Multiplier Decomposition, Poverty and Inequality in Income Distribution in a SAM Framework: the Vietnamese Case

Pansini, Rosaria Vega

University of Pavia

October 2008

QUADERNI DEL DIPARTIMENTO DI ECONOMIA PUBBLICA E TERRITORIALE

n. 4/2008

Marisa Bottiroli Civardi, Renata Targetti Lenti
and Rosaria Vega Pansini

Multiplier Decomposition, Poverty and Inequality in Income Distribution in a SAM Framework: The Vietnamese Case

UNIVERSITÀ DEGLI STUDI DI PAVIA

QUADERNI DEL DIPARTIMENTO DI ECONOMIA PUBBLICA E TERRITORIALE
UNIVERSITA' DI PAVIA

REDAZIONE

Enrica Chiappero Martinetti
Dipartimento di Economia Pubblica e Territoriale
Università degli Studi di Pavia
Corso Strada Nuova 65
27100 PAVIA
tel. 0039-382-984401 -984354
fax 0039-382-984402
E-MAIL chiapper@unipv.it

COMITATO SCIENTIFICO

La collana di **QUADERNI DEL DIPARTIMENTO DI ECONOMIA PUBBLICA E TERRITORIALE** ha lo scopo di favorire la tempestiva divulgazione, in forma provvisoria o definitiva, di ricerche scientifiche originali. La pubblicazione di lavori nella collana è soggetta, con parere di referees, all'approvazione del Comitato Scientifico.
La Redazione ottempera agli obblighi previsti dall'art. 1 del D.L.L 31/8/1945 n. 660 e successive modifiche.
Le richieste di copie della presente pubblicazione dovranno essere indirizzate alla Redazione.

QUADERNI DEL DIPARTIMENTO DI ECONOMIA
PUBBLICA E TERRITORIALE
n. 4/2008

UNIVERSITÀ DI PAVIA

MULTIPLIER DECOMPOSITION, POVERTY AND INEQUALITY IN INCOME DISTRIBUTION IN A SAM FRAMEWORK: THE VIETNAMESE CASE

Marisa Bottiroli Civardi*, Renata Targetti Lenti** and Rosaria Vega Pansini**

ABSTRACT

The aim of this paper is to show how and why is possible to assess both direct and indirect effects of exogenous income injections on mean income of different household groups using a new approach based on the decomposition of SAM-based multipliers. The approach we propose in this paper allows analyzing the level of inequality in the distribution of income linking the formation of individual/family income to the features of each country's productive structure and it can be used both for structural analysis and for simulations of redistributive and antipoverty policies. The first step in order to link changes in the level of poverty and inequality to policy measures will be to derive the "accounting price multipliers matrix", which allows considering the effects of policies affecting the labour market, thus changing the level of wages for different workers 'categories. Using the traditional Pyatt and Round's multiplicative decomposition method, we will be then able to disentangle the transfer, the open-loop and the closed-loop effects of a change in the income of exogenous SAM's accounts. The second step will be to use a new technique introduced by Pyatt and Round (2006) to further decompose each element of the total multiplier matrix in order to enlighten in "microscopic detail" the linkages between each household group's income of and other accounts whose income has been exogenously injected (i.e. Activities account and Factors account). Moreover, this new approach allows assessing the linkages between each household endowment in terms of factors and the features of the productive system and shading light on the most powerful links among different components of the economic system affecting the distribution of income. The empirical results obtained using the Vietnamese SAM for year 2000 show that

* University of Milano-Bicocca, marisa.civardi@unimib.it
** University of Pavia, targetti@unipv.it; rosaria.pansini@unipv.it (corresponding author)

the highest direct effects are related to exogenous injections to the agricultural sector and to less skilled labour force and that these effects involved not only on rural male headed but also other household groups. At the same time, the new type of multiplier decomposition shows which are the sectors and factors of production whose increase in income will have the greater indirect effects, increasing also the level of income of all household types. For example, investing in the sector of food processing and on female labour force will benefit the most all household groups, thus representing a policy option good for aggregate growth and for improving the distribution of income.

JEL CLASSIFICATION: D31, D33, D57, O15, O43.

Keywords: Income distribution, social accounting matrix, multiplier decomposition, growth, labour market, structure of production.

- The paper presents some results of the Pavia Research Unit (Recent poverty and inequality trends and the impact of growth and pro-poor policies) as a part of a national project “Micro and macroeconomic policies and their impact on inequality and poverty: a research agenda” coordinated by Renata Lenti Targetti (PRIN 2006 - 2006132051).The authors acknowledge all the people whose help and suggestions were useful for completing this project. The author are entirely responsible for the remain errors. Usual disclaimers apply.

1. *Introduction: using SAM for distributive analysis*

The organization of the production sector, the characteristics of final demand, the remuneration of factors of production (labour, capital and land) from value added, the ownership of factors by institutions (in particular, by households) and the system of transfers between institutions are all structural features that pertain at the functioning of an economic system and that determine the distribution of income to individuals and household groups. Moreover, most of the policy interventions, especially in the developing countries, have been devoted to enhance growth, thus influencing variables at the aggregate and at the sectoral level. The analysis of the structure of the economy shows that there can be features of the system that favour the accumulation of income by some group of households. In these conditions, there can be policies devoted to favour the poor but that end up improving the condition of better off household groups.

It is thus important taking into account all these issues for two different reasons. First, the distribution of income at the personal level depends also from macroeconomic variables and from the structure of the economy. Therefore, a microeconomic analysis should be completed by a macroeconomic approach (Bottiroli Civardi and Targetti Lenti, 2007:2). Second, considering that each economic system can be represented by a circular flow of income, policy reforms cause indirect effects that can be more important than immediate effects and difficult to measure using a microeconomic approach. Considering all these elements requires adopting a framework, valid at the macro and at the meso level, that allows analysing the link between structural characteristic of the economic system and personal distribution of income and evaluating the impact on inequality of policy reforms. This comprehensive framework is represented by a Social Accounting Matrix.

A Social Accounting Matrix (SAM) is a comprehensive, disaggregated, consistent and complete data system that captures the interdependence existing within a socioeconomic system. The SAM shows the entire circular flow of income from its production to its distribution and its expenditure. Formally, a SAM is a square matrix combining in an accounting framework the value of flows of an economic system and showing at the same time, for all transactions, who pays what to whom. The elementary flows, which connect among them the economic units aggregated at different level, are the starting point. With respect to other accounting frameworks, the innovative feature of a SAM is the introduction of accounts referred to Institutions (Households, Private Companies, Government, Rest of the World). The SAM allows then capturing the link between Activities of production and Institutions, which own the different factors of production. This link allows connecting the factorial to the personal income distribution within the same analytical framework. The secondary distribution of income is also introduced as the result of transfers between different Institutions, mainly between private Institutions and the Government.

Analytically, a SAM can be considered as an extension of the traditional input-output framework. This format, in fact, adds some matrices, not included in the Leontief schema, which allow taking into account the relationships between factorial distribution of income, income distribution to Institutions and final demand. The inclusion in the SAM of data related to the production side and to income distribution and consumption expenditures, which depends on households behaviour, allows also considering the SAM not only as a database and as an accounting tool, but also, in a wider sense, as a macroeconomic model.

The SAM can be then used as a conceptual framework to explore the impact of exogenous changes in such variables as exports, certain categories of government expenditures and investments, on the whole interdependent socioeconomic system, e.g. the structure of production and the related factorial and household income distribution. The disposable income of Institutions is the starting point for sustaining the final demand. In particular, Households, grouped in different socio-economic groups, sustain the demand for consumption. The amount of income, which is not consumed in the current year, is saved and goes into the capital account. As such, the SAM becomes the basis for simple multiplier analysis and for building and calibrating a variety of applied general equilibrium models.

Although a SAM is usually set up in a standard, basic framework, there is large flexibility both in the degree of disaggregation of accounts and in the emphasis placed on the different parts of the economic system explicitly included. The choice of the numbers of accounts to consider depends on the goals of the analysis and on the availability of statistical data. In order to be used for the analysis of income distribution, a SAM typically presents a high level of detail about the circular flow of income, showing transactions between different Institutions (including different household groups) and production activities. In particular, it records the interactions between both these sets of agents via the factors and the products markets. An overriding feature of a SAM is that Households and the household groups are at the heart of the framework. Only if there exists some level of detail on the distributional features of the household sector, the framework can truly earn the label 'social' accounting matrix.

Starting by this particular accounting framework, the approach we propose in this paper can be used for structural analysis of the features of the economic system and for the analysis of the impact of alternative socio-economic policies on personal income distribution and inequality. In particular, the SAM can be used as a Leontief linear model once we assume that the coefficients of income distribution and of expenditure are constant. The solution of the model brings to a matrix of multipliers, which allows assessing the effects of changes of some of variables (exogenous and policy driven) on the others (endogenous) of the system. In order to estimate the changes in the incomes of different household groups (deciles or socio-economic groups), it is possible to adopt a multiplier decomposition approach.

Following the seminal Pyatt and Round's decomposition method of "accounting multiplier matrix" (Pyatt and Round, 1979), it will be possible to determine the value of the global multipliers for different household groups with an application to the Vietnamese economic system. This can be considered a first step in order to link changes in the level of inequality and policy measures. The second step will be to decompose each total multiplier' element in order to enlighten in "microscopic detail" the linkages between the incomes of each socio-economic group with that of other accounts. In particular, it is interesting to assess the linkages between household income and income accruing to the production activities and to factors of production, i.e. the linkages between the Households endowment and the features of the productive system.

In order to reach this aim, the paper is organized as follows. The following two sections illustrate the methodology to derive the global multiplier matrix starting from an aggregate SAM and to decompose it using a multiplicative approach. Section three contains also a new approach proposed in this paper to decompose in 'microscopic detail' each single SAM-based multiplier in order to disentangle direct and indirect effects of exogenous income changes on endogenous accounts' income. Data used in this exercise are described in section four, while sections five and six contain results of the decomposition exercise. The final section seven sketches the main conclusions of the analysis.

2. The SAM as a simulation model: the decomposition of the multiplier matrix.

A SAM has frequently been used to examine the partial equilibrium impacts of a real shock, using a multiplier model that treats the circular flow of income endogenously. "If a certain number of conditions are met - in particular, the existence of excess capacity and unemployed or underemployed labour resources - the SAM framework can be used to estimate the effects of exogenous changes and injections, such as an increase in the demand for a given production activity, in government expenditures or in exports on the whole system. As long as excess capacity and a labour slack prevail, any exogenous change in demand can be satisfied through a corresponding increase in output without having any effect on prices. Thus, for any given injection anywhere in the SAM, influence is transmitted through the interdependent SAM system. The total, direct and indirect, effects of the injection on the endogenous accounts, i.e. the total outputs of the different production activities and the incomes of the various factors and socio-economic groups are estimated through the multiplier process" (Thorbecke, 2000:17).

