THE INTERDEPENDENCE OF GOODS AND SERVICES IN A BLOCK STRUCTURAL PATH ANALYSIS IN THE INDONESIAN ECONOMY

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Abstract

The purpose of this paper is to reveal the magnitude of the relationship between goods and service sector that is originally grouped into production activities in an Indonesian social accounting matrix (SAM) framework in 1995 and 1998. Prior to the decomposition of goods and services, general pattern of the structural change in the Indonesian economy using 1975-1999 aggregated SAM will be presented. Using block structural path analysis (BSPA) that traces feedback loop effects, there is continued evidence of the dominant role of the goods sector in generating factorial and institutional incomes in the Indonesian economy. The changes in structure generated by the 1997 fiscal crisis are clearly evident

1 Introduction

Earlier work of Sonis *et al*. (1997) evaluated changes in the Indonesian economy during the period 1975-1985 by analyzing the change in the structure of output, factorial and institutional incomes, and the change in the hierarchy of direct coefficients of production activities. Using a series of 1975-1985 Indonesian SAMs consisting of five aggregated production activities, two and three types of factors and institutions respectively, they found that block structural path analysis (BSPA) proved to be useful in contributing to the basic understanding in the processes of identifying change within a social accounting framework. Using 1975-1999 aggregated SAM data (13 X 13), Sonis *et al.* (2003) extended the Sonis *et al.* (1997) analysis by examining the role of past and current policies that might have affected the structural changes in the Indonesian economy, before and after the Indonesian economic crisis in mid-1997. BSPA method is proposed as a complement, not as a replacement to the more familiar forms of structural path analysis (SPA) as suggested by Khan and Thorbecke (1988), Defourny and Thorbecke (1984) who focus on the micro level of analysis of individual paths.

The foundation of the modern economy has shifted from the production of commodities such as agricultural products and manufactured goods to the service sector. Many studies have highlighted the important role the service sector plays as a prerequisite for economic development (Riddle, 1986; Bailly, *et al.*, 1987; Bailly and Coffey, 1991; Behuria and Khullar, 1994). Stahl (2001) observed the structural changes in the economies of all 21 APEC countries, including Indonesia; at the highest levels of per capita income, the income elasticity of demand for manufacturers declines marginally while the demand for services such as tourism, restaurants, health, education and banking and finance absorbs a proportionately larger share of per capita income. The declining share of manufacturing in GDP and the rising contribution of services reflects changes in the division of labor over time. More accountancy, legal, and engineering services, transport, financial and insurance needs are required that are often purchased from other companies.

Although most of the arguments on structural changes recognized the increasing share of services in total employment and GDP; however, the magnitude of the linkages between goods and services, and how the influence of each of these two sectors generates factorial and institutional incomes in the Indonesian economy has not comprehensively explored. The purpose of this paper is to reveal the nature of the linkages between goods and services, and how each has contributed to the changes in the structure of the Indonesian economy, particularly between 1995 and 1998 when the economy provided evidence of a transformation away to an eventual domination by services. In the next section, the changing role of goods and service activities in Indonesia will be presented followed by a brief overview of the macro changes in the Indonesian economy. Section 4 provides the methodology employed to decompose the SAMs. Section 5 presents a more detailed analysis of structural changes, again at the macro level, but using the BSPA framework to examine the nature of complication resulting from changes in institutions and activities. Section 6 extends the methodology to view the relationships between goods and services. Section 7 reports the empirical findings and section 8 offers some concluding remarks.

2 Goods Producing and Service Sector in the Indonesian Economy

It has been widely recognized that prior to the economic recession in mid-1997, Indonesia had

become one of the most rapidly growing economies in the Asia and Pacific region. Over the period 1975-95, average economic growth reached 6 to 7% annually, and income per capita rose by 4-5%. During the same period, the declining share of the agricultural sector, the increasing contribution of manufacturing industries to GDP, and the changes in labor market structure have characterized the more important structural changes in the Indonesian economy. One of the striking features of the Indonesian economy was the declining share of the agriculture sector from 36.8% GDP in 1975 to 16.1% in 1995, although it increased to 17.4% in 1999, almost two years after the crisis. The share of manufacturing (processing industries) increased from 10.9% in 1975 to 23.9% and 25.7% GDP in 1995 and 1999 respectively.

The share of services (including construction and utilities) increased from 41.2% in 1975 to 50.7% in 1995, but declined to 47.0% GDP in 1999. The largest share of the service sector was contributed by trade, hotel and restaurant services (14-17% GDP during 1975-99 period), whereas other services account for 8-12% GDP. Transportation service contributes 4-7.5% and financial services 4-9%. Before the crisis, one of the most rapidly growing service sectors was financial services, the expansion generated by financial liberalization in the 1988. The trade sector is dominated by petty trade, mainly self-employed and family work (including stalls, market traders and hawkers that are responsible for about 40% of total employment in services in the mid 1980s; see Manning, 1992). It was not difficult to argue that the Indonesian service economy was largely shaped by small and informal enterprises.

Alexander and Booth (1992) underlined the important role of the service sector in the Indonesian economy over the last several decades. Indonesia was a net importer of services[1] reflecting a lack of competitiveness in consulting and professional services. The only positive account was contributed by tourism but, in general, the service sector did contribute to the absorption of employment and in GDP growth. Further, Alexander and Booth (1992) argued that the rapid growth of employment in the service sector was due to the large share of government employment since the government role focused on the provision of public services such as health and education. In the 1970s, as oil and gas revenues grew and budgetary expenditures accelerated, the government embarked on an ambitious program of economic and social infrastructure development that necessitated the recruitment not just of administrative and

[1] The service sector encompasses wholesale, retail, hotels and restaurants, transport and communications, financial, and professional services, and public, domestic, and community services.

clerical staff but also of a wide range of skilled workers, including teachers, health workers, engineers, economists, statisticians, and financial managers. While, in 1975, almost 60% of all permanent government employees had at most a lower secondary education, by 1999 this had fallen under 30%. Thus, Indonesia is providing initial evidence of an eventual transfer to a service-dominated economy.

The next section will briefly examine some of the major structural changes in the macro economy prior to a presentation of the methodology and empirical analysis of the goods/services sectors.

3 Macro Overview of Changes in the Indonesian Economy, 1975-1999

3.1 The Hierarchy of Direct Coefficients

To provide some perspective on the changing role of goods and services, a brief analysis of some of the macroeconomic changes in structure in the Indonesian economy will be presented. First, analysis will evaluate the change in the hierarchy of direct coefficients of production. The use of food crops as an input to food crops (1,1) ranked highest in the hierarchy from 1975 to 1985, then dropped to third rank during 1990-95, and returned to the highest rank in 1999. The group of the inputs that had the highest rank between 1975-1990 was dominated by food-crops as an input into other sectors (see figure 1). The use of food crops as the inputs for financial, real estate, and government (1,5) in the SAM table was dominated by the government sector since food-crops were distributed as part of the compensation paid to civil servants. It should be noted that between 1975-1980, the government still played an important role in controlling economic activities. It is not difficult to understand the importance of input (1,3), the use of food crops by manufacturing sectors, and by restaurants (1,4) (see figure 1).

<<insert figure 1 here>>

Over the period from 1990 to 1999, the pattern of inter-industry relationships changed significantly in comparison to previous periods. The pair of sectors in the five highest ranks was dominated by intra-industry relationships replacing inter-industry. During 1990-95 for example, the first rank was achieved by (3,3) indicates the use of more the same manufacturing sector as the input. This finding is obviously sensitive to the level of aggregation but does indicate a

strengthening and deepening of the level of interactions between firms within a broad sector. The pattern of the hierarchy for the top five was stable over the period 1990-1995 that placed mining, non-food manufacturing, utilities and communication as the highest rank (3,3), followed by food crops (1,1), then financial, real estates, and government (5,5), trade, hotel & restaurant, transport, communication (4,4), and the pair of estate crops, forestry and hunting (2,2). In 1999, the pattern of the hierarchy has changed. The pair of food sector (1,1) returned to its position in the first rank, followed by estate crops (2,2), mining, manufacturing, utilities and construction in the third rank; pair of trades (5,5) and financial, real estate, and government (4,4) was in the fourth and fifth rank respectively.

On one hand, the pair of intra-industries relationships, (1,1), (2,2), (3,3), (4,4) and (5,5) converge to form the top hierarchy from 1990 to 1999, while, on the other hand the use of food crops, (1,3), dropped significantly to a lower hierarchy from rank 6^{th} to 11^{th}, 23^{rd} and 24^{th} in 1975, 1980, 1990 and 1999 respectively.

