K_{\text{ICH}} - 1}\right) \\
(4.45) \\
(4.45)
\]

\[+ 0.08902 \left(\frac{K_{\text{ICH}}}{K_{\text{ICH}} - 1}\right) + 0.04736 \left(1 - Q_{\text{SH65}}\right) \\
(3.51) \\
(5.78)
\]

\[R^2 = -0.194 \quad S.E. = 0.022 \quad D.W. = 2.37 \quad \text{Fit} = .9984
\]

Sample Period 1959-1974

(b) Material Inputs

\[
\frac{X_{\text{ICH}}}{X_{\text{ICH}} - 1} = 0.359 \left(\frac{N_{\text{MICF}}}{N_{\text{MICF}} - 1}\right) \\
(0.091)
\]

\[= 0.21184 \left(\frac{K_{\text{ICH}}}{K_{\text{ICH}} - 1}\right) \\
(2.22) \\
(2.22)
\]

\[+ 0.09884 \left(\frac{K_{\text{ICH}}}{K_{\text{ICH}} - 1}\right) \\
(2.52)
\]

\[+ 0.12845 \left(\frac{U_{\text{CH}}}{U_{\text{CH}} - 1}\right) + 0.04166 \left(1 - Q_{\text{SH65}}\right) \\
(0.67) \\
(3.66)
\]
(b) Material Inputs (con't.)

\[ R^2 = 0.061 \quad S.E. = 0.026 \quad D.W. = 2.51 \]
Sample Period 1960-1972

\[ \text{Fit} = 0.9973 \]

(X.13) XIMB Branch Output: Machine Building and Metal Working

(a) Primary Factors

\[
\frac{XIMB}{XIMB_{-1}} = 1.14460 \left( \frac{NMIMB}{NMIMB_{-1}} \right) \\
(8.79) \\
+ 0.09865 \left( \frac{KIMB}{KIMBM} \right) \left( \frac{KIMBM_{-1}}{KIMBM_{-1}} \right) \\
(1.38) \\
+ 0.20557 \left( \frac{KIMBM}{KIMBM_{-1}} \right) - 0.04838 Q6365 \\
(4.24) \\
+ 0.02026 QSH72 \\
(3.88) \\
\]

\[ R^2 = 0.889 \quad S.E. = 0.007 \quad D.W. = 2.82 \]
Sample Period 1959-1974

\[ \text{Fit} = 0.9999 \]

(b) Material Inputs

\[
\frac{XIMB}{XIMB_{-1}} - 0.200 \left( \frac{UMB}{UMB_{-1}} \right) \\
(0.055) \\
= 0.71779 \left( \frac{NMIMB}{NMIMB_{-1}} \right) \\
(3.23) \\
+ 0.11254 \left( \frac{KIMB}{KIMBM} \right) \left( \frac{KIMBM_{-1}}{KIMBM_{-1}} \right) \\
(0.95) \\
+ 0.16577 \left( \frac{KIMBM}{KIMBM_{-1}} \right) - 0.03822 Q6365 \\
(1.85) \\
\]

\[ R^2 = 0.607 \quad S.E. = 0.011 \quad D.W. = 1.76 \]
Sample Period 1960-1972

\[ \text{Fit} = 0.9986 \]
(X.14) XIFFP Branch Output: Forest Products

(a) Primary Factors

\[
\frac{XIFFP}{XIFFP_{-1}} - 0.02 = 0.48620 \left(\frac{NMIFFP}{NMIFFP_{-1}} - 1\right)
\]

\[
(0.99) (0.011)
\]

\[
+ 0.23734 \left(\frac{KIFFP}{KIFFP_{-1}} - 1\right) - 0.02825 Q6566
\]

\[
(5.64) (3.17)
\]

\[
- 0.04533 Q6061
\]

\[
(4.28)
\]

\[R^2 = 0.684\]

\[S.E. = 0.012\]

\[D.W. = 2.21\]

Sample Period 1960-1974

Fit = 0.9956

(b) Material Inputs

\[
\frac{XIFFP}{XIFFP_{-1}} = 0.44927 \left(\frac{UFP}{UFP_{-1}} - 1\right) + 0.447 \left(\frac{NMIFFP}{NMIFFP_{-1}} - 1\right)
\]

\[
(2.30) (0.031)
\]

\[
+ 0.34219 \left(\frac{KIFFP}{KIFFP_{-1}} - 1\right) - 0.02855 Q6566
\]

\[
(4.48) (2.61)
\]

\[
- 0.04670 Q6061
\]

\[
(4.06)
\]

\[R^2 = 0.612\]

\[S.E. = 0.014\]

\[D.W. = 1.65\]

Sample Period 1960-1972

Fit = 0.9907

(X.15) XIPA Branch Output: Paper and Pulp

(a) Primary Factors

\[
\frac{XIPA}{XIPA_{-1}} - 0.02 = 0.32433 \left(\frac{NMIPA}{NMIPA_{-1}} - 1\right)
\]

\[
(1.21) (0.045)
\]

\[
+ 0.28065 \left(\frac{KIPA}{KIPA_{-1}} - 1\right) + 0.04916 Q6566
\]

\[
(2.55) (2.63)
\]

\[
+ 0.01071 QSH68
\]

\[
(1.29)
\]

\[R^2 = 0.574\]

\[S.E. = 0.017\]

\[D.W. = 2.88\]

Sample Period 1959-1974

Fit = 0.9979
(b) Material Inputs

\[
(XIPA/XIPA_{-1}) = 0.16648 (NMIPA/NMIPA_{-1}) \\
(0.069) \\
+ 0.39275 (KIFP/KIFP_{-1}) \\
(4.32) \\
+ 0.31019 (UPA/UPA_{-1}) + 0.04943 Q6566 \\
(4.88) \\
= 0.760 \\
S.E. = 0.014 \\
D.W. = 2.80 \\
Sample Period 1960-1972 \\
Fit = 0.9987
\]

(R.16) XICM Branch Output: Construction Materials

(a) Primary Factors

\[
(XICM/XICM_{-1}) - 0.59 (NMICM/NMICM_{-1}) = \\
(0.059) \\
+ 0.17619 (KICM/KICM_{-1}) + 0.05121 \\
(3.03) \\
- 0.01853 QFYP - 0.4105 Q6869 \\
(2.06) \\
R^2 = 0.732 \\
S.E. = 0.018 \\
D.W. = 1.30 \\
Sample Period 1959-1974 \\
Fit = .9975
\]

(b) Material Inputs

\[
(XICM/XICM_{-1}) - 0.59 (.482)(NMICM/NMICM_{-1}) \\
(0.064) \\
= 0.20626 (KICM/KICM_{-1}) \\
(1.53) \\
+ 0.17136 (UCM/UCM_{-1}) + 0.02966 \\
(1.15) \\
R^2 = 0.233 \\
S.E. = 0.029 \\
D.W. = 1.26 \\
Sample Period 1960-1972 \\
Fit =
(X.17) XISC Branch Output: Softgoods

(a) Primary Factors

\[ \ln \text{XISC} = -4.73048 + 0.92123 \ln \text{NMISG} \]
\[ (4.356) \quad (2.97) \quad (4.60) \]
\[ + 0.21945 \ln \text{KISG} + 0.22810 \ln \text{XAGT70-1} \]
\[ (4.11) \quad (3.12) \]
\[ - 0.08337 \quad \text{Q6567} \]
\[ (7.47) \]

\( R^2 = 0.996 \quad \text{S.E.} = 0.017 \quad \text{D.W.} = 2.00 \)

Sample Period 1958-1974

(b) Material Inputs

\[ \ln \text{XISC} = -8.31346 + 1.43480 \ln \text{NMISG} + 0.03341 \ln \text{KISG} \]
\[ (4.335) \quad (2.37) \quad (3.36) \quad (0.19) \]
\[ + 0.16128 \ln \text{USC} - 0.06931 \text{Q6567} \]
\[ (1.14) \quad (3.49) \]

\( R^2 = 0.991 \quad \text{S.E.} = 0.024 \quad \text{D.W.} = 1.24 \)

Sample Period 1959-1972

(X.18) XIPF Branch Output: Processed Foods

(a) Primary Factors

\[ (\text{XIPF/XIPF}_{-1}) - 0.01 = 0.63866 \left( \frac{\text{NMIPF/NMIPF}_{-1}}{1} \right) \]
\[ (0.045) \quad (1.91) \]
\[ + 0.10178 \left( \frac{\text{KIPF/KIPF}_{-1}}{1} \right) + 0.02025 \left( \frac{\text{XAGT70}}{XACTN}_{-1} \right) \]
\[ (0.91) \quad (1.67) \]

\( R^2 = 0.304 \quad \text{S.E.} = 0.022 \quad \text{D.W.} = 3.00 \)

Sample Period 1959-1974
(b) **Material Inputs**

\[
\frac{\text{XIPF}}{\text{XIPF}_1} = \frac{0.86264}{\text{NMIPF}} \frac{\text{NMIPF}_1}{-1.} (0.054)
\]

\[
+ 0.12126 \frac{\text{KIPF}}{\text{KIPF}_1} (1.23)
\]

\[
+ 0.17662 \frac{\text{rIPF}}{\text{UPF}_1} (2.76)
\]

\[R^2 = 0.379\]

\[\text{S.E.} = 0.021\]

\[\text{D.W.} = 1.84\]

**Sample Period 1960-1972**

\[\text{Fit} = 0.995\]