In order to measure the effects occurring in some variables (the exogenous ones) on the others (the endogenous ones) of the system, a very aggregated SAM (Table 1.1) must be introduced, which shows the organization of accounts distinguished in exogenous and endogenous.

Table 1.1 Aggregate SAM with endogenous and exogenous accounts

	Endogenous Accounts			**Exogenous Accounts**	**Total receipts**
	Activities	Factors	Private Institutions		
Activities	T_{11}	**0**	T_{13}	x_1	y_1
Factors	T_{21}	**0**	**0**	x_2	y_2
Private Institutions	**0**	T_{32}	T_{33}	x_3	y_3
Exogenous Accounts	l'_1	l'_2	l'_3	x_4	y_4
Total expenditures	y'_1	y'_2	y'_3	y'_4	

Source: Pyatt and Round (1979) and Bottiroli Civardi and Targetti Lenti (2007).

One of the main aims of the SAM-based multiplier analysis is to examine the effects of real shocks occurring in the system on the distribution of income across different groups of households. "One other important feature of SAM-based multiplier analysis is that it lends itself easily to decomposition, thereby adding an extra degree of transparency in understanding the nature of linkage in an economy and the effects of exogenous shocks on distribution and poverty" (Round, 2003a:271). The determination of a multi-sector income multiplier is a distinguishing characteristic of the models based on a SAM. The equilibrium solution is obtained following the same procedure as in the input-output analysis and using the SAM as a linear model. "It is obvious that the SAM formulation contains more information and a higher degree of endogeneity since it captures the endogenously derived effects of income distribution on consumption, which the Leontief national model does not" (Thorbecke, 2000:22).

The multiplier approach allows quantifying the different ways by which an income equally earned by each socio-economic group identified in the Household sector, turns into different disposable income levels through the three stages of spending, production and redistribution. The accounting multipliers obtained using SAM as a linear model allow capturing the structural features of the income distribution and the interrelations between different households groups. The resulting inequality in personal income distribution can be considered as the minimum inequality compatible with the given productive and spending structures, and hence as a result of the mechanism only explicitly considered in the model. The income distribution of Institutions (Households) in the SAM must be considered as an equilibrium one, i.e. the distribution that assure the balance between the final demand for consumption and the supply of different commodities from the productive sectors in a given year.

As shown in Table 1.1, three components of the SAM have been endogenous: Activities, Factors, (national) Private Institutions as Households and Companies. Private Companies receive income from Factors and redistribute it to other Private Institutions. The endogenous accounts must be isolated from the exogenous ones (Government, Rest of the World and Capital/Saving) by aggregating one or more submatrices of the SAM. This kind of "truncated SAM consolidates all exogenous transactions and corresponding leakages and focuses exclusively on the endogenous transactions and transformations" (Thorbecke, 2000:8). In particular, the sum of the exogenous injections from government expenditures, investment and exports, respectively, has been consolidated into three vectors $\mathbf{x}_1$, $\mathbf{x}_2$ and $\mathbf{x}_3$.

Following a Keynesian approach, we can assume that the total level of income of each socio-economic Household group determines the level of consumption of different commodities. The equilibrium solution through the SAM determines the income distribution of the Private Institutions consistent with a given production structure under the assumption that the final demand depends on the disposable income of the Endogenous Institutions.

Traditional input-output analysis based on multipliers assumes the consumption demand as exogenous and the output of different activities depending on the propensities of final demand so that the composition of demand influences that of the value added. The opposite is not true because the input-output model does not include the link between the value added and the primary income distribution earned by different Households groups. In the SAM model, instead, the income of households groups assumes different values depending on the composition of final demand. This happens because our model takes into account the features of personal income distribution as depending on the composition of the value added, which is determined by the structure of production Activities.

With reference to the SAM of Table 1.1, equations expressing the generation process of total value added can be written out in explicit form. The equation [1] indicates, first of all, that the value of total production of the *n* activities ($\mathbf{t}_1$) must be equal to the sum of intermediate demand from Activities ($\mathbf{T}_{11}$), the final demand of commodities from Private Institutions ($\mathbf{T}_{13}$) and the residual component of the final demand $\mathbf{x}_1$. Equation [2] indicates that total factorial income ($\mathbf{t}_2$) should be equal to value added produced by the endogenous activities and then distributed to Factors ($\mathbf{T}_{21}$) plus the exogenous component $\mathbf{x}_2$. Equation [3] indicates that the total disposable income ($\mathbf{t}_3$), resulting from the primary and secondary distribution process, is equal to the income occurring to Private Institutions both from Factors ($\mathbf{T_{32}}$) and, after the redistribution process, within endogenous Institutions (T_{33}) plus the proportion of factorial income from exogenous institutions $\mathbf{x_3}$.

$$\mathbf{y_1 = T_{11} + T_{13} + x_1} \quad [1]$$

$$\mathbf{y_2 = T_{21} + x_2} \quad [2]$$

$$\mathbf{y_3 = T_{32} + T_{33} + x_3} \quad [3]$$

In order to derive the global multiplier matrix **M**, it is necessary to derive the matrices of average expenditure coefficients $\mathbf{A_{jk}}$ dividing matrix $\mathbf{T_{jk}}$ by the diagonal matrix $\mathbf{\hat{y}_k}$ whose elements are the components of $\mathbf{y_k}$. The hypothesis of fixed expenditure coefficients resulting from $\mathbf{A_{jk}}$ is consistent with the assumptions of the linear expenditure system developed by Stone for which there is a widespread empirical support (Stone, 1954).

$$\mathbf{A_{jk} = T_{jk}} (\hat{y}_k)^{-1} \quad [4]$$

The normalisation of the transaction matrices $\mathbf{T_{jk}}$ allows the constraints relating to row and column totals of the SAM in Table 1.1 to be rewritten isolating the group of the *r* (three in our case) endogenous accounts from the exogenous ones. We can, thus, write

$$\mathbf{y = A\,t + x} \quad [5]$$

$$\mathbf{y_4 = l'_1 t_1 + l'_2 t_2 + l'_3 t_3 + x_4} \quad [6]$$

The formulation in equation [5] indicates that vector **t** of total receipts for each endogenous account can be obtained from vector **x**, expressing the total receipts of exogenous Institutions, by the generalised inverse **A**. Equation [6] indicates that the equilibrium values of the accounts relating to exogenous Institutions is achieved once endogenous accounts are in equilibrium. Finally, considering the previous equations and the accounting principle that total receipts must be equal to total outlays, it follows that, in aggregate, total injections into the system must be equal to the total leakages (Pyatt and Round, 1979).

In order to capture how the matrix of global multipliers works to generate a new distribution of income to endogenous institutions as a response to an exogenous injection, it is useful to explicit the relations expressed in equation [5]. Following Thorbecke (2000:20) and considering the structure of the aggregate SAM in Table 1.1, we can write:

$$\mathbf{y_1 = A_{11}\, y_1 \qquad\qquad\qquad + A_{13}\, y_3 \qquad + x_1} \qquad [7]$$

$$\mathbf{y_2 = A_{21}\, y_1 \qquad\qquad\qquad\qquad\qquad\qquad + x_2} \qquad [8]$$

$$\mathbf{y_3 = \qquad\qquad A_{32}\, y_2 \qquad + A_{33}\, y_3 \qquad + x_3} \qquad [9]$$

and solving for the components of vector *y*, we obtain:

$$\mathbf{y_1 = (I-A_{11})^{-1}x_1 \qquad\qquad + (I-A_{11})^{-1}A_{13}\, y_3} \qquad [10]$$

$$\mathbf{y_2 = \qquad\qquad x_2 \qquad\qquad + A_{21}\, y_1} \qquad [11]$$

$$\mathbf{y_3 = (I-A_{33})^{-1}x_3 \qquad\qquad + (I-A_{33})^{-1}A_{32}\, y_2} \qquad [12]$$

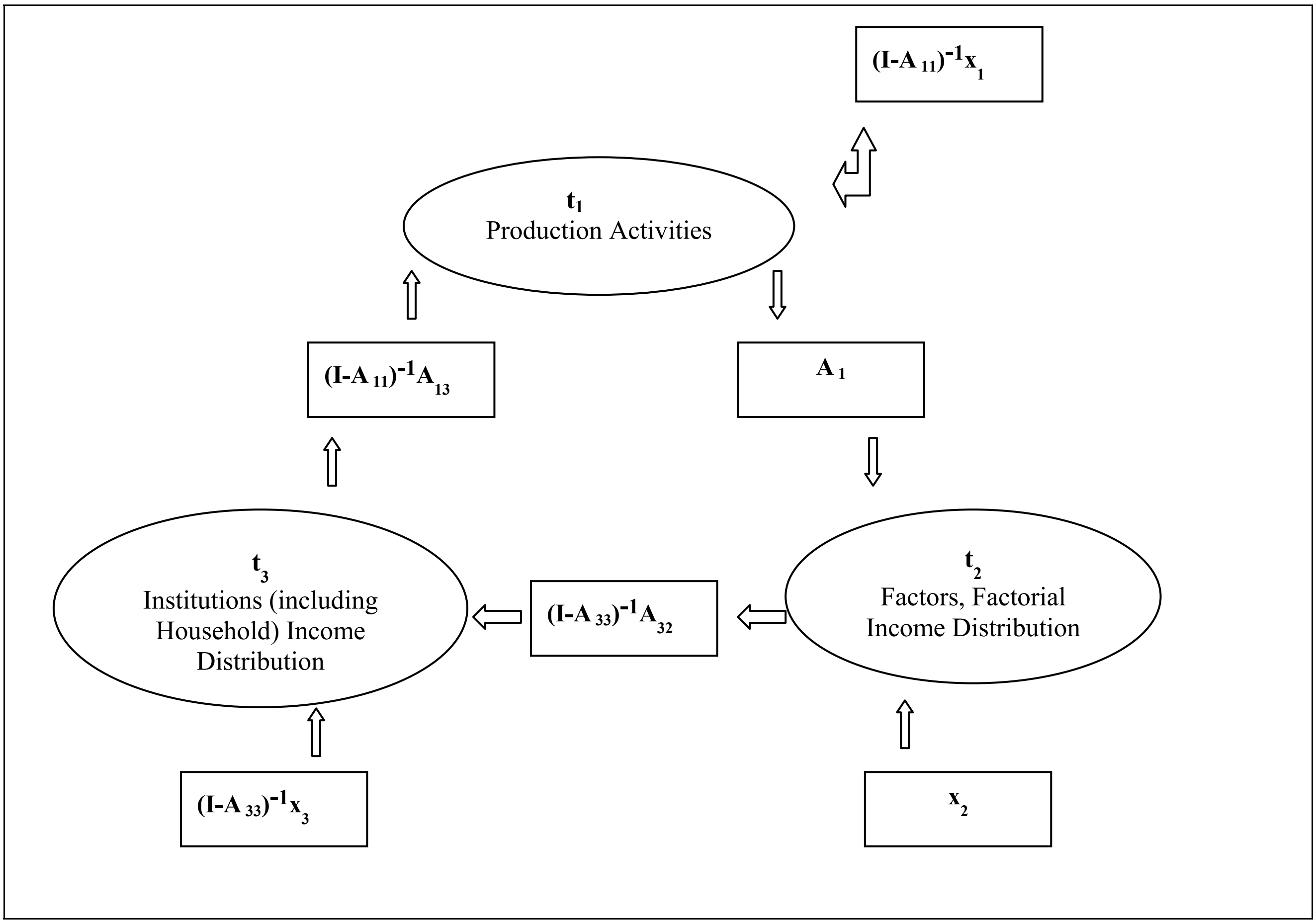
Following Thorbecke (2000), the set of equations from [10] to [12] can be represented graphically in Figure 1.1. This Figure shows clearly and explicitly the mechanisms through which the multiplier process operates as the result of different exogenous injections, taking in account that:

$\mathbf{x_1}$ = exogenous final demand from government consumption, export and investment demand;
$\mathbf{x_2}$ = exogenous final demand for factors from government consumption, export and investment demand;
$\mathbf{x_3}$ = exogenous injection from government transfers and remittances from abroad toward the Private Institutions.