3.2 The Influence of Final Demand and Technology

Another way of examining structural changes is to decompose them into (1) those generated by the influence of final demand, (2) by change in technology (intersectoral linkages) and (3) synergetic effects between change in final demand and technology (see Sonis *et al*., 1996. The decomposition of changes of output generated by institutions and activities are drawn as the following:

$$\begin{aligned} \Delta X &= X_t - X_0 \\ \Delta B &= B_t - B_0 \\ \Delta d &= d_t - d_0 \end{aligned} \tag{1}$$

where, $\Delta X, \Delta B, \Delta d$ are changes in total output, in the elements of the Leontief inverse, and in final demand between two different time periods. This yields the following:

$$\Delta X = X_t - X_0 = B_t d_t - B_0 d_0 \tag{2}$$

that can be decomposed into three components:

$$\begin{aligned} \Delta X &= \left[B_0 + \Delta B\right]\left[f_0 + \Delta f\right] - B_0 f_0 = \\ &= B_0 \Delta f + \Delta B f_0 + \Delta B \Delta f \end{aligned} \tag{3}$$

where, the first term provides the change in output due to changes of final demand, the second term the changes due to technological change and the final term is the result of synergetic interaction between changes in the value of final demand and changes in technology. Percentage changes in the income and output of institutions and activities in two- time periods from t_0 to t_1 derived by changes in final demand, technology, and both final demand and technology are gives as:

(a) Percentage change in final demand of economic subsystem *i*: $\Delta_i^{t0}\,\delta(d_i)^{t1-t0}$

(b) Percentage change in technology of economic subsystem *i*: $\delta(\Delta_i)^{t1-t0}\,d_i^{t0}$

(c) Percentage change in final demand and technology of economic subsystem *i* as a result of synergetic interaction: $\delta(\Delta_i)^{t1-t0}\,\delta(d_i)^{t1-t0}$.

The analysis on decomposition of income and output change is focused into two periods of time: 1975-1985 (see previous work of Sonis *et al*., 1997) and 1990-1999 that may represent state-led development stage of Indonesia and a period of market-led economy respectively. Four sub-periods: 1975-1980, 1980-1985 (represent 1975-1990 period), 1990-1995 and 1995-1990 (represent 1990-1990 period) are compared to reveal the pattern of the effect of changes in final demand, technology, and the combined (synergetic) effects. The patterns of the percentage change in institutional income during those sub-periods are varied. Table 1 shows the dominant role of final demand in changing households and firms income (more than 95%), compared to government income (56.1%) during 1975-1980. During 1980-1985, the pattern was reversed for households and government income; change in final demand was dominant (97.7%) in changing government income, while the greater change in technology has affected household income (29.5%). Closer observations for the 1990-1995 and 1995-1999 time periods show that final demand still played a dominant role; however, there has been increasing influence of changes in technology and synergetic effects in accounting for changes in institutional income.

Compared to the 1980-1985 period, the pattern of change in the output of activities during 1995-1999 is quite different. The value of final demand increased during 1990-1995 while the role of technological and synergetic effects declined compared to 1980-1985 period (table 2). From

1990-1995, there has been a clear decline in the role of technology and synergetic effects (negative sign) that indicate a decline in intermediate inputs that are sourced within the country.

In the next section, the methodology needed for the analysis of more complex changes in structural interdependence will be presented.

4 Decomposition of Three Economic Subsystems

While the analysis of the structural changes in the economy using SPA[2] focuses more on individual sectors with a highly disaggregated matrix, BSPA offers a macro perspective to trace the magnitude of the influence departing from an initial injection of an economic subsystem in a way that the transfer of influence to other corresponding economic subsystems provides a feedback loop effect to other corresponding subsystems – in other words, an augmentation process in the whole economic system. Figure 2 provides a general overview of the difference between SPA and BSPA.

<<Insert figure 2 here>>

One of the advantages of using BSPA is its ability to separate the influence of one economic subsystem in the whole system. The SAM can be decomposed in such a way that self-influence and induced self-influence can be detected. Sonis and Hewings (1998) extended the idea of self-influence and induced self-influence for a SAM in similar fashion to the decomposition of three regions into subsystems. Given a matrix of direct coefficients *A*, exogenous final demand *d* and total output *x* for a SAM framework, the system can be presented:

$$A=\begin{bmatrix} 0 & 0 & A_{13} \\ A_{21} & A_{22} & 0 \\ 0 & A_{32} & A_{33} \end{bmatrix}; \quad d=\begin{bmatrix} 0 \\ d_I \\ d_A \end{bmatrix}; \quad x=\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \tag{4}$$

The subscripts refer, respectively, to the usual tripartite division of a social accounting matrix into submatrices of factors (1), institutions (2) and activities (3) that can be decomposed as:

[2] See for example, a recent study by Azis (2001) on the application of SPA in the Indonesian economy.

$$A = \begin{pmatrix} 0 & 0 & 0 \\ A_{21} & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & A_{22} & 0 \\ 0 & A_{32} & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 & A_{13} \\ 0 & 0 & 0 \\ 0 & 0 & A_{33} \end{pmatrix} = \\ = A_1 + A_2 + A_3 \tag{5}$$

where, the matrices A_1, A_2, A_3 represent the direct inputs of factors, institutions and activities separately, from which a decomposed inverse can be presented:

$$B = (I - A)^{-1} = G_3 G_2 G_1 \tag{6}$$

Decomposition (6) differs from the multiplicative decomposition of Pyatt and Round (1979) that was primarily purposed to recognize own direct-effect, indirect self-influence and synergic cross effect by dividing matrix *A* into diagonal and off-diagonal elements and exploiting the properties of permutation matrices. In their system, the generalized inverse is decomposed as follows:

$$(I - A)^{-1} = M_3 M_2 M_1 \tag{7}$$

where,

$M_1 = (I - A_1)^{-1}$ own direct effect

$M_2 = \left\{ I - \left[(I - A_1) A_2 \right]^3 \right\}^{-1}$ indirect self influence

$M_3 = I + (I - A_1) A_2 + \left[(I - A_1) A_2 \right]^2$ synergetic cross effects

Defourny and Thorbecke (1984) proposed an additive decomposition for tracing the influence of economic subsystem:

$$(I - A)^{-1} = I + (M_1 - I) + (M_2 - I) M_1 + (M_3 - I) M_2 M_1 \tag{8}$$

Sonis and Hewings (1998) converted the additive decomposition (8) into a multiplicative form of a block matrix of direct inputs for three-region or economic subsystems:

$$A = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix} \tag{9}$$

and the corresponding Leontief inverse (with superscripts denoting the number of partitions):

$$B = (I - A)^{-1} = \begin{bmatrix} B_{11}^{III} & B_{12}^{III} & B_{13}^{III} \\ B_{21}^{III} & B_{22}^{III} & B_{23}^{III} \\ B_{31}^{III} & B_{32}^{III} & B_{33}^{III} \end{bmatrix} \tag{10}$$

However, matrix (10) does not separate the influence of economic subsystems from other sub-systems. In order to separate the influence of each three region (block matrices), the Schur-Banachiewicz inverse for a pair of sub-systems is used (see Sonis and Hewings, 1998).

Consider the row and column containing A_{33} in equation (9) that represents the domain of the block matrix (6). The formation of partial block matrix, such as the pair of block matrix (4) and (5) is considered as the domain of block matrix (6). Here, the direct inputs under the domain of (6) can be written as:

$$A(3) = \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix} \tag{11}$$

Define the Schur-Banachiewicz's partial block matrix as (S). The corresponding partial Leontief inverse is defined as:

$$\begin{aligned} B(S) = [I - A(S)]^{-1} &= \begin{bmatrix} B_{11}^{II}(S) & B_{12}^{II}(S) \\ B_{21}^{2}(S) & B_{22}^{2}(S) \end{bmatrix} = \\ &= \begin{bmatrix} B_{11}^{II}(S) & B_{11}^{II}(S)A_{12}B_{2} \\ B_{22}^{2}(S)A_{21}B_{1} & B_{22}^{II}(S) \end{bmatrix} = \begin{bmatrix} B_{11}^{II}(S) & B_{1}A_{12}B_{11}^{II}(S) \\ B_{2}A_{21}B_{22}^{II}(S) & B_{22}^{II}(S) \end{bmatrix} \end{aligned} \tag{12}$$

Superscript *II* in (12) denotes a two-region or a two-block matrix of economic system that characterize the nature of feedback loop process within the system. Based on the partial Leontief inverse for pair (1, 2), the element of the Schur-Banachiewincz inverse matrix in a three-economic-subsystems is presented as the following (for proofs, see Sonis and Hewings, 1998):

$$B = \begin{bmatrix} B_{11}^{III} & B_{11}^{III}A_{12}^{III}B_{22}^{II}(1) & B_{11}^{III}A_{13}^{III}B_{33}^{II}(1) \\ B_{22}^{III}A_{21}^{III}B_{11}^{II}(2) & B_{22}^{III} & B_{22}^{III}A_{23}^{III}B_{33}^{II}(2) \\ B_{33}^{III}A_{31}^{III}B_{11}^{II}(3) & B_{33}^{III}A_{32}^{III}B_{22}^{II}(3) & B_{33}^{III} \end{bmatrix} \tag{13}$$

The augmented inputs for three-region or three economic subsystems (see Yamada and Ihara, 1969; Ihara, 1999) can be presented as follows:

$$A_{ij}^{III} = A_{ij} + A_{is}B_{s}A_{sj} \qquad i \neq j, i \neq s, j \neq s; i, j, s = 1,2,3 \tag{14}$$

and the extended regional Leontief inverses:

$$B_{ii}^{III} = \left[I - A_{ii} - A_{ij}B_{jj}^{II}(i)A_{ji}^{III} - A_{is}B_{ss}^{II}(i)A_{si}^{III} \right]^{-1} \qquad i \neq j, i \neq s, j \neq s; i, j, s = 1,2,3 \tag{15}$$

The corresponding augmented Schur complement that captures economic self-influence and as the result of the augmentation of inputs from other subsystems can be written as:

$$S_i = A_{ii} + A_{ij}B_{jj}^{II}(i)A_{ji}^{III} + A_{is}B_{ss}^{II}(i)A_{si}^{III} \tag{16}$$