(X.19) **XIT Industrial Output**

(a) **Aggregation Identity**

\[\text{XIT} = 0.062 \text{XIEP} + 0.060 \text{XICP} + 0.056 \text{XIPP} + 0.073 \text{XIFM} + 0.038 \text{XINF} + 0.067 \text{XICM} + 0.062 \text{XICH} + 0.315 \text{XIMB} + 0.069 \text{XIFP} + 0.011 \text{XIPA} + 0.099 \text{XISG} + 0.090 \text{XIPF}\]
(b) Aggregate Production Function, No Foreign Capital Term

\[
\frac{XIT}{XIT_{-1}} - 1 = 0.33664 \left( 0.845 \frac{NMI}{NMI_{-1}} + 0.155 \frac{NIET}{NIET_{-1}} \right) \]

\[
(3.24) + 0.57337 \left( \frac{KIA}{KIA_{-1}} - 1 \right) \]

\[
(0.065) + 0.09348 \left( \frac{XAGT70}{XAGTN} + \frac{XAGT70_{-1}}{XAGTN_{-1}} - 2 \right) \]

\[
(7.27) \]

\[
R^2 = 0.709 \quad S.E. = 0.005 \quad D.W. = 2.32 \quad \text{Fit} = 0.9997 \]

Sample Period 1960-1974

(c) Aggregate Production Function, Capital Disaggregation

\[
\ln XIT - 0.37 \left( 0.845 \ln (NMI-\text{NIET}) + 0.155 \ln \text{NIET} \right) = \]

\[
(0.781) - 1.44177 + 0.41735 \ln (\text{KIA-KIW}) + 0.11497 \ln \text{KIW} \]

\[
(3.11) + 0.03522 Q6466 + 0.07159 \left( \frac{XAGT70}{XAGTN} - 1 \right) \]

\[
(3.66) \quad (1.06) \quad (0.98) \]

\[
R^2 = 0.997 \quad S.E. = 0.014 \quad D.W. = 0.58 \quad \text{Fit} = 0.9974 \]

Sample Period 1960-1974

(X.20) XCRUB Construction Activity, State Enterprises

\[
\ln XCRUB = -7.73635 + 1.08493 \ln \text{NMC} + 0.06917 \ln \left( \frac{KCR_{-1} + KCR}{2} \right) \]

\[
(3.506) \quad (8.09) \quad (1.57) + 0.23345 \ln XICM - 0.01867 QFIN \]

\[
(5.74) \quad (2.43) \]

\[
R^2 = 0.999 \quad S.E. = 0.009 \quad D.W. = 2.45 \]

Sample Period 1958-1974
(X.21) **Transport and Communications Output Index**

\[ \ln \text{XTR} = -3.30713 + 0.74248 \ln \left( \frac{\text{KTA}_{t+1} + \text{KTA}}{2} \right) \]

\[ + 0.15759 \ln \left( \frac{\text{NTSPA} + \text{NTSPA}_{-1}}{2} \right) + 0.62861 \ln \text{KTCUS} \]

\[ R^2 = 0.999 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 1.07 \]

Sample Period 1958-1974

(X.22) **Domestic Trade**

\[ \ln \text{XDTR} = -3.25146 + 0.29108 \ln \text{NMS} \]

\[ + 1.15236 \ln \left( \frac{0.27291(\text{XISG} + \text{XISG}_{-1}) + 0.39034(\text{XIPF} + \text{XIPF}_{-1})}{2(0.27291 + 0.39034)} \right) \]

\[ R^2 = 0.998 \quad \text{S.E.} = 0.015 \quad \text{D.W.} = 0.81 \]

Sample Period 1961-1974

(X.23) **Services**

\[ \ln \text{XSER70} = -4.71028 + 0.98524 \ln \text{NMG} \]

\[ + 0.1248 \ln \left( \frac{\text{KSER} + \text{KSER} + \text{KHB} + \text{KHB}_{-1}}{2} \right) \]

\[ R^2 = 0.9995 \quad \text{S.E.} = 0.005 \quad \text{D.W.} = 0.37 \]

Sample Period 1960-1974
W. WAGES

(W.1) \( WI^* \) Average Wage, Industry

\[
DVWI - DVWI_{-1} = 0.20052 \left( 28.3776 - DVWI_{-1} \right) + 0.02466 \quad (0.063) \\
+ 1.68906 \left( QWREF - 2.0625 \right) \quad (6.55)
\]

\[
+ 0.87915 \left( Q61 - 0.0625 \right) \quad (2.94)
\]

\( R^2 = 0.845 \quad S.E. = 0.281 \quad D.W. = 1.24 \)

Sample Period 1960-1973

Where

\[
DVWI = \frac{WI^*/PRC_{-1}}{171.449 \times \frac{XIT/NMI}{\text{(real wage)}}} \\
\quad \text{(average product)}
\]

(W.2) \( WAS^* \) Average Wage, State Farms

\[
DVWA - DVWA_{-1} = 0.41095 \left( DHWA - DVWA_{-1} \right) + 0.45859 \quad (0.779) \\
+ 0.41095 \left( Q61 - 0.0625 \right) \quad (0.93)
\]

\( R^2 = 0.411 \quad S.E. = 1.930 \quad D.W. = 1.77 \)

Sample Period 1959-1974

Where

\[
DVWA = \frac{10.WAS^*/PRC_{-1}}{\left( XAGTN_{-1}/\text{NAT}_{-1} \right)} \quad \text{(real wage)} \quad \text{(average product)}
\]

and

\[
DHWA = 61.11470 + 1.75075 \left( 1 - QSH68 \right) \left( QT50 - 19 \right) \\
(56.191) \quad (60.57) \quad (7.32)
\]

\( R^2 = 0.793 \quad S.E. = 3.009 \quad D.W. = 0.68 \)

Sample Period 1959-1974
(W.3) \[ WAK^* \text{ Average Wage, Collective Farms} \]

\[
DVWA - DVWA_{-1} = 0.84175 (DHWA-DVWA_{-1}) + 0.24676 \\
(1.559) \quad (5.22) \quad (0.45)
\]

\[ R^2 = 0.661 \quad \text{S.E.} = 1.923 \quad \text{D.W.} = 2.48 \]

Sample Period 1959-1974

Where

\[
DVWA = \frac{10 \cdot WAK^*/PRC_{-1}}{XAGT70_{-1}/NAT_{-1}} \quad \frac{(\text{real wage})}{(\text{average product})_{-1}}
\]

and

\[
DHWA = 41.67122 + 3.18046 (1.-QSH68)(QT50-19.) \\
(32.73) \quad (62.50) \quad (20.13)
\]

\[ R^2 = 0.967 \quad \text{S.E.} = 1.989 \quad \text{D.W.} = 2.01 \]

Sample Period 1959-1974

(W.4) \[ WC^* \text{ Average Wage, Construction} \]

\[
WC^* = \frac{1.10835 + 0.01052 (QT50-20.) (1.-Q690N)}{234.98} \quad (12.17)
\]

\[ R^2 = 0.908 \quad \text{S.E.} = 0.014 \quad \text{D.W.} = 1.55 \]

Sample Period 1958-1974

(W.5) \[ WTC^* \text{ Average Wage, Transport and Communications} \]

\[
WTC^* = \frac{1.00722 WTC^*}{516.04} + 0.02539 (Q6162 - 2.*.0625) \\
(1.0675) \quad (4.42)
\]

\[ R^2 = 0.941 \quad \text{S.E.} = 0.008 \quad \text{D.W.} = 1.71 \]

Sample Period 1959-1974
(W.6) \[ WS^* = \frac{1.00315 \cdot WS^*}{WGS^*} + 0.02056 \cdot (Q6668 - 3 \cdot 0.0625) \]
\[ \text{(387.15)} \]
\[ -1 \quad \text{(3.63)} \]
\[ (0.855) \]

\[ R^2 = 0.893 \quad \text{S.E.} = 0.009 \quad \text{D.W.} = 1.59 \]
Sample Period 1959-1974

\[ D. = 0.82 \]

(W.7) \[ WGS^* = \frac{0.98983 \cdot WGS^*}{WI^*} + 0.09364 \cdot Q65 \]
\[ \text{(259.03)} \]
\[ -1 \quad \text{(7.56)} \]
\[ (0.978) \]

\[ R^2 = 0.889 \quad \text{S.E.} = 0.012 \quad \text{D.W.} = 1.63 \]
Sample Period 1959-1974

\[ D. = 0.74 \]
Supplemental Wage Equations

These equations determine the monthly money wage variables which are used in the Hickman-Lau functions. Sample Period 1959-1972 for Equations (W.8)-(W.24).