Let us consider, for example, an exogenous increase (income injection) of exports, government consumption, or investment demand $\mathbf{x_1}$. This generates a rise in the output of the corresponding production activity of $\mathbf{(I-A_{11})^{-1}x_1}$. In turn, the additional factors of production which have to be employed to create the additional output generate a stream of value added $\mathbf{A_{21}y_1}$ which becomes income from factors in addition to any exogenous factor income received from other regions or from abroad and from the government, namely $\mathbf{x_2}$.

In the next link, Households (and Companies) receive income based on their resource endowment ($\mathbf{A_{32}}$) and transfers within the Household sector ($\mathbf{A_{33}}$) as well as exogenous government subsidies and transfer payments and remittances from other regions and abroad, i.e. $\mathbf{(I-A_{33})^{-1}x_3}$. Finally, the triangle is closed through the pattern of Households (and Companies) expenditures on commodities which translates into new production and in a corresponding flow of income accruing to production activities equal to $\mathbf{y_1=(I-A_{11})^{-1} A_{13}}$.

Figure 1.1: Multiplier Process among endogenous accounts



The circular flow of income and the global multiplier effects can be derived also starting from the equilibrium conditions expressed in equation [5]. This equation can be rewritten as

$$\mathbf{y = (I - A)^{-1} x = Mx} \qquad [13]$$

$$\mathbf{M = (I - A)^{-1}} \qquad [14]$$

Thus, from [13], endogenous incomes $\mathbf{y}$ (production activity incomes, $\mathbf{y_1}$, factors incomes, $\mathbf{y_2}$, Private Institutions' incomes, $\mathbf{y_3}$) can be derived by premultiplying vector of injections $\mathbf{x}$ by a multiplier matrix **M,** which shows the overall effects resulting from the direct, indirect transfer and closed-loop processes generated by an initial increase in anyone of the exogenous components $\mathbf{x_1}$, $\mathbf{x_2}$ and $\mathbf{x_3}$ on each element of the four endogenous accounts. This formulation indicates that the vector

y of receipt totals for each endogenous account can be obtained from vector **x**, expressing the receipt totals of exogenous institutions, by the generalised inverse of matrix **A**.

Matrix **M** has been referred to as the 'accounting multiplier matrix' (Pyatt and Round, 1979:856) because it explains the results obtained in a SAM and not the process by which they are generated. **M** can thus be interpreted as a simplified model of the actual way the system is working. From another point of view, the results of the multiplier analysis can be interpreted as a demonstration of how the economic system is expected to behave in case the model assumptions perfectly reflect the real situation. This "accounting multiplier matrix" is derived at constant prices and it is therefore constructed by "fixed-price" multipliers in a formal sense. It shows average responses of endogenous variables to exogenous injections. In particular, the generic element of the matrix of global multipliers[1] ${}_{rk}m_{ij}$ indicates the overall impact that a unit income change from the element *i* of exogenous account *r* has on the endogenous element *j* of the account *k*. One limitation of the accounting multiplier matrix is that "it implies unitary expenditure elasticities" (Thorbecke, 2000:19). The prevailing average expenditure propensities in **A** are assumed to apply to any incremental injection. Of course average responses could be different from the marginal ones[2].

Following Pyatt and Round (1979) and Bottiroli Civardi (1988:94-102) it is possible to decompose further the multiplier matrix **M** into three multiplicative components $\mathbf{M_1}$, $\mathbf{M_2}$ and $\mathbf{M_3}$. This decomposition has an important economic meaning for a structural analysis of income distribution, inequality and poverty, among and inside the Private Institutions, with particular reference to the Households' groups. "One other important feature of SAM-based multiplier analysis is that it lends itself easily to decomposition, thereby adding an extra degree of transparency in understanding the nature of linkage in an economy and the effects of exogenous shocks on distribution and poverty" (Round, 2003:271).

Equation [6] can be reformulated as:

$$
\begin{aligned}
\mathbf{y} &= \mathbf{A\,y + x} = \mathbf{A\,y + A_0\,y - A_0\,y + x} = \mathbf{(A\text{-}A_0)\,y + A_0\,y + x} \\
&= \mathbf{(I\text{-}A_0)^{-1}(A\text{-}A_0)y + (I\text{-}A_0)^{-1}\,x} \qquad [15] \\
&= \mathbf{M_1\,(A\text{-}A_0)\,y + M_1\,x}
\end{aligned}
$$

[1] Here the adjective 'global' indicates that in its aggregate version, the matrix M shows all the possible effects connected with a exogenous injection, without distinguish between direct and indirect or other effects.

[2] Then a matrix of 'fixed-price multipliers', based on marginal responses, could be introduced. "The distinction simply recognises that the marginal responses in the system, even in fixed-price world, may be different from what they are on average" (Round, 2003a:14). The estimate of the value of expenditure elasticities should be obtained only comparing the SAM values obtained for different years or with econometric methods.

where matrix **A** is:

$$\mathbf{A} = \begin{vmatrix} A_{11} & 0 & A_{13} \\ A_{21} & 0 & 0 \\ 0 & A_{32} & A_{33} \end{vmatrix}$$

matrices $\mathbf{A_0}$ and $\mathbf{A - A_0}$ are defined as:

$$\mathbf{A_0} = \begin{vmatrix} A_{11} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & A_{33} \end{vmatrix} \qquad \mathbf{A - A_0} = \begin{vmatrix} 0 & 0 & A_{13} \\ A_{21} & 0 & 0 \\ 0 & A_{32} & 0 \end{vmatrix}$$

and where $\mathbf{(I\text{-}A_0)^{-1} = M_1}$

That is

$$\mathbf{M_1} = \begin{vmatrix} (I - A_{11})^{-1} & 0 & 0 \\ 0 & I & 0 \\ 0 & 0 & (I - A_{33})^{-1} \end{vmatrix} = \begin{vmatrix} {}_1M_{11} & 0 & 0 \\ 0 & I & 0 \\ 0 & 0 & {}_1M_{33} \end{vmatrix} \qquad [16]$$

The $\mathbf{M_1}$ multiplier matrix captures the transfer elements. It expresses the effects within each endogenous account generated by direct transfers that are independent from the closed-loop process of income through the system. If we consider an exogenous injection of income in one endogenous account of the three blocks of the matrix, multiplier matrix $\mathbf{M_1}$ evaluates the impact on accounts belonging to the same block (for example, activities) due only to transfer effects within the same block. We can then refer to $\mathbf{M_1}$ as **within group** or **transfer multiplier.** The multiplier matrix $\mathbf{M_1}$ is a diagonal block matrix where the first diagonal block expresses the multiplier effects of the transfers within the activities and it is precisely the Leontief's inverse matrix. Since it is assumed that no direct transfers between factors take place, second diagonal block in $\mathbf{M_1}$is the identity matrix **I**. The third block captures the multiplier effects due to the transfers between endogenous Institutions.

The definition of $\mathbf{M_1}$ allows to introduce matrix $\mathbf{A^*}$ as $\mathbf{M_1\ (A\text{-}A_0) = (I\text{-}A_0)^{-1}(A\text{-}A_0)}$

$$\mathbf{A^* = M_1}\begin{vmatrix} 0 & 0 & A_{13} \\ A_{21} & 0 & 0 \\ 0 & A_{32} & 0 \end{vmatrix} = \begin{vmatrix} 0 & 0 & A^*_{13} \\ A^*_{21} & 0 & 0 \\ 0 & A^*_{32} & 0 \end{vmatrix}$$

Where

$\mathbf{A^*_{13} = (I- A_{11})^{-1} A_{13}}$

$\mathbf{A^*_{21} = A_{21}}$

$\mathbf{A^*_{32} = (I- A_{33})^{-1} A_{32}}$ or, if $\mathbf{A_{33} = 0}$ $\mathbf{A^*_{32} = A_{32}}$

We can write $\mathbf{y = [(I-A^*)^{-1} M_1] x}$ [17]

The elements of **A*** generate the circular flow of income. If we assume that $\mathbf{(I-A^*)^{-1}}$ exists, we can rewrite equation [17] as:

$$\mathbf{y = [(I-A^*)^{-1} M_1] x = (I-A^*)^{-1} (I-A_0)^{-1} x = Mx} \quad [18]$$

Equation [18] provides an initial decomposition of the matrix **M** into a transfer effects matrix $\mathbf{(I-A_0)^{-1}}$ and a complementary matrix $\mathbf{(I-A^*)^{-1}}$ that can be further decomposed. We can express:

$$\mathbf{(I- A^*)^{-1} = (I- A^{*r})^{-1} (I + A^* + A^{*2} +....+ A^{*r-1})} \quad [19]$$

Because the endogenous accounts are three we can fix $r = 3$. Then we can rewrite equation [18] as

$$\mathbf{y = (I- A^{*3})^{-1} (I + A^* + A^{*2}) M_1 x} \quad [20]$$

where

$$\mathbf{A^{*2}} = \begin{vmatrix} 0 & A^*_{13}A^*_{32} & 0 \\ 0 & 0 & A^*_{21}A^*_{13} \\ A^*_{32}A^*_{21} & 0 & 0 \end{vmatrix}$$

and

$$\mathbf{A^{*3}} = \begin{vmatrix} A^*_{13}A^*_{32}A^*_{21} & 0 & 0 \\ 0 & A^*_{21}A^*_{13}A^*_{32} & 0 \\ 0 & 0 & A^*_{32}A^*_{21}A^*_{13} \end{vmatrix}$$