The augmentation of inputs (16) leads to the detailed structure of augmentation in the Schur complement:

$$\begin{aligned} S_i = {} & A_{ii} + A_{ij}B_{jj}^{II}(i)A_{ji} + A_{is}B_{ss}^{II}(i)A_{si} + \\ & + A_{ij}B_{jj}^{II}(i)A_{js}B_{s}A_{si} + A_{is}B_{ss}^{II}(i)A_{sj}B_{j}A_{ji} \qquad i \neq j, i \neq s, j \neq s; i, j, s = 1,2,3 \end{aligned} \tag{17}$$

Thus, in the three-block system, the self-influence of a block comprise the superposition of (i) circulation (direct self-influence); (ii) self-influence generated through bilateral block interdependencies and (iii) self-influence promoted by tri-lateral block interdependencies. The expressions (16) and (17) reflect the existence of a nested hierarchy of different levels of augmentation represented in the recursive form in (13); in a sense, the process resembles the Matrioshka idea introduced by Sonis and Hewings (1991). Furthermore, using the Miyazawa (1966, 1976) fundamental equations for the case of three regions or accounts, the transfer of influence from account j to i can be defined as:

$$B_{ij}^{II} = B_{ii}^{III}A_{ij}^{III}B_{jj}^{II}(i) = B_{ii}^{II}(j)A_{ij}^{III}B_{jj}^{III} \qquad i \neq j, i, j = 1,2,3 \tag{18}$$

The augmented Schur complement (17) can also be written as:

$$S_i = A_{ii} + A_{ij}^{III}B_{jj}^{II}(i)A_{ji} + A_{is}^{III}B_{ss}^{II}(i)A_{si} \tag{19}$$

The expressions (18) and (19) offer the option of presenting the Leontief inverse for the three-block system in an alternative form:

$$B=\begin{bmatrix} B_{11}^{III} & B_{11}^{II}(2)A_{12}^{II}B_{22}^{II} & B_{11}^{II}(3)A_{13}^{III}B_{33}^{III} \\ B_{22}^{II}(1)A_{21}^{III}B_{11}^{III} & B_{22}^{III} & B_{22}^{II}(3)A_{23}^{III}B_{33}^{III} \\ B_{33}^{II}(1)A_{31}^{III}B_{11}^{III} & B_{33}^{II}(2)A_{32}^{III}B_{22}^{III} & B_{33}^{III} \end{bmatrix} \tag{20}$$

The generalizations (19) and (20) can be transferred from the meso-level of regions to the higher macro-level of the inner and outer left and right block matrix multipliers. For example, for the left multipliers:

$$\begin{aligned} B&=\begin{bmatrix} B_{11}^{III} & 0 & 0 \\ 0 & B_{22}^{III} & 0 \\ 0 & 0 & B_{33}^{III} \end{bmatrix}\begin{bmatrix} I & A_{12}^{III}B_{22}^{II}(1) & A_{13}^{II}B_{33}^{II}(1) \\ A_{21}^{III}B_{11}^{II}(2) & I & A_{23}^{II}B_{33}^{II}(2) \\ A_{31}^{III}B_{11}^{II}(3) & A_{32}^{III}B_{22}^{II}(3) & I \end{bmatrix}= \\ &=\begin{bmatrix} B_{11}^{IIIL} & 0 & 0 \\ 0 & B_{22}^{IIIL} & 0 \\ 0 & 0 & B_{33}^{IIIL} \end{bmatrix}\begin{bmatrix} B_1 & 0 & 0 \\ 0 & B_2 & 0 \\ 0 & 0 & B_3 \end{bmatrix}\begin{bmatrix} I-A_{11} & A_{12}^{III}B_{22}^{IIL}(1) & A_{13}^{III}B_{33}^{IIL}(1) \\ A_{21}^{III}B_{11}^{IIL}(2) & I-A_{22} & A_{23}^{III}B_{33}^{IIL}(2) \\ A_{31}^{III}B_{11}^{2L}(3) & A_{32}^{III}B_{22}^{IIL}(3) & I-A_{33} \end{bmatrix}\begin{bmatrix} B_1 & 0 & 0 \\ 0 & B_2 & 0 \\ 0 & 0 & B_3 \end{bmatrix} \end{aligned} \tag{21}$$

Augmented input of the blocks in the SAM are:

$$\begin{aligned} &A_{12}^{III}=A_{13}B_3A_{32}; \quad A_{13}^{III}=A_{13}; \\ &A_{21}^{III}=A_{21}; \qquad A_{23}^{III}=A_{21}A_{13}; \\ &A_{31}^{III}=A_{32}B_2A_{21}; \quad A_{32}^{3}=A_{32} \end{aligned} \tag{22}$$

The extended self-influence Leontief inverses at each block are:

$$\begin{aligned} B_{11}^{III}&=\left[I-A_{13}B_3A_{32}B_2A_{21}\right]^{-1} \\ B_{22}^{III}&=\left[I-A_{22}-A_{21}A_{13}B_3A_{32}\right]^{-1} \\ B_{33}^{III}&=\left[I-A_{33}-A_{32}B_2A_{21}A_{13}\right]^{-1} \end{aligned} \tag{23}$$

The corresponding augmented complements:

$$\begin{aligned} S_1&=A_{13}B_3A_{32}B_2A_{21} \\ S_3&=A_{22}+A_{21}A_{13}B_3A_{32} \\ S_3&=A_{33}+A_{32}B_2A_{21}A_{13} \end{aligned} \tag{24}$$

have the economic network structure associated with the blocks A_{22}, A_{33} and with the components of the quasi-permutation matrix of direct inputs:

Drawing on (19), the Leontief inverse for this SAM has a form:

$$B = \begin{bmatrix} B_{11}^{III} & A_{13}B_3A_{32}B_{22}^{III} & A_{13}B_{33}^{III} \\ B_2A_{21}B_{11}^{III} & B_{22}^{III} & B_2A_{21}A_{13}B_{33}^{III} \\ B_3A_{32}B_2A_{21}B_{11}^{III} & B_3A_{32}B_{22}^{III} & B_{33}^{III} \end{bmatrix} = \begin{bmatrix} I & A_{13}B_3A_{32} & A_{13} \\ B_2A_{21} & I & B_2A_{21}A_{13} \\ B_3A_{32}B_2A_{21} & B_3A_{32} & I \end{bmatrix} \begin{bmatrix} B_{11}^{III} & 0 & 0 \\ 0 & B_{22}^{III} & 0 \\ 0 & 0 & B_{33}^{3} \end{bmatrix} \quad (25)$$

At the meso level for the major divisions of the economy:

$$Bd = \begin{bmatrix} B_{11}^{III} & A_{13}B_3A_{32}B_{22}^{III} & A_{13}B_{33}^{III} \\ B_2A_{21}B_{11}^{III} & B_{22}^{III} & B_2A_{21}A_{13}B_{33}^{III} \\ B_3A_{32}B_2A_{21}B_{11}^{III} & B_3A_{32}B_{22}^{III} & B_{33}^{III} \end{bmatrix} \begin{bmatrix} 0 \\ d_I \\ d_A \end{bmatrix} = \begin{bmatrix} A_{13}B_3A_{32} \\ I \\ B_3A_{32} \end{bmatrix} B_{22}^{III} d_I + \begin{bmatrix} A_{13} \\ B_2A_{21}A_{13} \\ I \end{bmatrix} B_{33}^{III} d_A \quad (26)$$

The expression (26) reveals the major paths of influence in the transmission of economic impulses. Within the blocks, the individual paths are still preserved; in other words, the portraits of individual trees are still preserved in the forest picture of BSPA. This system enables presentation of the network complication that begins with an initial injection by the final demand of institutions (d_I) and production activities d_A and the following transformation are shown as,

a). Institutions: $d_I \rightarrow B_{22}^{III} d_I \rightarrow B_3A_{32}B_{22}^{III} d_I \rightarrow A_{13}B_3A_{32}B_{22}^{III} d_I$ (27)

b). Activities : $d_A \rightarrow B_{33}^{III} d_A \rightarrow A_{13}B_{33}^{III} d_A \rightarrow B_2A_{21}A_{13}B_{33}^{III} d_A$ (28)

In the next section, some evidence of changes in the nature of structural complication in Indonesia will be presented; thereafter, these formulations will be applied to consideration of the role of the goods and services sectors.

5 Structural Complication 1995-1999

Drawing on the previous work of Sonis *et al*. (2003), the general pattern of the structural changes in the Indonesian economy using aggregated SAMs for 1995-1999 are displayed in figures 3 and 4. Figure 3 shows the value of an initial injection from institutions and its transformation to the

distribution of household, firm and government incomes, and then the subsequent effects on the output of production activities and finally to labor and capital incomes[3]. Figure 4 shows the injection and transformation from production activities and its subsequent effects on the distribution of labor and capital, and institutional income distribution.

<<insert figures 3 and 4 here>>

In 1975 for example, the impact of an institutional injection generated a share of 45.3%, 17% and 37.7% among households, firms and government output respectively. This distribution pattern was almost the same until 1995, but changed significantly in 1999. Further transformation from institutional income to production activities revealed that the largest part of institutional influence, between 36-43% of activity output, went to food crops during the period of 1975 to 1985,. From 1990 to 1999, the share of food crop dropped from 36.8% to 28%. Compared to other production sectors, estate crops from 1975 to 1985 received the influence that indicated the linkages between the output of estate crops and institutional demand was not strongly related. The transformation of production activities due to the influence of institutional income showed the declining share of food crops from 1975 to 1999; they were substituted by manufacturing. This pattern indicated the increasing impact of institutional consumption of and spending on manufacturing products. In the period of financial crisis, the share of food crops rose slightly from 27.4% in 1995 to 28.3% in 1999. The share of financial (include government sector) outputs declined significantly after 1985 from 23-24% during 1975-85 to 2.6% and 4.6% respectively in 1995. In 1999 the share was down to only 2%. This result is interpreted as the declining influence of household consumption, company investment and government expenditure in the financial and government sector; this sector was badly hit by the crisis during which time many commercial banks collapsed.