(W.8) WAGI* Industry

\[
\begin{align*}
\text{WAGI*} & = 0.1004 \\
\text{WII} & = (1.166.) \hspace{1cm} (0.1000)
\end{align*}
\]

\[R^2 = 0.225 \quad \text{S.E.} = 0.0003 \quad \text{D.W.} = 0.88\]

(W.9) WAGA* Agriculture

\[
\begin{align*}
\text{WAGA*} & = 0.08355 \\
\text{WAS*} & = (5.45.) \hspace{1cm} (0.0835)
\end{align*}
\]

\[R^2 = -0.009 \quad \text{S.E.} = 0.0006 \quad \text{D.W.} = 2.26\]

(W.10) WAGCON* Construction

\[
\begin{align*}
\text{WAGCON*} & = 0.08329 + 0.001856 \text{ QSH65} \\
\text{WTC*} & = (3.18.) \hspace{1cm} (4.64) \hspace{1cm} (0.0841)
\end{align*}
\]

\[R^2 = 0.644 \quad \text{S.E.} = 0.0007 \quad \text{D.W.} = 2.02\]

(W.11) WAGTC* Transport and Communications

\[
\begin{align*}
\text{WAGTC*} & = 0.083255 \\
\text{WTC*} & = (4.34.) \hspace{1cm} (0.0833)
\end{align*}
\]

\[R^2 = 0.031 \quad \text{S.E.} = 0.0007 \quad \text{D.W.} = 1.08\]
(W.12) **WAGTD** Domestic Trade

\[
\begin{align*}
WAGTD^* &= 0.08334 - 0.000388 \text{QSH63} \\
\text{S.E.} &= 0.0002 \\
\text{D.W.} &= 1.79
\end{align*}
\]

(W.13) **WAGE** Economy Average

\[
\begin{align*}
\text{WAGE}^* &= 0.07675 + 0.03217 \text{Q69} - 0.0030 \text{QSH65} \\
\text{S.E.} &= 0.0005 \\
\text{D.W.} &= 0.714
\end{align*}
\]

**BRANCH WAGES** (W.14) - (W.24)

**Define API - Average Industrial Productivity**

\[
\text{API} = \frac{X11}{N11} \text{N11}
\]

**Define TR - Time Trend 1950 = -18 1968 on = 0**

\[
\text{TR} = (1-\text{QSH68}) \times (\text{QT50-19.})
\]

**Define TSH - Shift Variable 1 to 1967 1968 on = 0**

\[
\text{TSH} = 1 - \text{QSH68}
\]

(W.14) **WAGFM** Ferrous Metallurgy

\[
\begin{align*}
\text{WAGFM}^* &= 0.0554 + .04718 \times (X1FM/NM1FM)/API - .02117 \text{TR} \\
\text{S.E.} &= 0.08 \\
\text{D.W.} &= 2.20
\end{align*}
\]

(W.15) **WAGCP** Coal Products

\[
\begin{align*}
\text{WAGCP}^* &= 1.7903 - .11490 \text{TSH} - .00469 \text{TR} \\
\text{S.E.} &= .0301 \\
\text{D.W.} &= 1.74
\end{align*}
\]
WAGPG* Petroleum & Gas

\[
\text{WAGPG}^* = 1.0279 - .00898 \, \text{TR} \\
\text{(1.0568)}
\]

\[\begin{align*}
\text{R}^2 &= .992 \\
\text{S.E.} &= .0028 \\
\text{D.W.} &= 1.27
\end{align*}\]

WAGEP* Electric Power

\[
\text{WAGEP}^* = 1.0295 - .00373 \, \text{TR} - .08779 \, \text{Q5960} \\
\text{(1.0290)}
\]

\[\begin{align*}
\text{R}^2 &= .941 \\
\text{S.E.} &= .0069 \\
\text{D.W.} &= 1.34
\end{align*}\]

WAGMB* Machine Building & Metal Working

\[
\text{WAGMB}^* = .47923 + .19898 \, (\text{XIMB}/\text{NMIMB})/\text{API} + .00441 \, \text{TR} \\
\text{(1.0132)}
\]

\[\begin{align*}
\text{R}^2 &= .82 \\
\text{S.E.} &= .0061 \\
\text{D.W.} &= 1.11
\end{align*}\]

WAGCH* Chemicals

\[
\text{WAGCH}^* = 1.0293 - .00271 \, \text{TR} \\
\text{(1.0380)}
\]

\[\begin{align*}
\text{R}^2 &= .417 \\
\text{S.E.} &= .0110 \\
\text{D.W.} &= 1.72
\end{align*}\]

WAGFP* Forest Products

\[
\text{WAGFP}^* = .69099 + .02636 \, (\text{XIFP}/\text{NMIFP})/\text{API} + .00996 \, \text{TR} \\
\text{(.9805)}
\]

\[\begin{align*}
\text{R}^2 &= .906 \\
\text{S.E.} &= .1089 \\
\text{D.W.} &= 1.40
\end{align*}\]
(W.21) **WAGP** Paper

\[ \text{WAGP}^* = 0.97465 - 0.00621 \text{ TR} \]
\[ \text{(156) (4.50)} \]
\[ R^2 = 0.629 \quad \text{S.E.} = 0.0164 \quad \text{D.W.} = 1.22 \]

(W.22) **WAGCM** Construction Materials

\[ \text{WAGCM}^* = 0.85587 + 0.00696 \left( \frac{XICM}{NMICM} \right) / \text{API} + 0.00181 \text{ TR} + 0.06498 \text{ Q7072} \]
\[ \text{(9.97) (1.34) (1.14) (9.11)} \]
\[ R^2 = 0.966 \quad \text{S.E.} = 0.0072 \quad \text{D.W.} = 1.30 \]

(W.23) **WAGSG** Soft Goods

\[ \text{WAGSG}^* = 0.60873 + 0.02719 \left( \frac{XISG}{NMISG} \right) / \text{API} + 0.00495 \text{ TR} - 0.03348 \text{ Q5960} \]
\[ \text{(8.75) (2.40) (5.08) (4.48)} \]
\[ R^2 = 0.924 \quad \text{S.E.} = 0.0070 \quad \text{D.W.} = 0.823 \]

(W.24) **WAGPF** Processed Foods

\[ \text{WAGPF}^* = 0.88688 + 0.00699 \text{ TR} - 0.03112 \text{ Q5960} \]
\[ \text{(306) (8.27) (4.07)} \]
\[ R^2 = 0.957 \quad \text{S.E.} = 0.0073 \quad \text{D.W.} = 1.91 \]
(Z.1) **ZGW* Gross Earnings, State Employees**

\[ ZGW^* = 1.02077 \times ZWH^* \]

(102.18) (621.13)

\[ R^2 = 1.000 \quad S.E. = 0.72 \quad D.W. = 0.38 \]

Sample Period 1958-1972

Where: \( ZWH^* \equiv (NMI \cdot W1^* + NMC \cdot WC^* + NMTC \cdot WTC^* + NMS \cdot WS^* + NMG \cdot WGS^* + 1000 \cdot NASOV \cdot WSA^*) / 10.6 \)

(2.2) **ZWK* Collective Farm Wage Payments**

\[ ZWK^* \equiv NAKOL.WAK^* \]

(2.3) **ZSAG* Income from Sale of Farm Products**

\[ \ln ZSAG^* = -4.24559 + 0.71561 \times (\ln PAPC70 + \ln XAGT70) \]

\[ (1.968) \quad (3.39) \quad (12.30) \]

\[ - 1.27292 \times XAGT70 - 1 - 0.18380 \times Q69 \]

\[ (4.59) \quad (68.70) \quad (2.85) \]

\[ R^2 = .922 \quad S.E. = 0.061 \quad D.W. = 1.97 \]

Sample Period 1958-1974

(2.4) **ZMPA* Military Pay and Allowances**

\[ ZMPA^* \equiv NMD9.WDF^* \]

(2.5) **ZTG* Gross Household Money Income**

\[ ZTG^* \equiv ZGW^* + ZWK^* + ZSAG^* + ZMPA^* + BTRAN^* + EPCP^*9 \]

(2.6) **ZTD* Disposable Household Money Income**

\[ ZTD^* \equiv ZTG^* - TAXES^* - TDUES^*9 - TINS^*9 \]
(Z.7) **ZIK60 Agricultural Income in Kind**

\[
100. \frac{ZIK60}{XAGTN} = 18.81209 + 24.31700 \left(\frac{XAGT70}{XAGTN}\right) - 1. \left(\frac{18.12}{XAGTN}\right)
\]

\[
R^2 = 0.725 \quad S.E. = 1.03 \quad D.W. = 2.12
\]

Sample Period 1956-1966

(Z.8) **ZD70 Real Disposable Household Income**

\[
ZD70 = 100. \frac{ZTD*}{PRC} + \frac{ZIK60}{0.76}
\]

(Z.9) **Gross Profits, National Economy**

(a) **Non-Residual Version**

\[
\frac{ZPG*/ZPG*}{ZPG*/ZPG*} - 1 = 1.05012 + 0.16708 Q6668 + 0.12411 Q70 \\
(67.40) \quad (6.16) \quad (2.87)
\]

\[
+ 0.32122 \left(\frac{XAGT70}{XAGTN} - 1.\right) + 0.06636 QSH65 \\
(1.65) \quad XAGTN \quad (2.64)
\]

\[
R^2 = 0.817 \quad S.E. = 0.038 \quad D.W. = 3.01
\]

Sample Period 1959-1974

(b) **Residual Version**

\[
ZPG* = 0.9363 GNP3.PGNP3 - ZD70.PRC/100. - ZDT* \\
- TOSS* - TPOP*
\]

(Z.10) **Amortization Funds, National Economy**

\[
\frac{ZDT*/ZDT*}{ZDT*/ZDT*} - 1 = 0.53466 + 0.52239 KSUM/KSUM - 1 \\
(1.88) \quad (2.00)
\]

\[
+ 0.26786 Q63 + 0.01935 \left(QSH67 - QSH67\right) - 1. \left(33.79\right) \quad (1.59)
\]

\[
R^2 = 0.994 \quad S.E. = 0.007 \quad D.W. = 1.32
\]

Sample Period 1959-1974
(P.1) PNF70 State Retail Price, Non-Food Goods

\[
\frac{\text{PNF70}}{1+\text{RTTD9}} - \left(\frac{\text{PNF70}}{1+\text{RTTD9}}\right)_{-1} = -0.10904 + 1.56521 \text{Q6668} \\
\text{S.E.} = 0.48 \quad \text{D.W.} = 2.45
\]

\[
= 0.287
\]

\[
+ 0.30613 \left(\frac{\text{PWIQN}}{1+\text{RTTD9}}\right)_{-1}
\]

\[
R^2 = 0.683 \
\text{Sample Period 1960-1973}
\]

Where

\[
\text{PWIQN} = K \cdot \text{WIQN} \quad \text{(marked-up industrial wage)}
\]

\[
\text{WIQN} = \frac{\text{W}I^*}{17144.9 \text{ XIT/NMI}}
\]

\[
K = 2.78220 + 0.25912 \text{QLT28} - 0.14517 \text{QSH68} \\
\text{S.E.} = 4.77 \quad \text{D.W.} = 1.59
\]