Equation [20] can be written as:

$$\mathbf{y = M_3\, M_2\, M_1\, x} \qquad [21]$$

Where

$$\mathbf{M_2 = (I + A^* + A^{*2})} = \begin{vmatrix} I & A^*_{13}A^*_{32} & A^*_{13} \\ A^*_{21} & I & A^*_{21}A^*_{13} \\ A^*_{32}A^*_{21} & A^*_{32} & I \end{vmatrix} = \begin{vmatrix} I & {}_2M_{12} & {}_2M_{13} \\ {}_2M_{21} & I & {}_2M_{23} \\ {}_2M_{31} & {}_2M_{32} & I \end{vmatrix} \qquad [22]$$

$\mathbf{M_2}$ explicitly recognizes the interconnected character of each economic system. In fact, it captures the effects that an exogenous injection into an account of one block (for example, into one production activity) is transmitted to other endogenous accounts of other blocks (for example, on households) due to the circulation of income flows. We can refer to $\mathbf{M_2}$ as **open-loop multiplier.** The open loop effects are measured by the impact of an exogenous shock from any vector $\mathbf{x_j}$ over the elements of the other $\mathbf{y_k}$ accounts with *j≠k*. This matrix "explains why and how the stimulation of one part of the system has repercussions for all others" (Pyatt, Round, 2006:239)

Finally

$$\mathbf{M_3 = (I - A^{*3})^{-1}} = \begin{vmatrix} {}_3M_{11} & 0 & 0 \\ 0 & {}_3M_{22} & 0 \\ 0 & 0 & {}_3M_{33} \end{vmatrix} \qquad [23]$$

where:

$$\mathbf{{}_3M_{11} = (I - A^*_{13}\, A^*_{32}\, A^*_{21})^{-1} = [I - (I - A_{11})^{-1}A_{13}\,(I - A_{33})^{-1}A_{32}\, A_{21}]^{-1}} \qquad [24]$$

$$\mathbf{{}_3M_{22} = (I - A^*_{21}\, A^*_{13}\, A^*_{32})^{-1} = [I - A_{21}(I - A_{11})^{-1}A_{13}\,(I - A_{33})^{-1}A_{32}]^{-1}} \qquad [25]$$

$$\mathbf{{}_3M_{33} = (I - A^*_{32}\, A^*_{21}\, A^*_{13})^{-1} = [I - (I - A_{33})^{-1}A_{32}\, A_{21}(I - A_{11})^{-1}A_{13}]^{-1}} \qquad [26]$$

If we assume that $\mathbf{A_{33} = 0}$ equation [26] becomes

$$_{3}\mathbf{M}_{33} = [\mathbf{I}- \mathbf{A}_{32}\ \mathbf{A}_{21}\ (\mathbf{I}- \mathbf{A}_{11})^{-1}\mathbf{A}_{13}]^{-1} \qquad [27]$$

$\mathbf{M}_3$ is the matrix of the closed loop multipliers and enlighten the circular structure of the system from exogenous to endogenous accounts. Each element i (i = 1,2,3) of its diagonal blocks measures the multiplying impact of one exogenous shock in vector **x** on the endogenous account $\mathbf{y_i}$ after considering the feedback effects generated at the end of the circular loop. We can then refer to $\mathbf{M}_3$ as **closed-loop multiplier.** It represents the "consequences of a change on **x** travelling around the entire system to reinforce the initial injection" (Pyatt, Round, 2006, p. 239)

If we focus our attention on the determination of the income distributed within the endogenous Private Institutions, the corresponding $\mathbf{t}_3$ vector is given by:

$$\mathbf{y}_3 = \mathbf{M}_{33}\,\mathbf{M}_{32}\ \mathbf{M}_{31}\,\mathbf{x}= \mathbf{M}_{31}\,\mathbf{x}_1+ \mathbf{M}_{32}\,\mathbf{x}_2+ \mathbf{M}_{33}\,\mathbf{x}_3 \qquad [28]$$

Where $\mathbf{M}_{31}$, $\mathbf{M}_{32}$, $\mathbf{M}_{33}$ can be expressed as:

$$\mathbf{M}_{31} = {}_{3}\mathbf{M}_{33}\ {}_{2}\mathbf{M}_{31}\ {}_{1}\mathbf{M}_{11} \qquad [29]$$

$$\mathbf{M}_{32} = {}_{3}\mathbf{M}_{33}\ {}_{2}\mathbf{M}_{32} \qquad [30]$$

$$\mathbf{M}_{33} = {}_{3}\mathbf{M}_{33}\ {}_{1}\mathbf{M}_{33} \qquad [31]$$

Equation [28] allows us determining the total income of each group of the Private Institutions by the $\mathbf{M}_{31}$ $\mathbf{M}_{32}$ and $\mathbf{M}_{33}$ multipliers. The sum of the elements of the matrix $\mathbf{M}_{31}$ indicates the increase in the overall income of Private Institutions due to an exogenous injection of one unit in the income of each Activity account. The corresponding sums concerning $\mathbf{M}_{32}$ and $\mathbf{M}_{33}$ matrices indicate the increase in the overall income of Private Institutions due to an exogenous injection of one unit in the income of each Factor or each Private Institution. The column totals of these matrices are real income multipliers. Each of them, in fact, indicates by how much the overall income of each Private Institution would rise if the income of the corresponding elements in Activity, Factor or Private Institutions accounts would exogenously increase by one unit. Instead every row total indicates the multiplier effect on the income of every Private Institution in the case in which the income of each Activity Sector, each Factor or each Private Institution would increase by one unit.

The multiplier matrix $\mathbf{M}_{33}$, in particular, can be considered as a "structural" measure of inequality in the personal income distribution since it derives the product of the components relating to Private Institutions in the $\mathbf{M}_1$ and $\mathbf{M}_3$ multipliers. It captures, in fact, the transfer effects (related to matrix $\mathbf{M_1}$) and the closed-loop effects (related to matrix $\mathbf{M_3}$) that involve only private institutions. Considering our focus on income distribution of the private institutions, from equations 29-31 we can notice that the common element is matrix $_3\mathbf{M}_{33}$. Each element ($_3\mathbf{M}_{ij}$) represents the income received by the *i*-group in consequence of a change in the expenditure of disposable income of the *j*-group. Matrix $_3\mathbf{M}_{33}$ acquires then specific meaning of an income multiplier through the consumption expenditure as a result of a four-step "propagation" process. As also seen in Figure 1.1, the first step is represented by the matrix $\mathbf{A}_{13}$ of consumption coefficients with reference to disposable income of each of the Endogenous Private Institutions. The second step corresponds to that traditionally captured by the Leontief's inverse matrix transforming expenditure by sector into intermediate output and determining the shares of the value added generated in the productive process. The third step, corresponding to the product of matrix $\mathbf{A}_{32}$ and matrix $\mathbf{A}_{21}$, determines the value added received by the Endogenous Private Institutions in connection with their ownership of the production Factors. The fourth step, finally, given by $(\mathbf{I}\text{-}\mathbf{A}_{33})^{-1}$ corresponds to the redistribution of income between Endogenous Institutions. The income thus produced, distributed a redistributed, turns into new levels of expenditures for consumption and the process occurs again until an equilibrium position is achieved.

3. The decomposition of the "accounting multipliers" matrix M: a development.

Considering the single element m_{ij} of matrix $\mathbf{M}$ of global multipliers makes possible to disentangle the three effects that have been recalled above. Nevertheless, it does not allow evaluating the relative contribution of the forces operating behind the multiplier process. If, for example, we want to study the impact of one unit increase in the exogenous demand for agricultural sector goods (produced by activity 1) on the income of rural households (household type 1), we will look at the multiplier $\mathbf{M}_{HA}$ if we want to explore the effect of a change in the production sector on households. Multiplier $\mathbf{M}_{HA}$ does not capture all the effects behind this process and related, for example, to the fact that increasing the demand for activity 1 increases the demand for intermediate goods for all sectors and, similarly, to the fact that before returning to the household group 1, exogenous injection influences also the income of other household groups. We could then discover then that the linkage between agricultural sector (activity 1) and rural households (household type 1) is not the most important.

The attention needed to consider the issue described above has brought to a further decomposition of the single component m_{ij} of matrix $\mathbf{M}$ in 'microscopic detail', (Pyatt and Round, 2006:9). The single m_{ij} element of the matrix $\mathbf{M}$ can, in fact, be expressed as:

$$\boldsymbol{m_{ij}} = \mathbf{d'}_i\, \mathbf{M}\, \mathbf{d}_j = \mathbf{d'}_i\, \mathbf{M_3}\, \mathbf{M_2}\, \mathbf{M_1}\, \mathbf{d}_j = \mathbf{i'}\, (\hat{\mathbf{r}}\, \mathbf{A}\hat{\mathbf{s}})\, \mathbf{i} \qquad [32]$$

where $\mathbf{d'}_i$ and $\mathbf{d}_j$ are vectors in which respectively the *i*th element and the *j*th are equal to 1 and all others elements are equal to 0 (Pyatt, Round, 2006:240). In vector **i** all elements are equal to 1. The matrix **A** and the vectors **r'** and **s** are defined as:

$$\mathbf{r'}=\mathbf{d'}_i\, \mathbf{M_3} \qquad \mathbf{A} = \mathbf{M_2} \qquad \mathbf{s} = \mathbf{M_1}\mathbf{d}_j \qquad [33]$$

The equation [32] indicates that each m_{ij} must be equal to the sum of all elements of an $\hat{\mathbf{r}}\, \mathbf{A}\hat{\mathbf{s}}$ type transformation of the matrix $\mathbf{M_2}$ where, as we can see from [33], $\hat{\mathbf{r}}$ is a diagonal matrix formed from the *i*th row of the $\mathbf{M_3}$ multiplier, and $\hat{\mathbf{s}}$ is a diagonal matrix formed from the *j*th column of $\mathbf{M_1}$ (Pyatt and Round, 2006:240). In this way it is possible to capture the across effects, direct and indirect, from account *j* to account *i* ($i \neq j$) at a very disaggregated level. A complete accounting for m_{ij} can be constructed for any *i* and *j* from three elements i.e. the *i*th row of the matrix $\mathbf{M_3} = (\mathbf{I}-\mathbf{A}^{*3})^{-1}$, the entire matrix $\mathbf{M_2} = (\mathbf{I} + \mathbf{A}^* + \mathbf{A}^{*2})$ and the *j*th column of the matrix $\mathbf{M_1} = (\mathbf{I}-\mathbf{A_0})^{-1}$. The matrix $\hat{\mathbf{s}}$ shows how the consequences of a particular injection into the account *j* "will be amplified as a result of transfer effects within the category of accounts in which the initial stimulus arises" (Pyatt and Round, 2006:240). The matrix $\mathbf{A} = \mathbf{M_2}$ explains how these initial effects will spread across to accounts belonging to other categories, that is the so called open loop effect. Finally $\hat{\mathbf{r}}$ "quantifies the consequences for account *i* of the circulation around the entire system of the *stimuli* generated *via* the first two mechanisms" (Pyatt and Round, 2006:241).