The changing pattern of production activities on factor incomes indicates the increasing share of labor compared to capital. During 1975-1980, the share of capital income was larger than labor income while over the next periods, the share of labor income increased to surpass capital income. The transformation of the influence from institution to production activities and to factors provides a positive effect on the income distribution to labor during the whole period.

[3] In the BSPA we did not include the final demand of factors as an exogenous account.

Given the aggregate nature of this system, nothing can be inferred about the impact on the distribution of income across income groups.

The transformation of production activity to factors of production generally increased the share of labor income between 1975-99. The distribution of labor income in factors of production changed from 38.9% in 1975 to become 51.7% in 1990. Over the period, 1990-1999, labor become has received the lion's share in the factor incomes but the impact of factor income on the transformation of production activity and its subsequent influence on institutional income distribution varied. The share of household income was still the largest from 1975 to 1999, and the share of companies income dropped significantly from 30.5% in 1980 to become 18.6% in 1999 – the lowest level over the whole period.

Using a set of aggregated SAM data, at a macro scale, the results from two initial injections form institution and production activities provide some general features of the structural change in the Indonesia economy over the years from 1975 to 1999. The most important feature of the impact from the initial injection both for institution and activity is the increasing consumption of food crops during the financial crisis in 1999 with the decline in the share of trade, estate crops and financial & government services, compared to 1995. However, further conclusions about the impact of the crisis on structural changes in the Indonesian economy would need to be confirmed through the analysis of the hierarchy of direct coefficient of production activity in the SAM framework with a more detailed level of aggregation and, of course, with analysis five to ten years from the end of the crisis.

An important interpretation from the impact of institutional income to the transformation of production activities is the declining share of food crops consumption, substituted by the increasing share on manufacturing consumption during the period 1975-1995. This consumption pattern follows an Engel curve process whereby a declining portion of income would be spent on food consumption when income per capita rises. In the midst of the crisis in 1999, the share of consumption of food crops rises again due to the decline of real income. In this situation, the influence of the declining institutional income from households, companies and government to production activities provided a significant impact on the financial sector. In 1999, the demand for financial services declined dramatically.

Now that the changes in the macroeconomic structure have been presented, attention will be focused on the relationships between accounts within the SAMs and then, more specifically, on the interaction between goods and services.

6 The Decomposition of Goods and Services

In order to capture the influence and linkages between service sector and the rest of the economy, production activity must be partitioned into goods and services sub-matrices. Two sets of 1995 and 1998 (109 x 109) national SAM data were aggregated into 22 consistent sectors. The production activities are: agriculture, mining, manufacturing industries, electricity, gas & water (EGW), construction, trade, hotel and restaurant, transport, finance, and other service sector. The block matrix of factor of production in the SAM is divided into five elements, agricultural labor, production labor, administrative labor, professional labor, and capital and there are five elements in the institution accounts, agricultural households, non-agricultural household rural, non-agricultural household rural, firms, and government (see table 3).

The decomposition of the transaction matrix into goods and service sector is basically to partition A_{33} in the previous equation (1 and 2); the block matrices of the four economic subsystems is displayed as:

$$A = \begin{pmatrix} 0 & 0 & 0 & 0 \\ A_{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 & 0 \\ 0 & A_{22} & 0 & 0 \\ 0 & A_{32} & 0 & 0 \\ 0 & A_{42} & 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 & A_{13} & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & A_{33} & 0 \\ 0 & 0 & A_{34} & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 & A_{14} \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & A_{34} \\ 0 & 0 & 0 & A_{44} \end{pmatrix} \quad (29)$$
$$= A_1 + A_2 + A_3 + A_4$$

where, A_3 and A_4 represents block matrix of goods and services respectively. Let the previous A_{ij} for $i = 3$ or $j = 3$ be denoted with subscript (*). Using equation (26) as the framework, the linkages of the whole economic subsystem with the associated final demand d of each block matrix can be written as:

$$Bd = \begin{bmatrix} B_{11}^{IV} & A_{1*}B_{*}A_{*2}B_{22}^{IV} & A_{1*}B_{**}^{IV} \\ B_2A_{21}B_{11}^{IV} & B_{22}^{III} & B_2A_{21}A_{1*}B_{**}^{IV} \\ B_{*}A_{*2}B_2A_{21}B_{11}^{IV} & B_{*}A_{*2}B_{22}^{IV} & B_{**}^{IV} \end{bmatrix} \begin{bmatrix} 0 \\ d_I \\ d_{*} \end{bmatrix} = \\ = \begin{bmatrix} A_{1*}B_{*}A_{*2} \\ I \\ B_{*}A_{*2} \end{bmatrix} B_{22}^{IV} d_I + \begin{bmatrix} A_{1*} \\ B_2A_{21}A_{1*} \\ I \end{bmatrix} B_{**}^{IV} d_{*} \tag{30}$$

Superscript *IV* denotes four block matrices of economic subsystems. It can be shown here that:

$$A_{1*} = \begin{pmatrix} A_{13} & A_{14} \end{pmatrix}; \quad B_{*} = \begin{pmatrix} B_3 & 0 \\ 0 & B_4 \end{pmatrix}; \quad B_{**}^{IV} = \begin{pmatrix} B_{33}^{IV} & B_{34}^{IV} \\ B_{43}^{IV} & B_{44}^{IV} \end{pmatrix} \tag{31}$$

The formation of four block matrices, the final demand of institutions (d_I), goods sector (d_G) and service sector (d_S) is presented in equation (32):

$$Bd = \begin{bmatrix} B_{11}^{IV} & \begin{pmatrix} A_{13} & A_{14} \end{pmatrix} \begin{pmatrix} B_3 & 0 \\ 0 & B_4 \end{pmatrix} \begin{pmatrix} A_{32} \\ A_{42} \end{pmatrix} B_{22}^{IV} & \begin{pmatrix} A_{13} & A_{14} \end{pmatrix} \begin{pmatrix} B_{33}^{IV} \\ B_{43}^{IV} \end{pmatrix} & \begin{pmatrix} A_{13} & A_{14} \end{pmatrix} \begin{pmatrix} B_{34}^{IV} \\ B_{44}^{IV} \end{pmatrix} \\ B_2A_{21}B_{11}^{IV} & B_{22}^{IV} & B_2A_{21}\begin{pmatrix} A_{13} & A_{14} \end{pmatrix} \begin{pmatrix} B_{33}^{IV} \\ B_{43}^{IV} \end{pmatrix} & B_2A_{21}\begin{pmatrix} A_{13} & A_{14} \end{pmatrix} \begin{pmatrix} B_{34}^{IV} \\ B_{44}^{IV} \end{pmatrix} \\ \begin{pmatrix} B_3 & 0 \end{pmatrix} \begin{pmatrix} A_{32} \\ A_{42} \end{pmatrix} B_2A_{21}B_{11}^{IV} & \begin{pmatrix} B_3 & 0 \end{pmatrix} \begin{pmatrix} A_{32} \\ A_{42} \end{pmatrix} B_{22}^{IV} & B_{33}^{IV} & B_{34}^{IV} \\ \begin{pmatrix} 0 & B_4 \end{pmatrix} \begin{pmatrix} A_{32} \\ A_{42} \end{pmatrix} B_2A_{21}B_{11}^{IV} & \begin{pmatrix} 0 & B_4 \end{pmatrix} \begin{pmatrix} A_{32} \\ A_{42} \end{pmatrix} B_{22}^{IV} & B_{43}^{IV} & B_{44}^{IV} \end{bmatrix} \begin{pmatrix} 0 \\ d_I \\ d_G \\ d_S \end{pmatrix} \tag{32}$$

The decomposition of goods and services in equation (32) provides a *pseudo block matrix* because of the two-way interaction between both sectors as opposed to the one-way interaction between production activities, factors, and institutions economic subsystems. The injection of final demand will create a branching out process between goods and services. Network complication initiated by institutions, goods and services and the branching process resulting from the decomposition can be given as:

a). Initial injection from Institutions:

$$d_I \rightarrow B_{22}^{IV} d_I \rightarrow \begin{matrix} B_3A_{32}B_{22}^{IV} d_I \rightarrow A_{13}B_3A_{32}B_{22}^{IV} d_I \\ \uparrow\downarrow \\ B_4A_{42}B_{22}^{IV} d_I \rightarrow A_{14}B_4A_{42}B_{22}^{IV} d_I \end{matrix} \tag{33}$$

where, d_I, $B_{22}^{IV} d_I$ is the block matrix of final demand of institutions and the first transformation of institutions respectively. Branching out takes place in the form of $B_3 A_{32} B_{22}^{IV} d_I$ and $B_4 A_{42} B_{22}^{IV} d_I$ is the second (goods sectors) and the third transformation (service sector) respectively. Both $A_{13} B_3 A_{32} B_{22}^{IV} d_I$ and $A_{14} B_4 A_{42} B_{22}^{IV} d_I$ are the fourth transformations, generated from goods and services respectively.