Estimated over sample period 1959-1973

(P.2) PIRF70 State Retail Price, Food Goods

\[
\frac{\text{PIRF70}}{1+\text{RTTD9}} - \left(\frac{\text{PIRF70}}{1+\text{RTTD9}}\right)_{-1} = 0.72739 + 1.72614 \text{Q6668} \\
\text{S.E.} = 3.01 \quad \text{D.W.} = 3.29
\]

\[
= 1.087
\]

\[
+ 0.25991 \left(0.85 \text{PWIQN} + 0.15 \text{PAFC70}_{-1}\right) \\
\text{S.E.} = 2.87
\]

\[
\text{R}^2 = 0.610 \
\text{Sample Period 1960-1973}
\]

\[
\text{S.E.} = 0.800 \quad \text{D.W.} = 2.41
\]
(P.3) **PAFC70 "Negotiated" Agricultural Price**

(Food sold by collective farms to consumer cooperatives.)

\[
\text{PAFC70}/\text{PAFC70}_{-1} = 1.05715 + .09017 \text{Q69} - 0.1527 \frac{\text{MGRDWS}}{\text{PGR9}} \\
= 0.45472 \left(\frac{\text{XAGT70}_{-1}}{\text{XAGTN}_{-1}} - 1\right)
\]

\[R^2 = 0.521 \quad \text{S.E.} = 0.045 \quad \text{D.W.} = 2.26\]
Sample Period 1961-1974

(P.4) **PFCC Consumption Price, Food**

\[\text{PFCC} = .875 \text{PIRF70} + .125 \text{PAFC70}\]

(P.5) **PRC Consumption Price, Total**

\[\text{PRC} = .60 \text{PFCC} + .40 \text{PNF70}\]

(P.6) **PIWL70 Wholesale Price, Light Industry**

\[
\text{PIWL70} - \text{PIWL70}_{-1} = -0.23590 - 1.82417 \text{Q67} + 2.95478 \text{Q73} \\
+ .09382 (\text{PWIQN} - \text{PIWL70}_{-1})
\]

\[R^2 = .676 \quad \text{S.E.} = .798 \quad \text{D.W.} = 2.06\]
Sample Period 1960-1973

(P.7) **PIWH70 Wholesale Price, Heavy Industry**

\[
\text{PIWH70} - \text{PIWH70}_{-1} = -0.56813 - 3.97732 \text{Q61} + 14.20453 \text{Q67} \\
(0.162)
\]

\[R^2 = .924 \quad \text{S.E.} = 1.256 \quad \text{D.W.} = 1.22\]
Sample Period 1960-1973

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(P.8) PI1 Investment Deflator, Industry

\[ PI1 = 0.81500 \times CON9 + 0.20588 \times PIWH70 \]

\[ R^2 = 0.934 \quad S.E. = 1.62 \quad D.W. = 0.36 \]
Sample Period 1957-1972

(P.9) PIC Investment Deflator, Construction

\[ PIC = 0.32125 \times CON9 + 0.68619 \times PIWH70 \]

\[ R^2 = 0.727 \quad S.E. = 3.56 \quad D.W. = 2.13 \]
Sample Period 1957-1972

(P.10) PIT Investment Deflator, Transport and Communications

\[ PIT = 0.67878 \times CON9 + 0.32086 \times PIWH70 \]

\[ R^2 = 0.699 \quad S.E. = 4.40 \quad D.W. = 0.34 \]
Sample Period 1957-1972

(P.11) PIS Investment Deflator, Government, Trade, Services, etc. (excl. Housing)

\[ PIS = 0.78015 \times CON9 + 0.24469 \times PIWH70 \]

\[ R^2 = 0.899 \quad S.E. = 1.88 \quad D.W. = 0.36 \]
Sample Period 1957-1972

(P.12) PIHS Investment Deflator, Housing

\[ PIHS = 0.82329 \times CON9 + 0.19220 \times PIWH70 \]

\[ R^2 = 0.971 \quad S.E. = 1.11 \quad D.W. = 0.53 \]
Sample Period 1957-1972
(P.13) PIA Investment Deflator, Agriculture

\[ PIA = 0.34481 \text{ PXCON9} + 0.06897 \text{ PIWH70} + 58.03934 \]
\[ \text{(93.5)} \quad \text{(22.19)} \quad \text{(3.00)} \quad \text{(30.86)} \]

\[ R^2 = .983 \quad \text{S.E.} = 0.410 \quad \text{D.W.} = 1.16 \]
Sample Period 1957-1972

(P.14) PGNP3 GNP Deflator

\[ PGNP3 = 0.77346 + 0.01086 \text{ QT50} - 0.13101 \text{ QPR67} \]
\[ \text{(0.881)} \quad \text{(23.66)} \quad \text{(7.58)} \quad \text{(8.68)} \]

\[ R^2 = 0.989 \quad \text{S.E.} = 0.013 \quad \text{D.W.} = 1.70 \]
Sample Period 1958-1974

Actual PGNP defined by the identity:

\[ PGNP = \text{GNP}^{-1} \left( \frac{\text{ZD70} \cdot \text{PRC}}{100} + \text{ZPG*} + \text{ZDT*} + \text{TOSS*} + \text{TPOP*} \right) / .9363 \]
C. CONSUMPTION

(C.1) CR70 Total Consumption

(C.1a) Identity Determination

\[ CR70 = CRF70 + CRND70 + CRD70 + CRS70 \]

(C.1b) Direct Determination

\[
\frac{CR70}{ZD70} = 1.14566 - 0.60556 (QLT28 - 3.8067) \quad QSH72 - 1
\]

\[
(1.279) \quad (5.76) \quad (12.25)
\]

\[ - 0.39815 \frac{ZD70}{ZD70 - 1} + 1.20099 \left( \frac{27291 \times \text{ISG} + 0.39034 \times \text{XIPF}}{ZD70} \right) \]

\[
(3.09) \quad (4.44)
\]

\[ R^2 = 0.986 \quad S.E. = 0.015 \quad D.W. = 1.84 \]
Sample Period 1956-1974

(C.1c) Residual Determination

\[ CR70 \neq GNP3 - \text{GEUSUM3} - 0.001 (ETW70 - MTW70) - \text{GRESEM3} \]

(C.2) CRF70 Food Consumption

(C.2a) Direct Determination

\[
\frac{CRF70}{ZD70} = 1.56793 - 0.33992 \frac{ZD70}{ZD70 - 1} - 0.95585 \frac{PFCC}{PNF70}
\]

\[
(5.45) \quad (3.34) \quad (4.24)
\]

\[ + 0.30920 \frac{XAGT70}{ZD70} + 1.13451 \frac{0.39034 \times \text{XIPF}}{ZD70} \]

\[
(2.28) \quad (4.24)
\]
(C.2a) Direct Determination (Continued)

\[ R^2 = 0.987 \quad \text{S.E.} = 0.013 \quad \text{D.W.} = 1.37 \]
Sample Period 1956-1974

(C.2b) Share Determination

\[
\begin{align*}
\text{CRF}_{70}^{\text{CR}70} &= 0.74592 \left( \frac{\text{CRF}_{70}^{\text{CR}70}}{4.78} \right) + 0.33304 \left( \frac{\text{CRND}_{70}^{\text{CR}70}}{0.93} \right) - 1 \\
& \quad + 0.55263 \left( \frac{\text{CRD}_{70}^{\text{CR}70}}{1.58} \right) + 0.96972 \left( \frac{\text{CRS}_{70}^{\text{CR}70}}{2.06} \right) - 1 \\
& \quad - 0.21494 \left( \frac{\text{PFCC}_{70}^{\text{PNF}70}}{1.51} \right) + 0.00443 \left( \frac{1.71449X\text{IT}}{Z\text{D}70} \right) \\
& \quad + 0.18438 \left( \frac{100\text{BDN}^{*9}/\text{PIWH70}}{Z\text{D}70} \right) + 0.07783 \left( \frac{X\text{AGT70}}{Z\text{D}70} \right)
\end{align*}
\]

\[ R^2 = 0.978 \quad \text{S.E.} = 0.005 \quad \text{D.W.} = 2.42 \]
Sample Period 1957-1974

(C.2c) Share Determination, Non-Services

\[
\begin{align*}
\text{CRF}_{70}^{\text{CRNS}70} &= 1.03912 \left( \frac{\text{CRF}_{70}^{\text{CRNS}70}}{7.38} \right) + 0.65294 \left( \frac{\text{CRND}_{70}^{\text{CRNS}70}}{1.38} \right) - 1 \\
& \quad + 0.31635 \left( \frac{\text{CRD}_{70}^{\text{CRNS}70}}{1.00} \right) - 0.19691 \left( \frac{\text{PFCC}_{70}^{\text{PNF}70}}{1.23} \right) \\
& \quad - 0.54820 \left( \frac{0.27291X\text{ISG}}{Z\text{D}70} \right) + 0.05976 \left( \frac{X\text{AGT70}}{Z\text{D}70} \right) \\
& \quad + 0.44571 \left( \frac{100\text{BDN}^{*9}/\text{PIWH70}}{Z\text{D}70} \right)
\end{align*}
\]
(C.2c) Share Determination, Non-Services (Continued)

\[ R^2 = 0.978 \quad \text{S.E.} = 0.006 \quad \text{D.W.} = 2.24 \]
Sample Period 1957-1974