All three mechanisms are important for diagnostic reasons since they allow us to account for m_{ij} in a microscopic detail. The point can be better illustrated with reference to some specific examples. For instance, we suppose that *i* is a particular Households group ($i \in \mathbf{H}$) and *j* is alternatively a particular sector of activity ($j \in \mathbf{A}$) or a particular factor of production ($j \in \mathbf{F}$). Recalling that both $\mathbf{M_1}$ and $\mathbf{M_3}$ are block diagonal matrices, it follows from [28] that, in the first case, the element m_{ij} of **M** will be an element of the sub-matrix $\mathbf{M_{HA}}$ of **M** where:

$$\mathbf{M_{HA}} = {}_3\mathbf{M_{HH}}\ {}_2\mathbf{M_{HA}}\ {}_1\mathbf{M_{AA}} \qquad [34]$$

Therefore the element m_{ij} can be written as:

$$m_{ij} = (\mathbf{d'}_i\ {}_3\mathbf{M_{HH}})\ {}_2\mathbf{M_{HA}}\ \ ({}_1\mathbf{M_{AA}}\ \mathbf{d}_j) \qquad [35]$$

In the second case, since the column j is one of the production factor **F**, the element m_{ij} will be[3]:

$$m_{ij} = (\mathbf{d'}_i\ {}_3\mathbf{M}_{\mathbf{HH}})\ {}_2\mathbf{M}_{\mathbf{HF}}\ \mathbf{I} \qquad [36]$$

equations [35] [36] can be written in the form $\mathbf{i'}(\hat{\mathbf{r}}\ \mathbf{A}\hat{\mathbf{s}})\mathbf{i}$ where alternatively:

$$\mathbf{r'} = \mathbf{d'}_i\ {}_3\mathbf{M}_{\mathbf{HH}} \qquad \mathbf{A} = {}_2\mathbf{M}_{\mathbf{HA}} \qquad \mathbf{s} = {}_1\mathbf{M}_{\mathbf{AA}}\ \mathbf{d}j \qquad [37]$$

$$\mathbf{r'} = \mathbf{d'}_i\ {}_3\mathbf{M}_{\mathbf{HH}} \qquad \mathbf{A} = {}_2\mathbf{M}_{\mathbf{HF}} \qquad \mathbf{s} = {}_1\mathbf{M}_{\mathbf{FF}}\ \mathbf{d}j = \mathbf{I} \qquad [38]$$

From [37] and [38] it results that the cell m_{ij} is equal to the sum of all elements of a $\hat{\mathbf{r}}\ \mathbf{A}\hat{\mathbf{s}}$ type transform of the matrix **M** in which **r'** is the i row of the block matrix ${}_3\mathbf{M}_{\mathbf{HH}}$; **A** is equal, alternatively, to the block matrix ${}_2\mathbf{M}_{\mathbf{HA}}$ or ${}_2\mathbf{M}_{\mathbf{HF}}$ and **s** is the j column of the block matrix ${}_1\mathbf{M}_{\mathbf{AA}}$ (or, alternatively, of ${}_1\mathbf{M}_{\mathbf{FF}} = \mathbf{I}$). This decomposition allows showing in a clear way the consequences of an exogenous injection in the jth Activity/Factor on the ith Household. The ${}_2\mathbf{M}_{\mathbf{HA}}$, ${}_2\mathbf{M}_{\mathbf{HF}}$ are the matrices of the across effects and they explain how the original injection into the Activities/Factors accounts has repercussions in the Households account. These matrices have been bordered by the two vectors **r'** and **s**. These are respectively: 1) in the first case the ith row of the matrix ${}_3\mathbf{M}_{\mathbf{HH}}$ and the jth column of the matrix ${}_1\mathbf{M}_{\mathbf{AA}}$; 2) in the second case the ith row of the matrix ${}_3\mathbf{M}_{\mathbf{HH}}$ and the jth column of the matrix ${}_1\mathbf{M}_{\mathbf{FF}}$.

An unit injection toward the jth Activity/Factor is directly translated by the '**A**' part of the $\hat{\mathrm{r}}$ $\mathbf{A}\hat{\mathbf{s}}$ transform *i.e.* by the matrix ${}_2\mathbf{M}_{\mathbf{HA}}$ (or ${}_2\mathbf{M}_{\mathbf{HF}}$) into increments of the incomes for the endogenous Institutions. The multiplier transfer effects within the Activities account are captured by the matrix ${}_1\mathbf{M}_{\mathbf{AA}}$. In the case of Factors there are no multiplier transfer effects within the account, because the multiplier ${}_1\mathbf{M}_{\mathbf{FF}}$ is equal to **I**. Finally, the transmission of these increments right around the system - the complete circular flow - generates the impacts on the Household i that are captured by the ith row of the multiplier matrix ${}_3\mathbf{M}_{\mathbf{HH}}$.

As remarked above, column and row totals of the single components of the multiplier matrices $\mathbf{M}_1$. $\mathbf{M}_2$. $\mathbf{M}_3$ have a specific meaning in terms of impact analysis on income distribution. Using these totals, it has been possible to reconstruct the entire path of transmission of exogenous injections on income of endogenous account and divide the total impact into different effects.

Let us focus, for example, on matrix $\mathbf{M}_{\mathbf{HA}}$ only. Its column totals indicate the total effect of each sector of production on the household account of an injection on the jth sector. Its row totals indicate the total effect on each household group of an injection on the jth sector of production.

[3] Because ${}_2\mathbf{M}_{\mathbf{FF}} = \mathbf{I}$

These totals allow identify four different effects in which the single accounting multiplier m_{ij} can be then divided:

1. **direct-direct effect** is the direct effect of an injection in the *j*th account of production activity on the *i*th household group without considering any other indirect effect on other activity sectors or household groups. It equals the *j*th element of the column vector of the matrix $\mathbf{M_{HA}}$ corresponding to the activity sector where the injection first occurs;
2. **indirect-direct effect** is the effect from other production sectors, different from the one affected by the exogenous injection, on the *i*th household group. It captures the effect that an increase in the demand for *j*th sector has on other sectors and from those ones to the *i*th household group. It is obtained as the difference between row totals of matrix $\mathbf{M_{HA}}$ (which capture the total effect from *j*th sector of production on *i*th element the household account) and the direct-direct effect;
3. **direct-indirect effect** is the effect from the *j*th account of production affected by the exogenous injection on other household groups different from the *i*th. It captures the effect that an increase in the demand for *j*th sector has on the income of other household groups and from those ones to the *i*th household group. It is obtained as the difference between the column total of matrix $\mathbf{M_{HA}}$ for the *j*th account of production (which captures the total effect of the *j*th sector of production on the total of household account of an injection only in the *j*th production sector) and the direct-direct effect;
4. **indirect-indirect effect** is the effect from other accounts of production different from the one affected by the exogenous injection on the other household groups different from the *i*th.. It captures the effect that an increase in the demand of production of the *j*th sector has on other sectors and from those ones to other household groups. It is calculated as the difference between the total effect on *i*th household group (given, itself, by the difference between the matrix multiplier m_{ij} and the row total of matrix $\mathbf{M_{HA}}$) and the direct-indirect effect[4].

The meaning and the relevance of the multiplier approach in the use of the SAM as a simulation model for income distribution analysis will be illustrated with an application to the Vietnamese economic system. This exercise must be considered mostly as an application to highlighting the potentiality of the approach, rather than a simulation bringing to unquestionable

[4] Note that the derivation of these four distinct effects relies strictly on the structure of the matrix $\mathbf{M_{ij}}$ considered. For example, matrix $\mathbf{M_{FF}}$ equals the identity matrix I, implying that there aren't direct transfer effects among factors. This has significant consequences on the decomposition of the single multiplier m_{ij} related to the effect of an exogenous injection into the *j*th factor on the *i*th household group, because in the $\hat{r}A\hat{s}$ transformation, the indirect-direct and the indirect-indirect effects equal zero.

results.

4. Data: the Vietnamese SAM for year 2000.

The Social Accounting Matrix used in this study is the one constructed for year 2000 by Henning Tarp Jensen, John Rand and Finn Tarp for the Vietnamese Central Institute for Economic Management, (Tarp Jensen et al. 2004) and it uses different sources of data: a comprehensive set of input-output tables for the year 2000; data on marketing margins, the 2001 enterprise census, national accounts and product data, the 1997/1998 Vietnam Living Standard Survey. The SAM consists of a MacroSAM, reported in Table 4.1 and a detailed MicroSAM [5] obtained with a high degree of disaggregation of accounts.

Table 4.1: MacroSAM for Vietnam, 2000.

Receipts (bn VND)	Expenditures (bn VND)								
	1. Activities	*2. Commodities*	*3. Factors*	*4. Private Households*	*5. Enterprises*	*6. Recurrent State*	*7. Investment/ Savings*	*8. Rest of World*	*9. Total*
1. Activities		902,462		45,713					948,175
2. Commodities	524,000	88,435		230,651		45,567	131,479	241,895	1,262,027
3. Factors	392,094								392,094
4. Private Households			283,017		14,523	22,758		18,886	339,184
5. Enterprises			97,852			3,742		2,607	104,201
6. Recurrent State	32,082	17,471	11,225	1,831	26,112			2,028	90,749
7. Investment/ Savings				60,989	51,808	18,682			131,479
8. Rest of World		253,659			11,758				265,416
9. Total	948,175	1,262,027	392,094	339,184	104,201	90,749	131,479	265,416	

Source: Tarp Jensen et al. (2004).

For the purpose of the analysis on personal income distribution and in order to disentangle the direct, open-loop and closed-loop effects of SAM-based multiplies and their meaning in terms

[5] The MicroSAM has a very high level of detail in the disaggregation of account the following components: 112 production activities; 114 counterpart commodities; 14 factors of production; 16, 3 types of enterprises, one state expenditure account, 7 accounts for taxes; one for saving/investment account and one balance of payments account referring to the trade and capital flows (Tarp Jensen, 2004:21).

of income distribution and structural characteristics of the economy, we decided to aggregate the MicroSAM into a new version with the following features[6]:

- 10 production activities;
- 14 factors of production;
- 16 household groups;
- 3 types of enterprises;
- 1 state expenditure account;
- 3 accounts for taxes;
- one for saving/investment account;
- one account for inventories;
- Rest of the World Account.

A detailed description of the accounts of the Vietnam SAM is contained in Table A4.1 of the Annex. Before proceeding with the analysis of results obtained from the derivation of the global multipliers matrix and its successive disaggregation into direct and indirect effects, it is useful to explain the choice between endogenous and exogenous account. Following a Keynesian model based on a linear expenditure system, in which the intermediate and final demand for consumption from private institutions is endogenously determined, production activities, factors and private institutions (households and enterprises) have been considered endogenous. One characteristics of the SAM modelling contained in this study is that foreign-owned enterprises are considered exogenous, because they receive and pay resources to the Rest of the World account. Together with the government, investments/savings, taxes and Rest of the World accounts, they constitute the pool of exogenous accounts from which the impacts to the system originate.