b). Initial injection from Goods Sector:

$$\begin{array}{ccccccc} d_G & \rightarrow & B_{33}^{IV} d_G & \rightarrow & A_{13} B_{33}^{IV} d_G & \rightarrow & B_2 A_{21} A_{13} B_{33}^{IV} d_G \\ & & \uparrow\downarrow & & & & \\ & & B_{43}^{IV} d_G & \rightarrow & A_{13} B_{43}^{IV} d_G & \rightarrow & B_2 A_{21} A_{13} B_{43}^{IV} d_G \end{array} \tag{34}$$

where, d_G is the final demand of goods sector, $B_{33}^{IV} d_G$ and $B_{43}^{IV} d_G$ are the first and second transformation respectively as a result of branching out process generated by goods sector.

c). Initial injection from Services Sector:

$$\begin{array}{ccccccc} & & B_{34}^{IV} d_S & \rightarrow & A_{14} B_{34}^{IV} d_S & \rightarrow & B_2 A_{21} A_{14} B_{34}^{IV} d_S \\ & & \uparrow\downarrow & & & & \\ d_S & \rightarrow & B_{44}^{IV} d_S & \rightarrow & A_{14} B_{44}^{IV} d_S & \rightarrow & B_2 A_{21} A_{14} B_{44}^{IV} d_S \end{array} \tag{35}$$

7 Results of the Empirical Application

The branching out process generated by goods and service sector in 1995 and 1998 can be seen in tables 4 through 7. In the first transformation, final demand for goods transforms the output of the goods sector itself, and at the same time induces output in the services sector (second transformation). In the next stages, both goods and service sectors transform the composition of factors (third transformation) and institutions (fourth transformation).

<<insert tables 4 through 7 here>>

Using the final demand of the goods sector as the injector, at the first transformation the goods sector produces Rp.144,708 billion and Rp.376,146 billion of agricultural output in 1995 and 1998 respectively (table 4 and 6). In 1995, final demand of goods sector directly generated the

largest share of the output of goods sector (63.0%), with the rest, 37.0%, accounted for by services. In addition to the generation of agriculture, mining and manufacturing, the goods economic subsystem generated 42.2% of the total output of services; with the rest, 57.8%, generated by services itself. From tables 6 and 7, it can bee seen that the goods sector in 1998 played a more dominant role in generating both goods and services. The goods sector alone produces 78.1% and 54.7% of total output of goods and services respectively.

Viewing the data in table 5 and 7 in more detail, it can be seen that the increasing demand for electricity, gas and water (EGW) that was generated by goods sector increased from 55.9% in 1995 to 70.1% in 1998. Another interesting feature shows that more demand for the financial sector was generated by goods sector, increasing from 47.2% in 1995 to 59.4% in 1998. The demand for construction generated by goods producing sector also increased from 3.6% in 1995 to 22.2% in 1998.

The factorial and institutional income distribution is largely generated by the goods sector. In 1995 and 1998, the direct injection from services alone (not including any induced effects from the goods sector) contributed 27.6% and 17% of factor income respectively. The declining contribution of services in generating factorial income in 1998 indicated the deterioration of service sector following economic crises that started in mid-1997. Under these conditions, the goods sector alone contributed 47.5% of total institutional income in the economic system. Together with induced services, the injection of goods sector contributes 67% of total institutional income.

<<insert table 8 and 9 here>>

Tables 8 and 9 display the output and the composition of production activities and factor income created by initial transformation from institutions in 1995 and 1998 respectively. The comparison between 1995 and 1998 shows a great difference in the structure of the economy. The government output was decreased dramatically from 38.8% in 1995 to 18.8% of total institutional output in 1998, replaced by firms who saw their contribution rise from 18.4% in 1995 to 25.2% in 1998. With this structure, the share of manufacturing output in production activities was augmented from 32.2% in 1995 to 40.9% in 1998 and this lead to increased capital accumulation from 51.3% to 74.4%. There is a clear indication of an increasing role for production activities in driving the many of the economic subsystems, directly and indirectly.

8 Conclusions

The application of BSPA and the decomposition of production activities into goods and services in a more disaggregated SAM framework provide the capability to examine the contributions of these two sectors to the economy both directly and through the myriad paths of indirect interaction that characterize a SAM system of accounts. With BSPA, it is possible to examine the various feedback loop processes as well; taken together, the picture that emerges is one in which there are strong indications of the dominant role of the goods sector in shaping the formation and development of the Indonesian economy. There was a clear indication of the deterioration of the role of the service sector in the Indonesian economy following the mid-1997 economic crisis. While there are some controversies centering on the causal links between goods and services in the modern economies, the analysis is this paper has shown the magnitude of the linkages between both sectors. The goods sector has played a dominant role in changing the output of all production activities, factorial and institutional incomes.

The creation of SAMs in the next decade will provide an opportunity to explore the degree to which the Indonesian economy returns to its former (pre financial crisis) structure and continues to change in the same directions indicative of the period from the 1970s through mid 1990s. What the present SAM structure is unable to capture is the important role played by the informal sector in serving to mute the impact of some of the changes generated by the financial crisis; as Nazara (2003) has shown, many employees laid off from jobs in the formal sector retreated into the informal sector in an attempt to maintain household welfare levels. Many also returned to the agricultural sectors.

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Rank	Cell 1975	Cell 1980	Cell 1985	Cell 1990	Cell 1995	Cell 1999
1	1,1	1,1	1,1	4,4	4,4	1,1
2	1,5	1,5	3,3	3,3	3,3	4,4
3	1,4	1,4	1,5	1,1	1,1	3,3
4	1,2	3,3	1,4	5,5	5,5	2,2
5	3,3	1,2	1,2	2,2	2,2	5,5
6	1,3	2,2	3,4	4,2	4,2	4,3
7	2,2	3,5	4,4	4,3	4,1	4,1
8	3,5	4,4	5,5	4,1	4,3	3,5
9	3,4	3,4	3,5	3,4	3,5	3,1
10	5,4	5,5	3,2	3,2	3,2	3,4
11	4,4	1,3	4,5	3,5	2,1	4,2
12	5,5	5,4	1,3	1,4	5,4	3,2
13	3,2	5,2	5,4	3,1	1,4	4,5
14	5,2	3,2	5,2	2,1	3,4	1,4
15	4,5	4,5	2,2	5,4	3,1	5,4
16	5,3	5,3	4,2	4,5	5,3	2,1
17	4,2	4,2	3,1	2,3	2,3	2,3
18	3,1	2,1	5,3	5,3	5,1	5,2
19	5,1	3,1	5,1	5,2	5,2	1,5
20	4,3	5,1	2,1	5,1	4,5	5,1
21	4,1	4,1	4,1	1,5	1,2	5,3
22	2,1	4,3	4,3	2,4	1,5	1,2
23	2,3	2,3	2,3	1,2	2,4	1,3
24	2,4	2,5	2,4	1,3	1,3	2,4
25	2,5	2,4	2,5	2,5	2,5	2,5

Sector codes:

1. **Farm food crops, livestock, and food manufacturing**
2. **Estate crops, forestry, hunting**
3. **Mining, non-food manufacture, utilities and construction**
4. **Trade, restaurants, hotels, transport, and communication**
5. **Financial, real estate, and government**