D. = 0.63

(C.3) CRND7O Softgoods

(C.3a) Direct Determination

\[
\frac{\text{CRND7O}}{\text{ZD7O}} = -0.04455 + 0.08357 \frac{\text{PPCC}}{\text{PNF70}} + 1.29545 \frac{0.27291}{\text{XISG}} \frac{\text{ZD7O}}{\text{ZD7O}}
\]
(0.232)

\[ R^2 = 0.854 \quad \text{S.E.} = 0.006 \quad \text{D.W.} = 1.38 \]
Sample Period 1956-1974

(C.3b) Share Determination

\[
\frac{\text{CRND7O}}{\text{CR70}} = 0.21046 \frac{\text{CRF70}}{\text{CR70}} - 0.74858 \frac{\text{CRND7O}}{\text{CR70}} + 0.25518 \frac{\text{CRD7O}}{\text{CR70}} - 0.50359 \frac{\text{CRS7O}}{\text{CR70}} + 0.13329 \frac{\text{PPCC}}{\text{PNF70}} - 0.06414 \frac{1.71449}{\text{ZD7O}} \frac{\text{XISG}}{\text{ZD7O}}
\]
(0.184)

\[ R^2 = 0.895 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 2.25 \]
Sample Period 1957-1974

D. = 1.59
(C.3c) Share Determination, Non-Services

\[
\frac{\text{CRND70}}{\text{CRNS70}} = 0.00327 \left(\frac{\text{CRF70}}{\text{CRNS70}}\right) - 1 + 0.38969 \left(\frac{\text{CRND70}}{\text{CRNS70}}\right) - 1
\]

\[
= 0.09038 \left(\frac{\text{CRD70}}{\text{CRNS70}}\right) + 0.11796 \left(\frac{\text{PFCC}}{\text{PNF70}}\right)
\]

\[
+ 0.42829 \left(\frac{0.27291}{\text{XISG}}\right) - 0.04094 \left(\frac{\text{XAGT70}}{\text{ZD70}}\right) - 1
\]

\[
- 0.17759 \left(\frac{100.\text{BDN*9/PIWH70}}{\text{ZD70}}\right)
\]

\[R^2 = 0.859\quad \text{S.E.} = 0.004\quad \text{D.W.} = 1.90\]

Sample Period 1957-1974

(C.4) CRD70 Durables

(C.4a) Direct Determination

\[
\frac{\text{CRD70}}{\text{ZD70}} = 1.55588 + 1.42781 \left(\frac{\text{QT50}}{100}\right) - 0.48443 \left(\frac{\text{QLT28}}{3.87}\right)
\]

\[
+ 0.51143 \left(\frac{0.40624}{\text{XIMB}}\right) - 0.11888 \left(\frac{100.\text{BDN*9/PIWH70}}{\text{ZD70}}\right)
\]

\[R^2 = 0.975\quad \text{S.E.} = 0.003\quad \text{D.W.} = 1.09\]

Sample Period 1957-1974
(C.4b) **Share Determination**

\[
\frac{\text{CRD70}}{\text{CR70}} = 0.016681 \left( \frac{\text{CRF70}}{\text{CR70}} \right) - 0.03548 \left( \frac{\text{CRND70}}{\text{CR70}} \right) - 1 \\
+ 0.75690 \left( \frac{\text{CRD70}}{\text{CR70}} \right) - 0.13078 \left( \frac{\text{CRS70}}{\text{CR70}} \right) - 1 \\
+ 0.060524 \left( \frac{\text{PFCC}}{\text{PNF70}} \right) + 0.001138 \left( \frac{1.71449 \times \text{XIT}}{\text{ZD70}} \right) \\
- 0.23548 \left( \frac{100 \times \text{BDN}^*9/\text{PIWH70}}{\text{ZD70}} \right) - 0.02052 \left( \frac{\text{XAGT70}}{\text{ZD70}} \right) - 1
\]

\[R^2 = 0.988 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 2.02\]

Sample Period 1957-1974

\[D. = 0.09\]

(C.4c) **Share Determination, Non-Services**

\[
\frac{\text{CRD70}}{\text{CRNS70}} = -0.04239 \left( \frac{\text{CRF70}}{\text{CRNS70}} \right) - 0.04267 \left( \frac{\text{CRND70}}{\text{CRNS70}} \right) - 1 \\
+ 0.77406 \left( \frac{\text{CRD70}}{\text{CRNS70}} \right) + 0.07896 \left( \frac{\text{PFCC}}{\text{PNF70}} \right) \\
+ 0.11990 \left( \frac{0.27291 \times \text{XISG}}{\text{ZD70}} \right) - 0.01881 \left( \frac{\text{XAGT70}}{\text{ZD70}} \right) - 1 \\
- 0.26811 \left( \frac{100 \times \text{BDN}^*9/\text{PIWH70}}{\text{ZD70}} \right)
\]

\[R^2 = 0.987 \quad \text{S.E.} = 0.004 \quad \text{D.W.} = 2.17\]

Sample Period 1957-1974

\[D. = 0.59\]
(C.5) CRS70 Services

(C.5a) Direct Determination

\[
\begin{align*}
\text{CRS70} \quad \text{ZD70} &= \frac{0.08595 - 0.17694 \text{QT50} + 0.04295(\text{QLT28-3.8067})(1.-\text{QSH68})}{(1.58)} \quad (1.05) \quad (0.73) \\
&+ 0.72225 \frac{.43868 \text{XSER70}}{\text{ZD70}} \\
R^2 &= 0.973 \\
\text{S.E.} &= 0.004 \\
\text{D.W.} &= 1.13 \\
\text{Sample Period 1956-1974}
\end{align*}
\]

(C.5b) Share Determination

\[
\begin{align*}
\text{CRS70} \quad \text{CR70} &= \frac{0.02695 (\text{CRF70}) - 0.11714 (\text{CRN70})}{(0.48)} - 1 (0.92) \quad (0.185) \\
&- 0.05431 (\text{CRD70}) + 0.66464 (\text{CRS70}) \\
&+ 0.02112 (\text{PFCC}) + 0.05884 \frac{1.71449 \text{XIT}}{\text{ZD70}} \\
&+ 0.08986 \frac{100. \text{BDN}^*9/\text{PIWH70}}{(1.31)} - 0.01802 \frac{\text{XAGT70-1}}{\text{ZD70}} \\
R^2 &= 0.949 \\
\text{S.E.} &= 0.002 \\
\text{D.W.} &= 3.24 \\
\text{Sample Period 1957-1974}
\end{align*}
\]
(C.5c) **Supply Determination**

\[ CRS70 = 0.92528 (.43868 \times XSER70) - 0.35615 \]

\[ (32.53) \quad (71.78) \quad (0.75) \]

\[ R^2 = 0.997 \quad S.E. = 0.51 \quad D.W. = 0.76 \]

Sample Period 1956-1974

(C.6) **CRNS70 Consumption, Non-Services**

(C.6a) **Income Determination**

\[ \frac{CRNS70}{ZD70} = 0.28946 + 0.73564 \times XAGT70 - 1.042 \]

\[ + 1.04188 (\frac{0.27291 \times XISG + 0.39034 \times XIPF}{ZD70}) \]

\[ (1.042) \quad (3.10) \quad (7.43) \quad (2.97) \]

\[ R^2 = 0.955 \quad S.E. = 0.022 \quad D.W. = 1.67 \]

Sample Period 1956-1974

(C.6b) **Residual or Identity Determination**

\[ CRNS70 = CR70 - CRS70 \]
BUDGET REVENUES

\[ DDF = \frac{BD*9}{BGN*} \]

Defense Share

\[ DPRC = \frac{PRC}{PRC} - 1. \]

Consumption Price Deflator, Rate of Change

\[ ZW* = ZGW* + ZWK* \]

Money Wage Income

(T.1) TDP* Deductions from Gross Profits

\[ \frac{TDP*}{ZPG*} = 1.02975 RTDP9 + 1.22629 (DDF - 0.1275) - 0.08761 Q6768 \]

(0.718)

\[ (80.92) \quad (2.87) \quad (3.33) \]

\[ R^2 = 0.844 \quad S.E. = 0.034 \quad D.W. = 1.30 \]

Sample Period 1958-1974

(T.2) TT* Turnover Tax

\[ \frac{TT*}{ZW*} = 0.67775 (1. - QSH68) + 0.32344 QSH68 \]

(0.392)

\[ (49.80) \quad (76.48) \]

\[ - 0.01781 (1. - QSH68) * QT50 + 0.85416 DPRC - 1 \]

(18.76) \quad (3.88)

\[ - 0.63475 (DDF - 0.1275) \]

(4.03)

\[ R^2 = 0.987 \quad S.E. = 0.008 \quad D.W. = 2.32 \]

Sample Period 1958-1974
(T.3) \[ \text{TOSS}^* = 0.54012 + 0.14276 \text{ Q6165} + 0.30279 \text{ Q5860} \]
\[ - 0.06603 \text{ Q6672} \]
\[ (26.89) \quad (6.01) \quad (11.68) \]
\[ (0.608) \quad (2.90) \]
\[ R^2 = 0.969 \quad \text{S.E.} = 0.028 \quad \text{D.W.} = 2.96 \]
Sample Period 1958-1974

(T.4) \[ \text{TSD}^* = 0.05730 - 0.001283 \text{ Q6768} \]
\[ (491.00) \quad (4.15) \]
\[ (0.057) \]
\[ R^2 = 0.592 \quad \text{S.E.} = 0.004 \quad \text{D.W.} = 0.72 \]
Sample Period 1961-1974

(T.5) \[ \text{TPOP}^* = 0.09226 + 0.01759 \text{ Q5859} - 0.01203 \text{ Q6467} \]
\[ (97.64) \quad (7.30) \quad (6.57) \]
\[ (0.092) \]
\[ R^2 = 0.896 \quad \text{S.E.} = 0.003 \quad \text{D.W.} = 1.39 \]
Sample Period 1958-1974