5. Structural patterns and income distribution in the Vietnamese economy

Before going into the detail of the decomposition procedure applied to the Vietnam SAM, it is useful to look at some results from the analysis of the structure of the matrix of global multipliers (**M**)[7]. From Table A5.1 of the Annex we can notice that the top left submatrix of **M** is represented by the input-output table ($\mathbf{M_{11}}$), showing the interdependent character of the production sector and the fact that any injection into one production activity has different effects for other activities' income due to the activation of the demand for intermediate goods.

[6] The input-output table was derived aggregating the (2×2) table of the MicroSAM into a single matrix only with activity account. This was possible also because there is a 'one to one' mapping of commodities into production activities with the last two commodities referring to marketing margins. Moreover, in table 4.1, matrix (1,2) corresponds to a diagonal matrix with exchanges between each commodity and the corresponding activity. It is not the case, for the Vietnam SAM, that one activity sector produces different types of commodities.

[7] The complete M matrix is presented in table A5.1 of the Annex.

Different features emerge from the analysis of matrix $\mathbf{M_{11}}$. First, the total multiplier for this submatrix (sum of all elements of $\mathbf{M_{11}}$) equals 26.055 meaning that, on average, an injection of 1000 Vietnamese Dong into the system due to an increase in export demand is reflected into a total average increase of 2,605 Dong for all the production sectors.

Second, the diagonal elements of the matrix are all higher than one showing the fact that a unit injection on the *i*th sector, due for example to an increase in the exogenous demand, has an effect on the income of the same sector higher than one due to the multiplicative process of the circulation of income through the economic system. These diagonal elements provide a relative measure of how much a production sector is internally integrated. Table A5.2 reveals that the most integrated activity is manufacturing (A6, act 6), which shows the highest diagonal multiplier. The production activity less integrated is that related to the construction sector.

Third, even though it is the most integrated within itself, the manufacturing sector is the less integrated with the rest of the production system: the column total for act 6 is the lowest among production activities showing that any injection on the manufacturing sector has the lowest impact effect on the activation of production of other sectors. This could be related to the fact that, at the level of development achieved in 2000, manufacturing sector in Vietnam had not already become a potential vehicle of activation of the production process and of the intermediate demand. Food processing (A5, act 5) is instead the activity that contributes the most to the activation of the intermediate demand for other activity. These benefits occur in particular for the activity of rice (act 1), for manufacturing (A6, act 6) and for other services (A10, act 10). This means that any policy directed to the promotion of the food processing sector will have then the highest positive impact on the entire production system. Other activities highly integrated with others are that related to the production of rice (A1, act 1) and fish and livestock (A3, act 3).

Fourth, row totals reveal that manufacturing sector is also the one receiving the highest benefit from a stimulus of the same amount to all the activities. Other services have also high multipliers and not surprisingly, they receive the most of the benefits from activities related to trade (act 9). The calculation of the shares of multipliers for production sectors on the corresponding column totals shows that on average 30% of the exogenous injections are kept inside the production sectors. The left 70% is partly due to effects on other endogenous accounts and partly due to income leakages to exogenous accounts.

Finally, the low potential of the manufacturing sector in stimulating the intermediate demand for other sectors is confirmed also in its role to impact on the distribution of the value added to factors because its column total multiplier is the lowest.

Due to the focus on personal income distribution, equation (28) indicates that the interesting submatrices for this aim are represented respectively by $\mathbf{M_{33}}$, $\mathbf{M_{32}}$ and $\mathbf{M_{31}}$ describing the multiplier effects on the household income of exogenous injections into activities, factors of production and private institutions on the households income.

The following Table 5.3 presents matrix $\mathbf{M_{31}}$. It shows the effects on income of private institutions due to a unit injection into the production system. Its column total represents income multiplier measuring the impact on each household group from a unit increase in the income of the corresponding activity to which the account belongs. On average (last column of Table 5.3), injecting the production activities by one unit, the corresponding effect on households' income is 0.740. The most of this multiplier effects occurs for rural male-headed farm-employed households (H1, hh 1), which show the highest row total (2.449). If we go ahead considering the effects on different types of households, two issues can be raised. First, there is a prevalence of rural households as beneficiaries of most of income linkages, (Tarp *et al*. 2002:169). This is related to two aspects: on one hand, in this group there is the highest share of Vietnamese households; on the other hand, there exists a location bias in the effects of injections on the production sector. Second, there is also a gender issue that emerges if we compare the level of multipliers for female headed and for male headed households. Multipliers for the latter category are systematically higher than for the formers. Other features emerge from the analysis of submatrix $\mathbf{M_{31}}$. Not surprisingly, considering urban male headed households, global multipliers are higher for self-employed than for farm employed due to the higher opportunity to be self employed in the urban sector.

(insert Table 5.3 here)

Moreover, a reading by column shows production activities that have the most significant income effect on household consumption. Agricultural related sectors (production of rice, other agricultural activities and fish and livestock[8]) shows the highest level of multipliers, thus implying than any exogenous injection into these sectors have the highest income effect on all the household groups, while manufacturing is still the sector that shows the lowest effect. It is even more surprising to see that the rural households benefit more than urban ones in many non agricultural activities.

The second component of equation (28) is represented by matrix $\mathbf{M_{32}}$ reported in Table 5.4. It measures the impacts on household income from an exogenous injection directed to the factor account. On average, a unit injection in income going to factors increases by 1.482 household

[8] This result is also confirmed in Tarp *et al* (2002:5).

income and by 1.682 total income of the endogenous institutions. Different structural features emerge from the analysis of the derived multiplier in this matrix.

(insert Table 5.4 here)

First, as in the previous matrix, rural male-headed farm employed households (H1, hh1) benefit the most from an increase in the income to all factors of production. Second, in general, rural households with the exception of those with a non-employed head, receive the highest income benefit. Third, there is a gender bias represented by the fact that, on average, female-headed have lower expenditure effects than the corresponding male-headed households. Finally, an analysis by column shows that there is a difference between rural and urban in the effect of each single labour factor on household income. It is also true that these effects do not differ that much. Moreover, the effects seem to be related only to the location of the labour factor (urban/rural with a preference for rural labour categories) and not to the gender or the level of education.

The third component of the (28) implies the use of matrix $\mathbf{M}_{33}$ to show the effects on household income from an exogenous injection into the income of household groups. Following Bottiroli Civardi and Targetti Lenti (2007) matrix $\mathbf{M}_{33}$ can be considered as a 'structural' measures of the inequality in the personal income distribution because it shows how an external stimulus to the income of household account is reflected into a higher income level for the household account itself. Matrix $\mathbf{M}_{33}$ is presented in Table 5.5.

(insert Table 5.5 here)

As in the analysis of matrix $\mathbf{M}_{11}$, diagonal elements are all higher than one indicating that a unit injection on the income of a households group results into an increase greater than one of the income of the same household group due to the multiplicative effect of the circulation of the income through the system and thus to the transfer, open loop and closed-loop effects. The highest diagonal element is the one corresponding to rural male farm employed households. These are also the type of households that have the highest row totals i.e. that show the highest level of impact due to exogenous injections. Row totals are, in fact, a measure of the structural components of income inequality because they show the effect on each household group after the increasing by the same amount of all the household groups. If among rural households those with a farm employed head benefit the most from any exogenous stimulus, urban households have the highest effects when the head is self-employed. Female-headed households receive lower benefits than male headed ones, especially when they are rural and wage employed.

The analysis of row totals of matrix $\mathbf{M_{33}}$ shows important structural features of the Vietnamese income distribution of income. The static perspective of SAM-based multipliers reveals that, at the early stage of the transition from an agricultural-based to an industry-based economy and typical of a former socialist country, Vietnam shows an income distribution biases toward the rural farm employed households, which are also those with the lowest level of consumption. This suggests that any policy intervention focusing on these households will thus benefit the overall personal income distribution that will become more equally distributed.

6. Multiplier decomposition and income inequality in Vietnam

The previous insight into the mechanism of circular flow of income in the economic system resulting from the analysis of multipliers does not allow tracking the relative contribution of direct and indirect effects of injection into the j*th* sector on income of the i*th* sector and disentangling the different directions in which the exogenous stimulus operates. The contribution of this research thus tries to fill in this gap. The objective of capturing into 'microscopic detail' the structural feature of personal income distribution requires focusing on the structure of the labour market and on the relationship between functional and institutional distribution of resources, Chander et al. (1985:75). The way in which value added is received by the different factors of production and how it is then distributed to the institutions based on their factor endowments constitutes one aim of our analysis. At the same time, studying a transition economy like Vietnam in the late nineties when the effects of economic reforms started to emerge requires also looking at the relative impact that shocks on the production side (related to policy interventions to the production sector to enhance aggregate growth) have on personal income distribution. Moreover, the version of the SAM chosen for our analysis and the level of disaggregation of its accounts allows comparing the results derived for different characteristics of both the factor and the household types.

The underlined reasons for our attention to the relationship between production activities and factors and households in our country case are related to the characteristics of Vietnamese process of economic development (the so called *Doi Moi*). The wide range of reforms implemented by Vietnamese authorities starting from the 1986 guided the country to a gradual process of transition from a traditional economy heavily dependent on the primary sector to a modern one more and more based on the promotion of the industrial sector and on an opening process of trade. Aware of the fact that these policy interventions will not come without costs, the Vietnamese authorities tried also to implement policies related to the protection of vulnerable people and to the reduction of poverty trying to avoid an increase in the income inequality. In order to simulate the effects of this kind of reforms we started from the hypothesis that a higher degree of industrialization and openness to trade brings about a higher exogenous demand for both the agricultural and the industrial sector.

For the agricultural sector, we concentrate our attention on the two activities that show the highest multiplier effects on households' income: the production of rice (A1, act 1) and the activity of food processing (A5, act 5). On the other hand, if we suppose that the exogenous injection occurs as an increase in the demand for industrial commodities, we looked at the effects on households' income of the sector of trade (A10, act 10) and of construction (A8act 8). These results have been derived with respect to rural male/female headed farm employed households (H1, hh1 and H5, hh5) and urban male/female headed self-employed[9] households (H10, hh10 and H14, hh14) and for urban male headed wage employed households (H11).