Figure 1 The hierarchy of direct coefficients in the Indonesian SAM 1975-1999

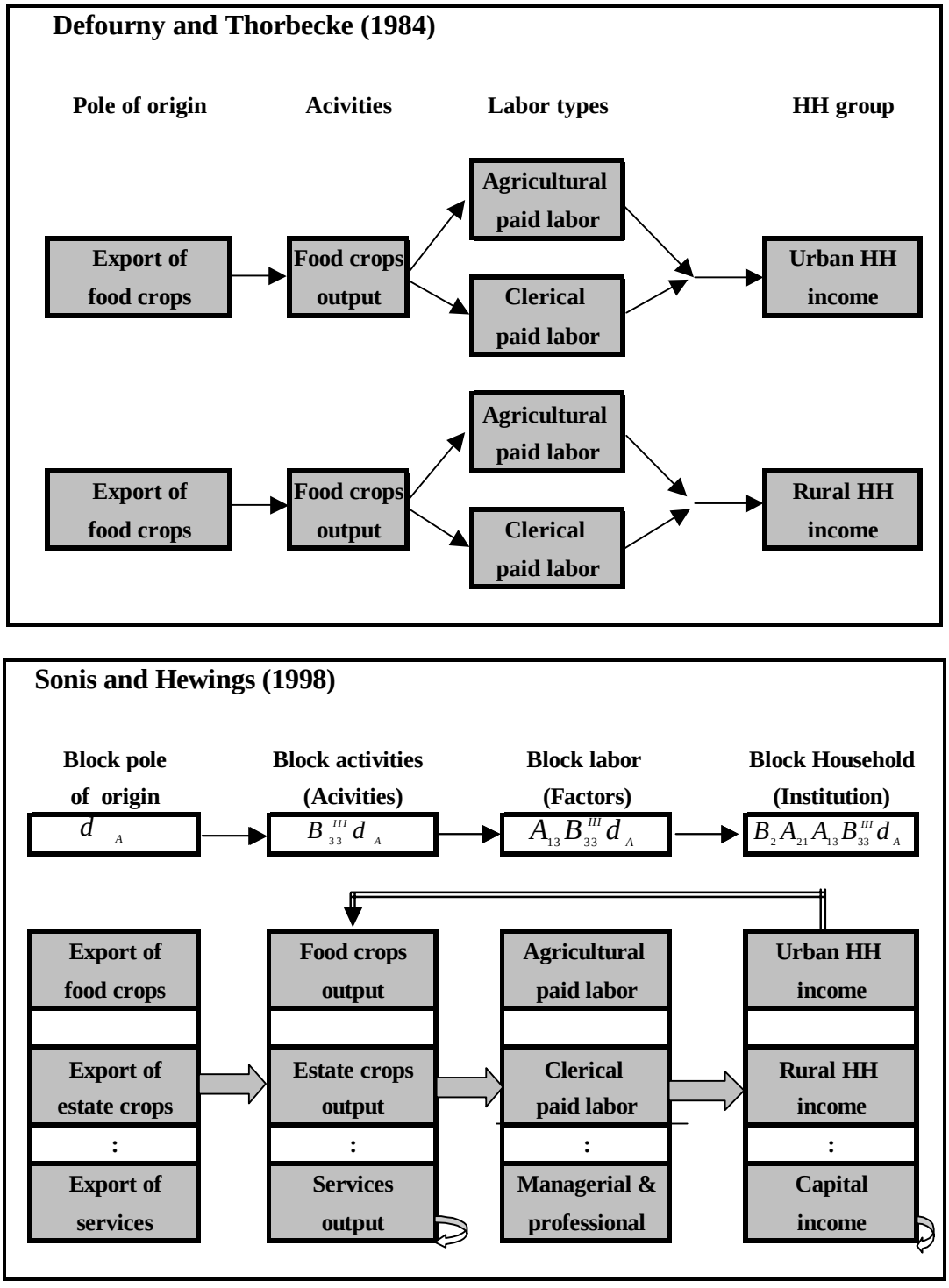

Figure 2. The Path from Origin to Destination of a SPA in SAM Framework

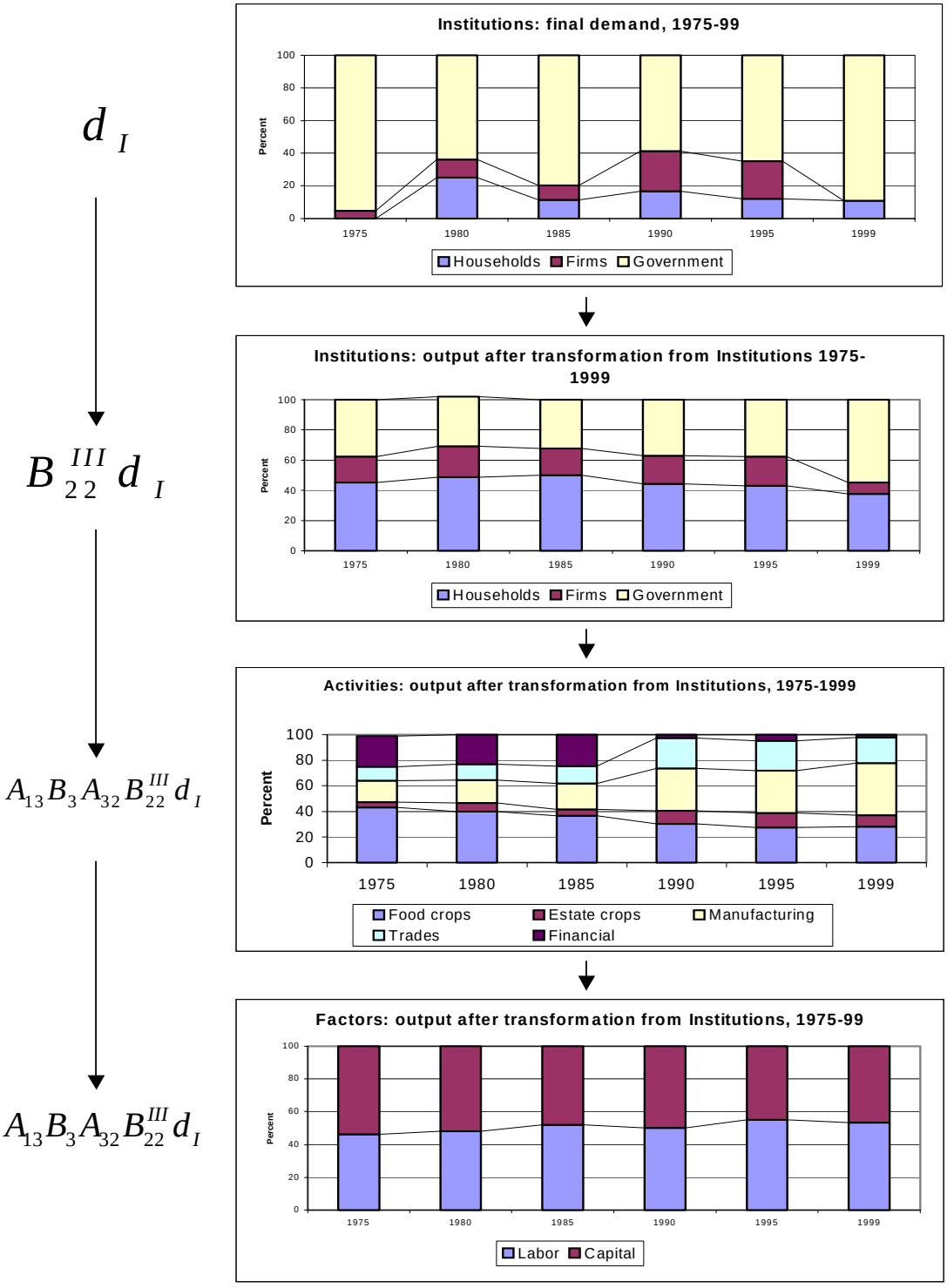

Figure 3. The Transformation from the Injection of Institution

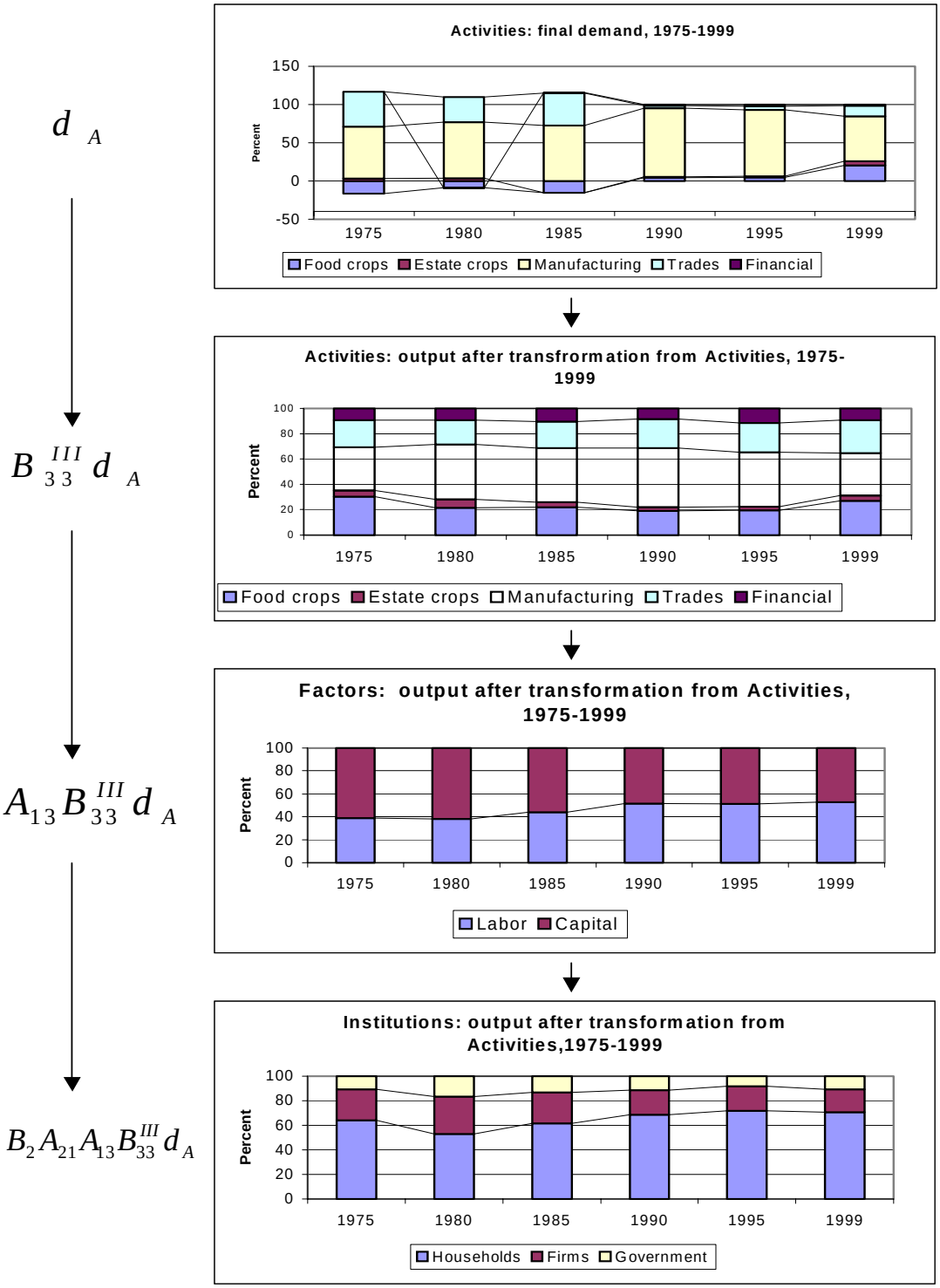

Figure 4. The transformation from injection of Activities to Factors and Institutions

Table 1 Decomposition of changes in institutional income 1975-1985 and 1990-1999 (%)

Period	Sector	Change in final demand $\Delta_I^{t0}\delta(d_I)^{t1-t0}$	Change in technology $\delta(\Delta_I)^{t1-t0}\, d_I{}^{t0}$	Change in final demand & technology $\delta(\Delta_I)^{t1-t0}\,\delta(d_I)^{t1-t}$	Total change
1975-1980	Households	95.1	-1.6	-3.3	100
	Firms	99.1	0.2	0.7	100
	Government	56.1	32.6	11.4	100
1980-1985	Households	64.6	5.9	29.5	100
	Firms	99.6	-0.1	-0.3	100
	Government	97.6	0.3	2.1	100
1990-1995	Households	86.2	6.0	7.8	100
	Firms	91.9	3.4	4.7	100
	Government	79.1	-9.1	-11.8	100
1995-1999	Households	80.8	-7.6	-11.6	100
	Firms	78.5	-6.1	-15.3	100
	Government	82.8	12.1	5.2	100

Note: negative changes were calculated as the absolute number of changes.