(T.6) \[ \text{TAXES}^* = \text{TPOP}^* + \text{TAX}\*9 \]
(T.7) \( TR^* \) Total Revenues, State Budget

\[ TR^* = TDP^* + TT^* + TOSS^* + TPOP^* \]
B. STATE BUDGET OUTLAYS

\[ DDF = \frac{BD*9}{BGN^*} - 0.126 \]

Defense Share, Deviation from Mean

\[ DWG = \frac{WGS^*}{WGS^* - 1} - 1.03433 \]

Rate of Change of Government Wage, Deviation from Mean

Q6768 Industrial Price Reform Dummy

Q65 Governmental Financial Reorganization

(B.1) BF* Financing of the National Economy

\[
BF^* = 1.06561 - 0.11691 (Q61-0.0625) + 0.06702 Q6768 \\
= 1.08271 + 0.56345 DWG - 0.01749 Q7175 \\
(1.078)
\]

\[ R^2 = 0.747 \quad S.E. = 0.032 \quad D.W. = 2.86 \]

Sample Period 1959-1974

(B.2) BSC* Social and Cultural Measures (including Science)

\[
BSC^* = 1.08271 + 0.56345 DWG - 0.01749 Q7175 \\
(1.078)
\]

\[ R^2 = 0.830 \quad S.E. = 0.010 \quad D.W. = 1.68 \]

Sample Period 1959-1974
(B.3) **BNAUK*** Science

\[
\text{BNAUK}^* \quad = \quad 1.05050 - 0.008985 (QT50-23.) \text{ QSH72} \\
\text{BNAUK}^* -1 \quad (134.69) \quad (8.24)
\]

\[R^2 = 0.829 \quad \text{S.E.} = 0.019 \quad \text{D.W.} = 2.50\]

Sample Period 1959-1974

(B.4) **BAD*** Administration

\[
\text{BAD}^* \quad = \quad 1.02362 + 1.23163 \text{ DWG} + 0.04589 \text{ Q6669} \\
\text{BAD}^* -1 \quad (122.16) \quad (5.41) \quad (2.83)
\]

\[R^2 = 0.751 \quad \text{S.E.} = 0.028 \quad \text{D.W.} = 2.81\]

Sample Period 1960-1974

(B.5) **BRES*** Expenditure Residual

\[
\text{BRES}^* \quad = \quad 1.06512 - 0.41976 (Q63+Q67-0.133) \\
\text{BRES}^* -1 \quad (33.83) \quad (4.48)
\]

\[R^2 = 0.848 \quad \text{S.E.} = .122 \quad \text{D.W.} = 1.22\]

Sample Period 1960-1974

(B.6) **BGN*** Total Expenditures

\[\text{BGN}^* = \text{BF}^* + \text{BSC}^* + \text{BAD}^* + \text{BRES}^* + \text{BD}^*9\]
(B.7) \[ \text{BTRAN}^* \text{ Transfer Payments (for Disposable Income)} \]

\[
\text{BTRAN}^* = 1.08962 + 0.58739 \text{ DWG} + 0.45132 \frac{\text{XAGT70}}{\text{XAGTN}} - 1. \\
(142.71) (2.90) (3.88) \\
(1.076)
\]

\[ R^2 = 0.698 \quad \text{S.E.} = 0.025 \quad \text{D.W.} = 2.55 \]
Sample Period 1959-1974

(B.8) \[ \text{BRESDEV} \text{ Index of Research and Development Expenditures} \]

\[
\text{BRESDEV} = 0.24665 - 0.000757 \text{ QT50} - 0.05106 (\text{Q6567} + \text{Q68}) \\
(12.52) (6.54) (4.14) \\
(0.109)
\]

\[ R^2 = 0.839 \quad \text{S.E.} = 0.021 \quad \text{D.W.} = 1.82 \]
Sample Period 1958-1973

(B.9) \[ \text{BADMIN} \text{ Index of State Administrative Expenditures} \]

\[
\text{BADMIN} = 0.02994 + 0.20913 \frac{\text{BAD}^*}{\text{BAD}^*-1} \\
(7.64) (3.46) \\
(0.0385)
\]

\[ R^2 = 0.500 \quad \text{S.E.} = 0.0114 \quad \text{D.W.} = 2.09 \]
Sample Period 1960-1973

(B.10) \[ \text{BDT}^* \text{ Total Defense and State Reserves, Current Ruble} \]

\[
\text{BDT}^* = \text{BD}^*9 + \text{BDR}^*9 + \text{BDSR}^*9
\]
(B.11) BDT70  Defense and State Reserves, 1970 Rubles

\[
\text{BDT70} = \frac{5.320}{3.8} \text{NMD9} + \text{BDSR}^9 + 100.\text{BDN}^9/\text{PIWH70} + \text{BDR}^9/(.2 \frac{\text{WGS}^*}{1572} + .8 \frac{\text{PIWH70}}{100})
\]
E. Exports

(E.1) ERMCM* Export of Raw Materials and Semifabricates to CMEA

\[
100 \frac{\text{ERMCM}^*}{\text{PERMCM}^9} = -937.22 + 30.983 \text{ YCMEA}^9 \\
(3.63) (15.5) \\
(-3.098) \\
- 13.364 \{100 \left(\frac{\text{PRMW}^9}{\text{PTW}^9} - \frac{\text{PRMW}^9 - 1}{\text{PTW}^9 - 1}\right) \\
(1.26) \\
- (\text{PERMCM}^9 - \text{PERMCM}^9 - 1)\}
\]

\[R^2 = 0.964 \quad \text{S.E.} = 195 \quad \text{D.W.} = 1.23\]
Sample Period 1961-1973

(E.2) EMACM* Exports of Machinery, to CMEA

\[
\text{EMACM}^* = -712.392 + 0.658452 \text{ ERMCM}^* - 125.552 \text{ Q}4590 \\
(2674) (10.65) (26.57) (4.65)
\]

\[R^2 = 0.985 \quad \text{S.E.} = 66 \quad \text{D.W.} = 1.51\]
Sample Period 1960-1973

(E.3) EGRCM* Exports of Grain, to CMEA

\[
\text{EGRCM}^* = 2.06403 + 2.45125 \frac{\text{XGR}}{\text{NPOP}^9} - \frac{\text{XGRCM}^9}{\text{NCM}^9} \\
(10.97) (3.49) \\
+ 3.3278 \left(\frac{\text{XGR} - 1}{\text{NPOP}^9 - 1} - \frac{\text{XGRCM}^9 - 1}{\text{NCM}^9 - 1}\right) \\
(3.80)
\]

\[R^2 = 0.808 \quad \text{S.E.} = 0.14 \quad \text{D.W.} = 2.29\]
Sample Period 1960-1972

Where:

\[
\text{GRSTK} = \sum_{i=1}^{3} (\text{XGR}_{-i} - \text{XGRPK}_{-i})
\]

228
(E.4) ECOCM* Exports of Consumption Goods; other than Grain

\[
ECOCM^* = 164.554 + 4.51039 \times AGT70_{-1} - 3.78446 \times GRCM9
\]

\[
(254.) \quad (2.19) \quad (1.85) \quad (1.60)
\]

\[R^2 = 0.239 \quad S.E. = 38 \quad D.W. = 1.03\]

Sample Period 1960-1973

(E.5) ETCM* Total Exports to CMEA

\[ETCM^* = ERMCM^* + EMACM^* + EGRCM^* + ECOCM^* + EUSCM^*9\]

(E.6) ENETCM* Balance of Trade with CMEA

\[ENETCM^* = ETCM^* - MTCM^*\]

(E.7) ENFDWS Non-food Exports to the Developed West

\[
\frac{ENFDWS}{ENFDWS_{-1}} - 1. = -0.07584 + 0.27125 \times \left(\frac{MTDW^S - ENETDW^S_{-1}}{MTDW^S_{-1}} - 1.\right)
\]

\[
+ 1.27199 \times \left(\frac{WTDW9 \times PENFDW9}{WTDW9_{-1} \times PENFDW9_{-1}} - 1.\right)
\]

\[R^2 = .820 \quad S.E. = 0.083 \quad D.W. = 1.34\]

Sample Period 1961-1973

(E.8) EGRDW$ Grain Exports to the DW

\[
\frac{100 \times EGRDW$}{PGR9 \times NPOP9} = 1.73703 - 3.88386 \times GWE9
\]

\[
(5.99) \quad (4.92) \quad (NWE9)
\]

\[+ 2.06302 \times GRSTK\]

\[4.74 \quad (NPOP9)\]

\[R^2 = 0.786 \quad S.E. = 0.091 \quad D.W. = 1.98\]

Sample Period 1960-1972

Where:

GRSTK is defined below (E.3)
(E.9) \( \text{EFFODW} \) Export of Food other than Grain to the DW

\[
\text{EFFODW} = -132.72 + 3.22044 \times \text{XAGT70}_{-1}
\]

\[
R^2 = 0.714 \quad \text{S.E.} = 21 \quad \text{D.W.} = 1.29
\]

Sample Period 1960-1973

(E.10) \( \text{ETDWS} \) Total Exports to the Developed West

\[
\text{ETDWS} = \text{ENFDW} + \text{EGRDW} + \text{EFFODW}
\]

(E.11) \( \text{ENETGR} \) Net Balance of Grain Trade

\[
\text{ENETGR} = 1.1111 \times \text{ERCM} + 100. \frac{\text{EGRDW} + \text{EGRILDC} - \text{MGREW}}{\text{PGR9}}
\]

(E.12) \( \text{ENETDW} \) Balance of Trade with the DW

\[
\text{ENETDW} = \text{ETDWS} - \text{MTDW}
\]

(E.13) \( \text{ETLDC} \) Total Exports to the Less Developed Countries

\[
\text{ETLDC} = -137.601 + 0.213556 \times \text{WTLDC9}_{-1}
\]

\[
+ 0.339775 \times \text{ETLDC9}_{-1}
\]

\[
R^2 = 0.954 \quad \text{S.E.} = 93 \quad \text{D.W.} = 2.07 \quad \text{D.} = 0.22
\]

Sample Period 1961-1973

(E.14) \( \text{EGRILDC} \) Exports of Grain to the LDC's

\[
\frac{\text{EGRILDC} \times 100}{\text{NPOP9} \times \text{PGR9}} = 2.47943 + 1.42838 \times \text{GRSTK}_{-1}
\]

\[
- 9.95524 \times \frac{\text{XGRLDC9}_{-1}}{\text{NLDC9}_{-1}}
\]

\[
R^2 = 0.404 \quad \text{S.E.} = 0.12 \quad \text{D.W.} = 1.57
\]

Sample Period 1960-1972
(E.14) EGR ldc$ Exports of Grain to the LDC's (Continued)

Where GRSTK defined below (E.3).