Results from the decomposition of multipliers related to an injection on the activity of production of rice (A1, act 1) on rural male-headed farm-employed households (H1) are contained in Table 6.1, which shows the calculation of the $\hat{\mathbf{r}}\,\mathbf{A}\hat{\mathbf{s}}$ type transformation in which **r'** is the *first* row of ${}_{3}\mathbf{M}_{\mathbf{HH}}$, **A** is equal to ${}_{2}\mathbf{M}_{\mathbf{HA}}$ and **s** is the *first* column of ${}_{1}\mathbf{M}_{\mathbf{AA}}$. Since ${}_{2}\mathbf{M}_{\mathbf{HA}}$ is a 16 x 10 matrix the m_{ij} multiplier will be disaggregated into 160 components for each *i* and *j* accounts. The last column reports the level of total multiplier m_{H1A1}=0.3631, which indicates that an exogenous increase of 1,000 Dong of the demand for rice, after the income circulates into the system, is transmitted into an increase in the income of rural male headed farm employed households by 363 Dong. This effect can be divided into the total effects from A1 as the results of the activation of the income for all households and the total effect on all household groups. The most of the total multiplier effect (0.3631), corresponding to a share of 76, 70%, is attributable to the direct-direct effects from A1 on income of H1. We can compare these results with those emerging from table 6.2 related to the same decomposition when the injection into the rice sector (A1, act1) is transmitted to the female headed households employed in the farm sector (H5, hh5) (element m_{H5A1} of matrix M). Differently form male head households, female rural households have a total multiplier effect that is much lower thus implying the existence of a sort of gender bias in the farm employed rural households. Moreover, in this case the dominant effects are those related to the capacity that the rice production has to stimulate the income of other households and from these to the H5 group.

(insert Table 6.2 here)

[9] As derived from the questionnaire for the VLSS, self-employed people are considered outside the agricultural sector.

We decompose also the effects from an injection to the activity of production of rice (A1, act 1) to urban households self-employed outside the farm sector, both male (H10) and female (H14) headed (presented respectively in the following Tables 6.3 and 6.4). As expected, as in other cases, the effect for female headed is lower than for male headed households, and in general global multipliers are lower than those emerging from an effect directed to farm households, indicating that the effects from agriculture to households employed in the same sector are still quite high in Vietnam. Moreover, in this case the direct-indirect effects (from A1 to other households and from these back to H10 or H14), respectively, 0.1193 and 0.0604, predominate on the direct effects: they constitute, in fact, the 79.32% and the 73.12%, respectively, of the global multipliers, respectively 0.1504 and 0.0826.

(insert Table 6.3 here)

(insert Table 6.4 here)

We tried also to disentangle the effects of an injection into the activity of food processing (A5, act 5) on the same households groups considered above, in order to test which are the relative effects of an industrial activity strictly connected to the agricultural sector, in particularly on rural /urban farm and self employed households (H1, H5, H10 and H14). Results related to male headed rural farm households are shown in table A6.5[10]. Results show that there is a significant effect of the food processing sector on the income of rural farm households (H1 and H5) (always higher in the case of male headed households, H1) and that these effects are systematically higher than those for self-employed urban households, both male (H10) and female headed (H14). It is interesting, in particular, that the foods processing activity influences rural household income through indirect effects. As expected, indirect-indirect effects prevail in the case of H1 indicating that stimulating food processing sector activates other activities, from those the effects are transmitted to other households that in turn stimulate the income of the category of rural farm employed households.

[10] Other tables are not included in the paper but are available upon request to the authors.

Table 6.1: Decomposition of the global multiplier m_{H1A1} of matrix M

Decomposition of multiplier m_{H1A1} of matrix M									
Column j (injection)	**Row i (effect of injection to)**	**Household groups**	**Direct-Direct Effects**	**Indirect-Direct Effects**	**Total Effect from A1**	**Direct-Indirect Effects**	**Indirect-Indirect Effects**	**Total Effect on Households**	**Total multiplier mH1A1**
A1	**H1**	hh1	0,2431	0,0354	0,2784	0,0735	0,0112	0,0847	**0,3631**
A1	**H1**	hh2	0,0102	0,0014	0,0116	0,3064	0,0451	0,3515	**0,3631**
A1	**H1**	hh3	0,0068	0,0012	0,0080	0,3098	0,0453	0,3551	**0,3631**
A1	**H1**	hh4	0,0000	0,0000	0,0000	0,3166	0,0466	0,3631	**0,3631**
A1	**H1**	hh5	0,0075	0,0013	0,0087	0,3091	0,0453	0,3544	**0,3631**
A1	**H1**	hh6	0,0010	0,0003	0,0014	0,3156	0,0462	0,3618	**0,3631**
A1	**H1**	hh7	0,0008	0,0002	0,0010	0,3157	0,0464	0,3621	**0,3631**
A1	**H1**	hh8	0,0000	0,0000	0,0000	0,3166	0,0466	0,3631	**0,3631**
A1	**H1**	hh9	0,0039	0,0004	0,0043	0,3127	0,0461	0,3588	**0,3631**
A1	**H1**	hh10	0,0159	0,0017	0,0175	0,3007	0,0449	0,3456	**0,3631**
A1	**H1**	hh11	0,0121	0,0019	0,0140	0,3045	0,0446	0,3491	**0,3631**
A1	**H1**	hh12	0,0000	0,0000	0,0000	0,3166	0,0466	0,3631	**0,3631**
A1	**H1**	hh13	0,0027	0,0002	0,0029	0,3139	0,0463	0,3602	**0,3631**
A1	**H1**	hh14	0,0076	0,0014	0,0090	0,3090	0,0452	0,3542	**0,3631**
A1	**H1**	hh15	0,0051	0,0011	0,0062	0,3115	0,0455	0,3569	**0,3631**
A1	**H1**	hh16	0,0000	0,0000	0,0000	0,3166	0,0466	0,3631	**0,3631**

Source: author's calculations based on SAM for Vietnam, 2000.

Note: A1:Activity rice; H1:Household Rural Male Farm-employed. H1 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation.

The existence of indirect effects more significant than the direct ones has been also found in the Indonesian case by Pyatt and Round (2003) for the food processing sector. They coherently observe that the increased intermediate demand for food crops activate demand for food crops that stimulate the income of all households, and from these also of the farm households. Indirect linkages appear to be more important than the direct ones. From a policy point of view, these results indicate that investing and stimulating a manufacturing sector the food processing can have significant impact on the income of the poorest households, constituting thus a good strategy for poverty reduction.

We have also decomposed the effects of injections into two industrial sectors: construction (A8, act 8) and trade (A8, act 9) on urban male and female wage employed households (respectively, H11, hh11 and H15, hh15)[11]. Stimulating the production sector related to trade has a higher effect on households' income than the construction sector. What emerges is, differently from the agricultural sector, the predominance of indirect effects, both from other activities and from other households, on the total multiplier. From a policy perspective this could have a double implication: on one hand, interventions on the trade sector, for example, activate important channels between households that allow transmitting the total effects more that in the case of agriculture. On the other hand, policy targeted to a specific group of households through the industrial sector must take into account also these indirect effects.

The analysis of multipliers related to an injection into factor accounts on household income reflects the same interest to study the consequences of Vietnamese reforms on income inequality. Moreover, the focus on the labour market will allow us to see how a demand-driven system like the one described by the SAM translates a new factorial distribution due an exogenous shock into a new personal distribution of income. The hypothesis that Vietnamese's transition to a modern economy consists in a progressive openness to international trade and in higher share of aggregate income produced by the industrial sector translates into an increase in the demand for different factors of production: first, rural labour factors because they constitute he majority of labour force in Vietnam and we suppose that their demand will increase if agricultural exports increase; second, urban factors, if reforms are related to an increase in the production of manufacturing and industrial sectors.

As for the analysis of multipliers involving the production factors, we analyze now the element m_{ij} through a $\hat{r}\,\mathbf{A}\hat{\mathbf{s}}$ type transform in which **r'** is the row *i* of ${}_3\mathbf{M}_{\mathbf{HH}}$, **A** is to ${}_2\mathbf{M}_{\mathbf{HF}}$ and **s** is the column *j* of ${}_1\mathbf{M}_{\mathbf{FF}}$. Matrix ${}_1\mathbf{M}_{\mathbf{FF}}$ equals the matrix I, implying that, in the case of injections into

[11] For results see note #10.

the factor accounts, there are no indirect effects, and the total multiplier can be divided into the effect from the i*th* factor to the j*th* household (direct-direct effect) and from i*th* factor to other households and from those to the j*th* household group (direct-indirect effect).

Table 6.6 below describes the effects of an injection of income into the rural male factor with low education (F1, lab1) on rural male-headed farm employed households (H1, hh1). As we can see from the last column of the table, the global effect is quite high (0.8054), meaning that the majority of the total injection into F1 is translated into an equivalent increase of the income of H1. From factor $\mathbf{F_1}$ to $\mathbf{H_1}$ the direct effect (0.7206) represents the 89.49% of the total effect (0.8054). Thus an increase in the demand for rural factors will benefit, as expected, the rural households. Comparing these results with those obtained for female head rural households (H5) (Table 6.7) the picture changes. The value of total multiplier confirms the presence of a gender issue in Vietnam in the transmission mechanism to male and female head households. Moreover, for female households, income changes occur for the majority from effect of rural male factor with low education (F1) to all other household.

(insert Table 6.7 here)

If we then analyse together with the previous results also those emerging from the decomposition of multipliers when we increase the demand for rural female labour with low education (F4, lab4)[12]. We can observe that in general, independently from the kind of factor of production stimulated, the effects on male headed households are mainly direct, while for female headed households effects on other households' income prevails. Any increase in the industrial production has been linked to an increase in the demand for factors with a medium level of education located into the urban area. These impacts have been explored with reference to households with the head employed as a wage worker. A surprisingly result occurs injecting the income for the female factor with a medium level of education (F11, lab11) on the urban household with a male and wage worker head (H11, hh11). The total effect is in fact higher than that derived from the same injection on the demand for male urban and with a medium level of education factor of production (F8, lab8). This confirms the hypothesis that female employment has broader benefit for all the households' member, and thus should be encouraged in a development policy perspective. Going into the detail of the decomposition exercise, the direct total effect (0.8740) from the factor represented by female headed household with a medium level of education (F11, lab11) appears to be the most relevant (89.90%) on the total effect. Increasing then demand for

[12] For results see note #10.

female workers medium educated has benefits on households male headed and wage employed (H11).

The same is not true if we analyse the effects of the increase in the demand for female labour force from a perspective of the level of education. Looking comparatively at the effects that an increase in the income occurring to the female labour force located into the urban area and with a high level of education (F12, lab12), it is interesting to note that the effect is higher for those households with a female head wage employed (H15, hh15) that for the corresponding male headed households (H11, hh11), even if the overall level of multipliers are not so different (respectively, 0.4789 and 0.4352). Moreover, in both cases the prevailing effects are those generated from other factors and the transferred to F12 and, at the end of the process, transmitted to the relevant household group. This example explains that there could be a sort of education effect in the transmission of the impacts of an exogenous injection into the labour market and then to the income of household groups. This effect passes through the impact that stimulated factor accounts have on other factors and from those to households.