Table 2 Decomposition of changes in output of production activities 1975-1985 and 1990-1999 (%)

Period	Sector	Change in final demand $\Delta_I^{t0}\,\delta(d_I)^{t1-t0}$	Change in technology $\delta(\Delta_I)^{t1-t0}\,d_I{}^{t0}$	Change in final demand & technology $\delta(\Delta_I)^{t1-t0}\,\delta(d_I)^{t1-t}$	Total change
1975-1980	Food crops	63.9	-8.0	-28.1	100
	Estate crops	99.2	-0.1	-0.8	100
	Manufacturin	96.7	-0.8	-2.5	100
	Trade	94.1	-1.2	-4.8	100
	Financial	85.2	-3.4	-11.4	100
1980-1985	Food crops	36.9	40.4	22.7	100
	Estate crops	51.6	26.7	21.7	100
	Manufacturin	57.0	26.9	16.1	100
	Trade	71.1	18.2	10.7	100
	Financial	51.3	30.7	18.1	100
1990-1995	Food crops	82.7	7.5	9.8	100
	Estate crops	67.9	13.9	18.3	100
	Manufacturin	84.5	6.7	8.8	100
	Trade	84.6	6.6	8.7	100
	Financial	53.2	20.0	26.8	100
1995-1999	Food crops	81.8	-7.1	-11.1	100
	Estate crops	84.3	-6.3	-9.5	100
	Manufacturin	65.8	-18.5	-15.7	100
	Trade	74.7	-10.2	-15.1	100
	Financial	62.1	-17.0	-20.9	100

Note: negative changes were calculated as the absolute number of changes.

Table 3. Classification of 1995 and 1998 National SAM (22 X 22)

	Sector	Abbreviation	SAM Aggregation (109 X 109)
FACTOR OF PRODUCTIONS	Agricultural Labor	AgLab.	1-4
	Production Labor	ProLab	5-8
	Administration Labor	AdmLab.	9-12
	Professional Labor	ProfLab.	13-16
	Capital	Cap.	17-23
INSTITUTIONS	Agricultural Household	AgHH	24-27
	Non-agricultural Household Rural	NagRural	28-30
	Non-agricultural Household Urban	NagUrban	31-33
	Firms	Firm	34
	Government	Gov.	35
PRODUCTION ACTIVITIES	Agriculture	Agri.	36-40, 61-65, 84-88
	Mining	Mining	41-42, 66-67, 89-90
	Manufacturing	Man.	43-47,68-72, 91-95
	Electricity, Gas, and Water	EGW	48, 73, 96
	Construction	Const.	49, 74, 97
	Trades, Hotels, restaurants	Trade	50-52, 59, 75-77, 98-100
	Transportation	Trans.	53-54, 60, 78-79, 101-102
	Finance, Real Estate	Finance	55-56, 80-81, 103-104
	Other services	Other	57-58, 82-83, 105-106

Table 4. Transformation from Goods 1995 (Rp. Billion)

Final Demand	First and Second Transformation		Third Transformation		Fourth Transformation	
GOODS	Goods	Output	Factors	Output	Institution	Output
Agri	Agri	144,708	AgLabor	30,092	AgriHH	29,087
Mining	Mining	66,793	ProdLabor	24,697	NAgrRural	33,662
Manuf	Manuf	512,003	AdmLabor	5,994	NAgrUrban	41,173
	Total	723,504	ProfLabor	1,658	Firm	34,785
			Capital	80,260	Govn.	13,793
			Total	142,701	Total	152,500
	Services	Output	Factors	Output	Institution	Output
	EGW	11,673	AgLabor	-	AgriHH	8,620
	Construc	7,295	ProdLabor	8,557	NAgrRural	21,912
	Trade	177,598	AdmLabor	42,446	NAgrUrban	52,060
	Transport	62,628	ProfLabor	7,905	Firm	19,729
	Finance	75,633	Capital	45,522	Govn.	8,188
	Otherserv	61,626	Total	104,430	Total	110,509
	Total	396,452				
SERVICES	Services	Output	Factors	Output	Institution	Output
Elect	EGW	9,213	AgLabor	-	AgriHH	11,015
Construc	Construc	195,583	ProdLabor	24,266	NAgrRural	28,815
Trade	Trade	140,798	AdmLabor	38,852	NAgrUrban	60,853
Transport	Transport	53,740	ProfLabor	9,318	Firm	23,522
Finance	Finance	84,614	Capital	54,274	Govn.	9,779
Otherserv	Otherserv	59,908	Total	126,709	Total	133,984
	Total	543,857				
	Goods	Output	Factors	Output	Institution	Output
	Agri	100,877	AgLabor	20,977	AgriHH	18,799
	Mining	31,926	ProdLabor	13,812	NAgrRural	20,489
	Manuf	292,787	AdmLabor	3,364	NAgrUrban	23,740
	Total	425,589	ProfLabor	926	Firm	20,070
			Capital	46,308	Govn.	7,980
			Total	85,387	Total	91,077
TOTAL	Activities	Output	Factors	Output	Institution	Output
Agri	Agri	245,584	AgLabor	51,070	AgriHH	67,521
Mining	Mining	98,719	ProdLabor	71,333	NAgrRural	104,879
Manuf	Manuf	804,790	AdmLabor	90,655	NAgrUrban	177,826
Elect	GOODS	1,149,094	ProfLabor	19,807	Firm	98,106
Construc			Capital	226,363	Govn.	39,740
Trade	EGW	20,886	Total	459,227	Total	488,071
Transport	Construc	202,878				
Finance	Trade	318,397				
Otherserv	Transport	116,368				
	Finance	160,247				
	Otherserv	121,534				
	SERVICES	940,310				

Table 5. Composition After the Transformation of Goods and Services, 1995 (%)

Final Demand	First and Second Transformation		Third Transformation		Fourth Transformation	
GOODS	Goods	Output	Factors	Output	Institution	Output
Agri	Agri	58.9	AgLabor	58.9	AgriHH	43.1
Mining	Mining	67.7	ProdLabor	34.6	NAgrRural	32.1
Manuf	Manuf	63.6	AdmLabor	6.6	NAgrUrban	23.2
	Total	63.0	ProfLabor	8.4	Firm	35.5
			Capital	35.5	Govn.	34.7
			Total	31.1	Total	31.2
	Services	Output	Factors	Output	Institution	Output
	EGW	55.9	AgLabor	-	AgriHH	12.8
	Construc	3.6	ProdLabor	12.0	NAgrRural	20.9
	Trade	55.8	AdmLabor	46.8	NAgrUrban	29.3
	Transport	53.8	ProfLabor	39.9	Firm	20.1
	Finance	47.2	Capital	20.1	Govn.	20.6
	Otherserv	50.7	Total	22.7	Total	22.6
	Total	42.2				
SERVICES	Services	Output	Factors	Output	Institution	Output
Elect	EGW	44.1	AgLabor	-	AgriHH	16.3
Construc	Construc	96.4	ProdLabor	34.0	NAgrRural	27.5
Trade	Trade	44.2	AdmLabor	42.9	NAgrUrban	34.2
Transport	Transport	46.2	ProfLabor	47.0	Firm	24.0
Finance	Finance	52.8	Capital	24.0	Govn.	24.6
Otherserv	Otherserv	49.3	Total	27.6	Total	27.5
	Total	57.8				
	Goods	Output	Factors	Output	Institution	Output
	Agri	41.1	AgLabor	41.1	AgriHH	27.8
	Mining	32.3	ProdLabor	19.4	NAgrRural	19.5
	Manuf	36.4	AdmLabor	3.7	NAgrUrban	13.4
	Total	37.0	ProfLabor	4.7	Firm	20.5
			Capital	20.5	Govn.	20.1
			Total	18.6	Total	18.7
TOTAL	Activities	Output	Factors	Output	Institution	Output
Agri	Agri	100	AgLabor	100	AgriHH	100
Mining	Mining	100	ProdLabor	100	NAgrRural	100
Manuf	Manuf	100	AdmLabor	100	NAgrUrban	100
Elect	GOODS	100	ProfLabor	100	Firm	100
Construc			Capital	100	Govn.	100
Trade	EGW	100	Total	100	Total	100
Transport	Construc	100				
Finance	Trade	100				
Otherserv	Transport	100				
	Finance	100				
	Otherserv	100				
	SERVICES	100				