(E.15) EOSC$ Exports to Yugoslavia and the Far Eastern Socialist Countries

\[
\text{EOSC} = -174.24 + 4.26099 \times \text{WT9} + 0.38366 \times \text{EOSC}_t-1
\]

\[
(690) \quad (2.94) \quad (2.69) \quad (1.44)
\]

\[
R^2 = 0.970 \quad \text{S.E.} = 62 \quad \text{D.W.} = 1.80
\]

Sample Period 1961-1973

(E.16) EMACH$ Exports of Machinery to China

\[
\text{EMACH} = 17.40668 + 0.35579 \times \text{GNPCH9} - 39.3286 \times \text{Q6870}
\]

\[
(44) \quad (0.48) \quad (1.02) \quad (2.84)
\]

\[
R^2 = 0.509 \quad \text{S.E.} = 20 \quad \text{D.W.} = 1.80
\]

Sample Period 1962-1972

(E.17) EOCH$ Exports of Other than Machinery to China

\[
\text{EOCH} = -9.2943 + 0.48417 \times \text{EMACH} + 0.66898 \times \text{EOCH}_{t-1}
\]

\[
(88) \quad (0.56) \quad (1.57) \quad (7.20)
\]

\[
R^2 = 0.898 \quad \text{S.E.} = 28 \quad \text{D.W.} = 2.83
\]

Sample Period 1961-1973

(E.18) ETCH$ Total Exports to China

\[
\text{ETCH} = \text{EMACH} + \text{EOCH}
\]
(E.19) ECUBA$Exports to Cuba

ECUBA$ = \begin{align*}
& -12.8513 + 3.71639 \text{WT9} + 37.719 \text{Q6263} \\
& (0.26) \quad (12.38) \quad (0.96)
\end{align*}

R^2 = 0.948 \quad \text{S.E.} = 46 \quad \text{D.W.} = 0.93

Sample Period 1961-1973

(E.20) ETW$Exports to the World

ETW$ = ETDW$ + ETCM* PREX9 + ETCH$ + EOSC$ + ECUBA$ + ETLDQ$ + EUSW$9

(E.21) ETW70Exports to the World at Domestic Constant Prices

ETW70 = 1.5 \frac{100 \text{ETW$}}{\text{PREX9 PTX9}}
M. Imports

(M.1) MRMCM* Imports of Raw Materials and Semifabricates from CMEA

\[
\frac{100 \text{MRMCM}^*}{\text{PMRMCM9}} = 502.182 + 0.073422 \frac{100\text{ERMCM}^*}{\text{PERCM9}}
\]

(717)

+ 0.13713 \text{DEVMMACM}^*_{-1}

(1.97)

\[R^2 = 0.755 \quad \text{S.E.} = 42 \quad \text{D.W.} = 1.61\]

Sample Period 1960-1973

Where:

\[\text{DEVMMACM}^* = (\text{MMACM}^* - (-983.61 + 179.55 \text{ QT50}))\]

(M.2) MMACM* Imports of Machinery from CMEA

\[\text{MMACM}^* = -756.457 + 1.09900 \text{ ERMCM}^*\]

(2150) (4.88) (19.09)

+ 1.71429 \text{DEVEMACM}^*_{-1}

(3.10)

\[R^2 = 0.972 \quad \text{S.E.} = 145 \quad \text{D.W.} = 1.47\]

Sample Period 1960-1973

Where:

\[\text{DEVEMACM}^* = (\text{EMACM}^* - (-915.905 + 109.89 \text{ QT50}))\]

(M.3) MFOCM* Imports of Food from CMEA

\[\text{MFOCM}^* = -296.915 + 5.15949 \text{ CRF70}\]

(400) (1.99) (2.26)

+ 0.50700 \text{MFOCM}^*_{-1}

(2.21)

\[R^2 = 0.968 \quad \text{S.E.} = 34 \quad \text{D.W.} = 2.38 \quad \text{D.} = 1.38\]

Sample Period 1960-1973

233
(M.4) MCOCM* Imports of Manufactured Consumer Goods from CMEA

\[
MCOCM^* = -211.75 + 12.3971 \text{ CRND}70 \\
(1059) \quad (1.37) \quad (1.22)
\]

\[+ 0.18248 \text{ ENETCM}^* -1 + 0.86325 MCOCM^* -1 \\
(1.41) \quad (3.93)
\]

\[R^2 = 0.985 \quad \text{S.E.} = 59 \quad \text{D.W.} = 1.89 \]
Sample Period 1960-1973

(M.5) MTCM* Total Imports from CMEA

\[
MTCM^* = MRMCM^* + MMACM^* + MFOCM^* + MCOCM^* + MUSCM^*
\]

(M.6) MNGDW$ Imports other than Grain from the Developed West

\[
MNGDWS = -22.17793 + 0.44185 \text{ XIT} + 3.74336 \text{ FLQ} -1 \\
(4.83) \quad (10.04) \quad (3.04)
\]

\[R^2 = 0.954 \quad \text{S.E.} = 1.604 \quad \text{D.W.} = 1.74 \]
Sample Period 1961-1973

(M.7) MMADW$ Total Machinery Imports from the Developed West

\[
\ln \frac{100.\text{MMADW}$}{\text{F71GE9} -1 \text{FIN}} = 3.72053 + 0.21729 \ln \text{ FLQ} -1 \\
(64.18) \quad (3.22)
\]

\[\quad - 0.07814 \text{ Q6466} + 0.32515 \text{ QSH68} \\
(0.82) \quad (2.47)
\]

\[R^2 = 0.671 \quad \text{S.E.} = 0.110 \quad \text{D.W.} = 2.37 \]
Sample Period 1961-1973
(M.8) \[ \text{MCODW$ = \text{Imports of Consumer Goods other than Grain from the DW} \]}

\[
\frac{\text{MCODW$_s$}}{\text{MNGDW$-MUSDW$_s$}} = -0.09594 + 1.54632 \frac{\text{CR70-CR70}_-1}{(1.55)} + 1.25745 \frac{\text{CRD70}}{\text{CR70}} - 0.12083 \frac{\text{MGRDW}$}{\text{MTDWS}} (0.0732)
\]

\[
\text{R}^2 = 0.501 \quad \text{S.E.} = 0.038 \quad \text{D.W.} = 1.21
\]

Sample Period 1960-1973

(M.9) \[ \text{MRMDW$ = \text{Imports of Raw Materials from the DW} \]}

\[
\text{MRMDW$ = \text{MNGDW$ - MMADW$ - MCODW$ - MUSDW$_s$} \]

(M.10) \[ \text{MGRDW$ = \text{Imports of Grain from the Developed West} \]}

\[
100 \cdot \text{MGRDW$_s$} + ( \frac{100 \cdot \text{MGRDW$_s$}}{\text{PGR9-GRAVE}} - 1 ) = -2.39634 + 0.14315 \text{ QT50} \quad (1.51) \quad (1.90)
\]

\[
-19.79195 \frac{\text{GRSTK}}{\text{GRAVE}} \quad (3.42)
\]

\[
\text{R}^2 = 0.545 \quad \text{S.E.} = 0.925 \quad \text{D.W.} = 2.08
\]

Sample Period 1961-1973

Where:

\[
\text{GRAVE} = \text{XGR} + \text{XGR}^{-1} + \text{XGR}^{-2}
\]

\[
\text{GRSTK} = \sum_{i=1}^{3} (\text{XGR}^{-1} - \text{XGRPK}_{-1})^{-1}
\]

(M.11) \[ \text{MTDW$ = \text{Total Imports from the Developed West} \]}

\[
\text{MTDWS$ = \text{MNGDW$ + MGRDW$} \]

235
(M.12) **MTLDC$**  **Total Imports from the Less Developed Countries**

\[
\text{MTLDC$} = -99.3283 + 0.507074 \text{ETLDC$} + 1538.13 \frac{\text{PRMW9}}{\text{PMAW9}} - \frac{\text{PRMW9}_{-1}}{\text{PMAW9}_{-1}} \\
\text{(1.43)} \quad \text{(2.66)} \quad \text{(3.78)} \\
- 136.922 \text{Q67} + 0.674961 \text{MTLDC$}_{-1} \\
\text{(1.86)} \quad \text{(3.23)}
\]

\[R^2 = 0.989 \quad \text{S.E.} = 67 \quad \text{D.W.} = 2.04\]

Sample Period 1960-1973  \(D. = 0.11\)

(M.13) **MOSC$**  **Total Imports from Yugoslavia and the Far Eastern Socialist Countries**

\[
\text{MOSC$} = 95.07715 + 0.46756 \text{EOSC$} \\
\text{(418)} \quad \text{(2.50)} \quad \text{(9.33)}
\]

\[R^2 = 0.888 \quad \text{S.E.} = 57 \quad \text{D.W.} = 0.76\]

Sample Period 1961-1973

(M.14) **MTCH$**  **Imports from China**

\[
\text{MTCH$} = -3.81454 + 1.03969 \text{ETCH$} + 212.664 \text{Q6164} \\
\text{(259)} \quad \text{(0.30)} \quad \text{(23.99)} \quad \text{(11.14)}
\]

\[R^2 = 0.987 \quad \text{S.E.} = 31 \quad \text{D.W.} = 3.01\]

Sample Period 1960-1972

(M.15) **MCUBA$**  **Imports from Cuba**

\[
100. \frac{\text{MCUBA$}}{\text{PSUGSU9}} = 347.80 + 5.31084 \text{XSUG9}_{-1} - 0.86734 \text{WT9} \\
\text{(2.10)} \quad \text{(2.83)} \quad \text{(1.69)} \\
- 213.32 \frac{\text{PSUGW9}}{\text{PSUGSU9}} \\
\text{(1.56)}
\]

\[R^2 = 0.519 \quad \text{S.E.} = 81 \quad \text{D.W.} = 2.81\]

Sample Period 1960-1973
(M.16) \[ \text{MTWS} \quad \text{Imports from the World} \]
\[ \text{MTWS} = \text{MTDW}$ + \text{MTCM} \times \text{PREX9} + \text{MTLDC} + \text{MOSC} + \text{MCUBA} + \text{MUSW} \]

(M.17) \[ \text{MTW70} \quad \text{Imports from the World at Constant Domestic Prices} \]
\[ \text{MTW70} = 2.00 \times \frac{\text{100MTW}}{\text{PREX9} \times \text{PTM9}} \]

(M.18) \[ \text{MIEINS} \quad \text{Imports from Developed West, Machinery and Equipment (less Transport Equipment)} \]
\[ \ln \frac{100 \times \text{MIEINS}}{\text{inP71GE9} - 1} = 3.48565 + 0.17595 \ln \text{FLQ}_1 \]
\[ (3.465) \]
\[ - 0.34055 \times \text{Q6466} + 0.36836 \times \text{QSH68} \]
\[ (3.33) \quad (2.60) \]
\[ R^2 = 0.844 \quad \text{S.E.} = 0.118 \quad \text{D.W.} = 2.27 \]
Sample Period 1961-1973

(M.19) \[ \text{MTM100-5} \quad \text{Machinery Imports, Total, FTN10: Metal-Working (Including Complete Plants, FTN105)} \]
\[ \ln \frac{100 \times \text{MTM100-5}}{\text{inM71GE9} - 1} = 3.95284 + 0.27371 \ln \text{FLQ}_1 + 0.36289 \times \text{Q70} \]
\[ (4.016) \]
\[ + 0.31255 \times \text{QSH68} + 0.05595 \times \text{QSH68} \times (\text{QT50-19}) \]
\[ (2.68) \quad (1.95) \]
\[ R^2 = 0.797 \quad \text{S.E.} = 0.113 \quad \text{D.W.} = 2.15 \]
Sample Period 1961-1973
(M.20) MTM120-9* Machinery Imports, Total, FTN12: Mining, Metallurgy and Petroleum

\[
\ln \frac{100 \cdot MTM120-9^*}{IIPP*P71GE9^* -1} = 4.36190 + 0.09478 \ln FLQ_{-1} + 0.16944 QFYP_{-1} \\
(4.283) \\
+ 0.12421 QSH68 - 0.13378 QSH68 (QT50-19.) \\
(1.07) (4.86)
\]

\[R^2 = 0.909\quad S.E. = 0.109\quad D.W. = 2.45\]
Sample Period 1961-1973

(M.21) MIECH$ Machinery Imports, West, Chemical Equipment

\[
\ln \frac{100 \cdot MIECHS}{IICH*P71GE9^* -1} = 4.74708 + 0.35898 \ln FLQ_{-1} \\
(4.454) \\
- 0.47803 QFYP + 0.33654 QSH68 \\
(3.62) (1.55)
\]

\[R^2 = 0.667\quad S.E. = 0.221\quad D.W. = 2.41\]
Sample Period 1961-1973
**F. Hard Currency**

(F.1) **FNETHC Hard Currency Balance of Trade**

\[
FNETHC = -60.7808 + 1.21162 \text{ ENETDW}
\]

\[
(-434) \quad (1.45) \quad (14.32)
\]

\[
R^2 = 0.945 \quad \text{S.E.} = 123 \quad \text{D.W.} = 2.12
\]

Sample Period 1960–1973

(F.2) **FCREPS Credit Repayments**

\[
FCREPS = 0.73024 + 0.28217 \text{ FCDR} - 0.68156 \text{ FCRePS} - 2
\]

\[
(246) \quad (0.05) \quad (2.90) \quad (3.10)
\]

\[
R^2 = 0.976 \quad \text{S.E.} = 28 \quad \text{D.W.} = 1.26
\]

Sample Period 1960–1973

(F.3) **FDEBT$ Outstanding Debt**

\[
FDEBT = FDEBT_{-1} + \text{ FCDR} - \text{ FCRePS}
\]

(F.4) **FINT$ Interest Payments**

\[
FINT = -4.0578 + 0.055122 (FDEBT + FDEBT_{-1})/2
\]

\[
(41.9) \quad (5.32) \quad (76.97)
\]

\[
R^2 = 0.998 \quad \text{S.E.} = 1.6 \quad \text{D.W.} = 1.96
\]

Sample Period 1960–1972

(F.5) **FDHC$ Hard Currency Inflow (Balance of Payments)**

\[
FDHC = \text{ FNETHC} + \text{ FSER} + \text{ FCDR} + \text{ FGSALE} - \text{ FINT} - \text{ FCRePS}
\]

(F.6) **FSTK$ Hard Currency Holdings**

\[
FSTK = FSTK_{-1} + FDHC
\]
(F.7) \[ \text{FGSALE} = 263.274 - 0.14013 \frac{\text{FNETHC}_t + \text{FNETHC}_{t-1}}{2} - 0.45661 (\text{FSTK}_t - \text{FGSALE}_t) \]

\[(261) \quad (3.49) \quad (1.00) \quad (4.24) \]

\[ R^2 = 0.828 \quad \text{S.E.} = 141 \quad \text{D.W.} = 2.27 \]

Sample Period 1961-1973

(F.8) \[ \text{FGOLD} = \text{FGOLD}_{t-1} + \text{XGOLD}_t - \frac{\text{FGSALE}_t}{\text{PGOLD}_t} \]

(F.9) \[ \text{FLQ} = \frac{\text{FGOLD}}{\text{MTDWS}} - \frac{\text{PGOLD}_9 - \text{FDEBT}_t}{\text{MTDWS}} \]
G. AGGREGATE IDENTITIES AND BALANCES

(G.1) GNPA3 Gross National Product, Agriculture

GNPA3 = \frac{.71826}{.74122} (XAGT70 - AVCP70)

(G.2) GNPNA3 Gross National Product, Non-Agricultural Sectors

GNPNA3 = 1.71449 XIT + \frac{.25379}{.438} XCRUB + .31581 XT7R

+ .17065 XDTR + .43868 XSER70 + \frac{5.320}{3.8} NMD9

(G.3) GNP3 Gross National Product

GNP3 = (GNPA3 + GNPNA3)/.96264

(G.4) GNMP3 Net Material Products

GNMP3 = 1.71449 XIT + \frac{.25379}{.438} XCRUB + \frac{.71826}{.74122} (XAGT70-AVCP70)

+ .31581 (.734) XDTR + .17065 (.1264) XDTR

(G.5) GEUSUM3 GNP End-Use, Excluding Net Exports and Consumption

GEUSUM3 = ISUM + BDSR*9 + .09971 BADMIN + .09927 BRESDEV

+ \frac{5.320}{3.8} NMD9

(G.6) GRESEM3 End-Use Residual

(Note: Actual Values used for GRESEM3 defined by

GRESEM3 = GNP3 - .001 (ETW70-MTW70) - GEUSUM3 - CR70)

GRESEM3 = 2.21834 + 0.47610 (XAGT70 - XAGTN)

(2.690) (1.95) (2.03)

- 0.68756 (XAGT70\_1 - XAGTN\_1)

(2.70)

241
(G.6) **GRESEM3 End-Use Residual (Continued)**

\[ R^2 = 0.475 \quad \text{S.E.} = 4.008 \quad \text{D.W.} = 1.78 \]
Sample Period 1960-1973

(G.7) **GSIMRES Simulation Residual GNP Category**

\[ GSIMRES = \text{GNP3} - \text{GEUSUM3} - \text{CR70} - \text{GRESEM3} - 0.001 (\text{ETW70-MTW70}) \]

**NOTE:** Actual values for GSIMRES are identically zero. Solution values represent the difference between "production" and "end use" determinations of GNP when consumption is not obtained by residual identity.
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<td>139 REVENUES, PRODUCTION FROM PROFIT, STATE ENTERPRISES</td>
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<td>B, CUR, RUBLES</td>
<td>JEC7A=THAN</td>
<td>3</td>
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<td>Z9764</td>
<td>114 GROSS HOUSEHOLD MONEY INCOME</td>
<td>B, CUR, RUBLES</td>
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<td>Z9784</td>
<td>112 WAGE PAYMENTS TO COLLECTIVE FARM MEMBERS</td>
<td>B, CUR, RUBLES</td>
<td>JEC76</td>
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