Table 6. Transformation from Goods and Services 1998 (Rp. Billion)

Final Demand	First and second Transformation		Third Transformation		Fourth Transformation	
GOODS	Goods	Output	Factors	Output	Institution	Output
Agri	Agri	376,146	AgLabor	43,385	AgriHH	66,162
Mining	Mining	250,832	ProdLabor	39,117	NAgrRural	87,634
Manuf	Manuf	1,623,225	AdmLabor	9,487	NAgrUrban	112,488
	Total	,250,203	ProfLabor	2,809	Firm	142,568
			Capital	335,865	Govn.	51,079
			Total	430,663	Total	459,930
	Services	Output	Factors	Output	Institution	Output
	EGW	39,379	AgLabor	-	AgriHH	19,939
	Construc	76,357	ProdLabor	14,079	NAgrRural	41,433
	Trade	385,155	AdmLabor	53,866	NagrUrban	83,557
	Transport	141,296	ProfLabor	10,277	Firm	55,200
	Finance	144,556	Capital	130,041	Govn.	20,399
	Otherserv	138,268	Total	208,263	Total	220,528
	Total	925,010				
SERVICES	Services	Output	Factors	Output	Institution	Output
Elect	EGW	16,799	AgLabor	-	AgriHH	15,537
Construc	Construc	266,837	ProdLabor	16,882	NAgrRural	31,676
Trade	Trade	215,559	AdmLabor	32,256	NAgrUrban	59,858
Transport	Transport	87,746	ProfLabor	6,936	Firm	42,224
Finance	Finance	98,659	Capital	99,472	Govn.	15,548
Otherserv	Otherserv	80,864	Total	155,546	Total	164,842
	Total	766,463				
	Goods	Output	Factors	Output	Institution	Output
	Agri	24,951	AgLabor	14,412	AgriHH	19,521
	Mining	52,459	ProdLabor	10,622	NAgrRural	24,846
	Manuf	454,572	AdmLabor	2,563	NAgrUrban	30,852
	Total	631,983	ProfLabor	753	Firm	38,954
			Capital	91,770	Govn.	13,976
			Total	120,120	Total	128,150
TOTAL	Activities	Output	Factors	Output	Institution	Output
Agri	Agri	501,097	AgLabor	57,797	AgriHH	121,159
Mining	Mining	303,291	ProdLabor	80,700	NAgrRural	185,588
Manuf	Manuf	2,077,798	AdmLabor	98,172	NAgrUrban	286,755
Elect	GOODS	2,882,186	ProfLabor	20,776	Firm	278,947
Construc			Capital	657,149	Govn.	101,002
Trade	EGW	56,178	Total	914,593	Total	973,451
Transport	Construc	343,193				
Finance	Trade	600,714				
Otherserv	Transport	229,042				
	Finance	243,215				
	Otherserv	219,132				
	SERVICE	1,691,474				

Table 7. Composition After Transformation of Goods and Services, 1998 (%)

Final Demand	First and Second Transformation		Third Transformation		Fourth Transformation	
GOODS	Goods	Output	Factors	Output	Institution	Output
Agri	Agri	75.1	AgLabor	75.1	AgriHH	54.6
Mining	Mining	82.7	ProdLabor	48.5	NAgrRural	47.2
Manuf	Manuf	78.1	AdmLabor	9.7	NAgrUrban	39.2
	Total	78.1	ProfLabor	13.5	Firm	51.1
			Capital	51.1	Govn.	50.6
			Total	47.1	Total	47.2
	Services	Output	Factors	Output	Institution	Output
	EGW	70.1	AgLabor	-	AgriHH	16.5
	Construc	22.2	ProdLabor	17.4	NAgrRural	22.3
	Trade	64.1	AdmLabor	54.9	NAgrUrban	29.1
	Transport	61.7	ProfLabor	49.5	Firm	19.8
	Finance	59.4	Capital	19.8	Govn.	20.2
	Otherserv	63.1	Total	22.8	Total	22.7
	Total	54.7				
SERVICES	Services	Output	Factors	Output	Institution	Output
Elect	EGW	29.9	AgLabor	-	AgriHH	12.8
Construc	Construc	77.8	ProdLabor	20.9	NAgrRural	17.1
Trade	Trade	35.9	AdmLabor	32.9	NAgrUrban	20.9
Transport	Transport	38.3	ProfLabor	33.4	Firm	15.1
Finance	Finance	40.6	Capital	15.1	Govn.	15.4
Otherserv	Otherserv	36.9	Total	17.0	Total	16.9
	Total	45.3				
	Goods	Output	Factors	Output	Institution	Output
	Agri	24.9	AgLabor	24.9	AgriHH	16.1
	Mining	17.3	ProdLabor	13.2	NAgrRural	13.4
	Manuf	21.9	AdmLabor	2.6	NAgrUrban	10.8
	Total	21.9	ProfLabor	3.6	Firm	14.0
			Capital	14.0	Govn.	13.8
			Total	13.1	Total	13.2
TOTAL	Activities	Output	Factors	Output	Institution	Output
Agri	Agri	100	AgLabor	100	AgriHH	100
Mining	Mining	100	ProdLabor	100	NAgrRural	100
Manuf	Manuf	100	AdmLabor	100	NAgrUrban	100
Elect	GOODS	100	ProfLabor	100	Firm	100
Construc			Capital	100	Govn.	100
Trade	EGW	100	Total	100	Total	100
Transport	Construc	100				
Finance	Trade	100				
Otherserv	Transport	100				
	Finance	100				
	Otherserv	100				
	SERVICES	100				

Table 8. Transformation from Institution 1995 and 1998 (Rp. Billion)

Final Demand	First Transformation	Second and Third Transformation	Fourth Transformation

1995

INSTUTION
AgriHH
NAgrRural
NAgrUrban
Firm
Govn.

Institution	Output
AgriHH	11,459
NagrRural	14,372
NagrUrban	23,135
Firm	20,767
Govn.	43,325
Total	113,058

Goods	Output
Agri	25,824
Mining	3,262
Manuf	66,141
Total	95,227

Services	Output
EGW	2,959
Construc	2,655
Trade	32,756
Transport	12,330
Finance	18,296
Otherserv	41,371
Total	110,367

Total	205,594

Factors	Output
AgLabor	5,370
ProdLabor	2,887
AdmLabor	700
ProfLabor	190
Capital	9,635
Total	18,782

Factors	Output
AgLabor	-
ProdLabor	3,052
AdmLabor	11,323
ProfLabor	4,502
Capital	11,368
Total	30245

Total	49,027

1998

INSTUTION
AgriHH
NAgrRural
NAgrUrban
Firm
Govn.

Institution	Output
AgriHH	17,599
NagrRural	25,780
NagrUrban	31,650
Firm	33,848
Govn.	25,213
Total	134,090

Goods	Output
Agri	38,553
Mining	7,589
Manuf	119,001
Total	165,143

Services	Output
EGW	5,318
Construc	8,975
Trade	45,596
Transport	17,610
Finance	19,143
Otherserv	29,247
Total	125,889

Total	291,032

Factors	Output
AgLabor	4,447
ProdLabor	2,664
AdmLabor	637
ProfLabor	185
Capital	23,027
Total	30,960

Factors	Output
AgLabor	-
ProdLabor	2,122
AdmLabor	7,318
ProfLabor	1,978
Capital	17,492
Total	28910

Total	59,870

Table 9. Transformation from Institution 1995 and 1998 (%)

Final Demand	First Transformation	Second and Third Transformation	Fourth Transformation

1995

INSTUTION
AgriHH
NAgrRural
NAgrUrban
Firm
Govn.

Institution	Output
AgriHH	10.1
NagrRural	12.7
NagrUrban	20.5
Firm	18.4
Govn.	38.3
Total	100

Goods	Output
Agri	12.6
Mining	1.6
Manuf	32.2
Total	46.3

Services	Output
EGW	1.4
Construc	1.3
Trade	15.9
Transport	6.0
Finance	8.9
Otherserv	20.1
Total	53.7

Total	100

Factors	Output
AgLabor	11.0
ProdLabor	5.9
AdmLabor	1.4
ProfLabor	0.4
Capital	19.7
Total	38.3

Factors	Output
AgLabor	-
ProdLabor	6.2
AdmLabor	23.1
ProfLabor	9.2
Capital	23.2
Total	61.7

Total	100

1998

INSTUTION
AgriHH
NAgrRural
NAgrUrban
Firm
Govn.

Institution	Output
AgriHH	13.1
NagrRural	19.2
NagrUrban	23.6
Firm	25.2
Govn.	18.8
Total	100

Goods	Output
Agri	13.2
Mining	2.6
Manuf	40.9
Total	56.7

Services	Output
EGW	1.8
Construc	3.1
Trade	15.7
Transport	6.1
Finance	6.6
Otherserv	10.0
Total	43.3

Total	100

Factors	Output
AgLabor	7.4
ProdLabor	4.4
AdmLabor	1.1
ProfLabor	0.3
Capital	38.5
Total	51.7

Factors	Output
AgLabor	-
ProdLabor	3.5
AdmLabor	12.2
ProfLabor	3.3
Capital	29.2
Total	48.3

Total	100