Table 6.6: Decomposition of the global multiplier m_{H1A1} of matrix M

			Decomposition of multiplier m_{H1F1} of matrix M						
Column j (injection)	**Row i (effect of injection to)**	**Househols groups**	**Direct-Direct Effects**	**Indirect-Direct Effects**	**Total Effect from F1**	**Direct-Indirect Effects**	**Indirect-Indirect Effects**	**Total Effect on Hs**	**Total multiplier mH1F1**
F1	**H1**	hh1	0,7208	0,0000	0,7208	0,0846	0,0000	0,0846	**0,8054**
F1	**H1**	hh2	0,0359	0,0000	0,0359	0,7695	0,0000	0,7695	**0,8054**
F1	**H1**	hh3	0,0221	0,0000	0,0221	0,7833	0,0000	0,7833	**0,8054**
F1	**H1**	hh4	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh5	0,0210	0,0000	0,0210	0,7844	0,0000	0,7844	**0,8054**
F1	**H1**	hh6	0,0028	0,0000	0,0028	0,8026	0,0000	0,8026	**0,8054**
F1	**H1**	hh7	0,0028	0,0000	0,0028	0,8026	0,0000	0,8026	**0,8054**
F1	**H1**	hh8	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh9	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh10	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh11	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh12	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh13	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh14	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh15	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**
F1	**H1**	hh16	0,0000	0,0000	0,0000	0,8054	0,0000	0,8054	**0,8054**

Source: author's calculations based on SAM for Vietnam, 2000.

Note: F1:Factor Rural Male Low Education; H1:Household Rural Male Farm-employed. H1 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation.

7. *Conclusions*

The analysis contained in this paper introduced a new methodology to decompose the accounting multiplier matrix (M) that allows disentangling the contribution of different direct and indirect effects on the total impact from an exogenous injection into the system. The application to the Vietnamese country case was used to show the linkages between production activities, primary income distribution to production factors and personal income distribution to households and to derive important policy implications for inequality reduction. The decomposition has been applied to the effects of an injection of income to the account of activities on households income and then of an injection to different kind of factors to households income.

Different results emerge from stimulating production activities. First, there is a gender bias in the transmission of the benefits to households: on average, male headed households have higher multiplier effects than corresponding female headed households. Second, the importance of the agricultural sector in Vietnam is still very high because the multiplier is higher than for other production sectors. Moreover, when stimulating the agricultural sectors, the prevailing effects are the direct effects on a specific group of households. It is interesting to note that there are other sectors, like for example food processing, that activate important indirect effects that can be significant in the process of transmission of the impact of economic reforms and thus should not be neglected. Finally, the decomposition of multipliers related to injections to different factors of production reveals that there is still a gender bias when we analyse the stimulus to labour factors with a low level of education. This bias is confirmed also when we analyse medium educated labour categories. But when we move to higher educated factors, urban located, the gender effect still exists but it is reversed, in the sense that the major benefits occur for female head households. What emerges in the case of multipliers related to labour factors is the prevalence of indirect on direct effects revealing the capacity to activate other factors' income and from those ones the income of the households group of destination. This result is particularly important in the case of policy impacts analysis because it indicates that effects on relatively poorer households can derive also from policies not specifically targeted to promote their participation in the labour market. Important feed back effects can occur also from policies enhancing employment opportunities of urban better educated female headed households (as the example in previously presented explains) due to the capacity of the system to transmit these effects to all household groups.

Finally, it worth remanding that the new approach used in this research, is particularly interesting because it allows studying at the same time the structure of the production sector, the interdependences between parts of the economic system and income distribution at a very disaggregate level. Even tough useful in the analysis of inequality, it should not be considered an all-comprehensive one but complementary to the traditional study of inequality at the micro and individual level.

References

Bottiroli Civardi M. (1988), *Le matrici di contabilità sociale per un'analisi strutturale della distribuzione personale dei redditi*, Milano: A. Giuffrè.

Bottiroli Civardi M. (1990), 'Income Multipliers in the Household Institutional Sector in Income and Wealth Distribution, Inequality and Poverty', in: Dagum, C. and M. Zenga, (eds), *Studies in Contemporary Economics*, Berlin: Springer-Verlag.

Bottiroli Civardi M. and Targetti Lenti R.(1988), The distribution of Personal Income at the Sectoral Level in Italy: A SAM model, *Journal of Policy Modeling*, Vol. 10(3), pp. 453-68.

Bottiroli Civardi M. and Targetti Lenti R.(1999), *La Matrice di Contabilità Sociale (SAM) ed il Sistema dei Conti Nazionali (SNA): problemi di integrazione e di scelta dei gruppi socio-economici*, Quaderni del Dipartimento di Economia Pubblica e Territoriale, n.5/99, Università di Pavia.

Bottiroli Civardi M. and Targetti Lenti R.(2002), The social accounting matrix (SAM), a framework for building inequality "structural indicators" for analysing the income distribution, SIEP Working paper No. 129, University of Pavia, June. (http://www.unipv.it/websiep/wp/129.pdf)

Bottiroli Civardi M. and R. Targetti Lenti (2007), 'Multiplier decomposition, inequality and poverty in a SAM framework', Paper Presented at the 'Seminar on SAM', ISCONA, Rome, March 30, 2007.

Bourguignon, F. and L. A. Pereira da Silva (2003), (eds), *The Impact of Economic Polices on Poverty and Income Distribution: Evaluation Techniques and Tools*, The World Bank, Washington D.C.

Hayden C and J I Round (1982) 'Developments in Social Accounting Methods as Applied to the Analysis of Income Distribution and Employment Issues', *World Development*, Vol. 10, pp. 451-65.

Molini, V. (2005), 'The transformation of the Vietnamese earnings distribution during the transition: a micro-simulation using Shapley's value', SOW-VU working paper, Amsterdam.

Pyatt, G, (1988) 'A SAM Approach to Modelling', *Journal of Policy Modelling*, 10(3): 327-352.

Pyatt, G. (2001) 'Some Early Multiplier Models of the Relationship Between IncomeDistribution and Production Structure', *Economic Systems Research*, Vol. 13(2): 139-164.

Pyatt, G. and J. I. Round (1977) 'Social Accounting Matrices for Development Planning', *Review of Income and Wealth*, Series 23, No.4; 339-64.

Pyatt G. and J. I. Round (1979), Accounting and fixed prices multipliers in a Social Accounting Matrix Framework, *The Economic Journal*, Vol. 89, december, pp.850-73.

Pyatt G. and J. I. Round (1985), (eds), *Social Accounting Matrices: A Basis for Planning*, Washington, DC: The World Bank.

Pyatt G. and J. I. Round (2006), 'Multiplier effects and the reduction of Poverty', in: de Janvry A. and Kanbur R. (eds), *Poverty, Inequality and Development: essays in honour of Erik Thorbecke*, Springer.

Pyatt G. and E. Thorbecke (1976) *Planning Techniques for a Better Future*, ILO, Geneva.

Round J. I. (2003a), Social Accounting Matrices and SAM-based Multiplier Analysis, in: Bourguignon, F. and L. A. Pereira da Silva (eds), *The Impact of Economic Polices on Poverty and Income Distribution: Evaluation Techniques and Tools*, The World Bank, Washington D.C. pp.269-287.

Round, J. I. (2003b), 'Constructing SAMs for Development Policy Analysis: Lessons Learned and Challenges Ahead', *Economic System Research*, Vol. 15 No. 2, pp. 161-84.

Santos, S. (2004), 'Distribution of aggregate income in Portugal from 1995 to 2000 within a SAM framework. Modeling the household sector,' Working Papers 2004/12, Department of Economics, Institute for Economics and Business Administration (ISEG), Technical University of Lisbon.

Stone R. (1977), Forward to G Pyatt & A Roe *et al, Social Accounting for Development Planning*, Cambridge University Press, Cambridge).

Stone R.(1985), The Disaggregation of the Household Sector in the National Accounts, in: G. Pyatt and J.I. Round (eds.), *Social Accounting Matrices. A basis for planning*, Washington, DC: The World Bank.

Targetti Lenti, R. (1984), *Struttura Produttiva e Distribuzione Personale del Reddito: una Verifica del Caso Italiano*, Analisi e Ricerche del Dipartimento di Economia Pubblica e Territoriale, Università di Pavia. Milano: A. Giuffrè.

Targetti Lenti, R. (1990), *Modelli Multisettoriali e Distribuzione del Reddito. Un'Applicazione al Sistema Economico Italiano*, Analisi e Ricerche del Dipartimento di Economia Pubblica e Territoriale, Università di Pavia. Milano: A. Giuffrè.

Tarp, F. and D. Roland-Holst (2002), 'Household Income Determination in Vietnam: A Structural Analysis with Implications for Market Reforms', CIEM Discussion Paper No. 0203, CIEM, Hanoi.

Tarp Jensen, H., J. Rand and F. Tarp (2004), *A New Vietnam Social Accounting Matrix for year 2000*, CIEM , Science and technics publishing house Hanoi.

Thorbecke, E.(2000), 'The Use of Social Accounting Matrices in Modeling', Paper prepared for the 26th General Conference of the International Association for Research in Income and Wealth, IARIW, Cracow.

Table 5.3: Matrix M_{31} for Vietnam, 2000.

	act1	**act2**	**act3**	**act4**	**act5**	**act6**	**act7**	**act8**	**act9**	**act10**	**Total**	**Average**
hh1	0,3631	0,3439	0,3775	0,2115	0,2779	0,0761	0,1300	0,1961	0,2792	0,1938	**2,4492**	**0,2449**
hh2	0,0914	0,0854	0,0970	0,0605	0,0689	0,0195	0,0391	0,0576	0,0640	0,0502	**0,6336**	**0,0634**
hh3	0,0645	0,0640	0,0765	0,0450	0,0535	0,0158	0,0274	0,0420	0,0577	0,0405	**0,4868**	**0,0487**
hh4	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0003	0,0001	0,0002	0,0002	**0,0016**	**0,0002**
hh5	0,0689	0,0683	0,0776	0,0435	0,0563	0,0161	0,0268	0,0396	0,0616	0,0411	**0,4998**	**0,0500**
hh6	0,0145	0,0168	0,0217	0,0117	0,0147	0,0047	0,0068	0,0103	0,0198	0,0120	**0,1331**	**0,0133**
hh7	0,0095	0,0101	0,0129	0,0071	0,0088	0,0027	0,0042	0,0064	0,0107	0,0069	**0,0792**	**0,0079**
hh8	0,0000	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001	**0,0007**	**0,0001**
hh9	0,0323	0,0263	0,0219	0,0113	0,0213	0,0055	0,0092	0,0115	0,0216	0,0152	**0,1760**	**0,0176**
hh10	0,1504	0,1161	0,1113	0,0609	0,0989	0,0262	0,0553	0,0619	0,0926	0,0757	**0,8493**	**0,0849**
hh11	0,1386	0,1142	0,1162	0,0732	0,1069	0,0338	0,0632	0,0757	0,1315	0,0984	**0,9516**	**0,0952**
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0002	0,0001	0,0001	0,0001	**0,0010**	**0,0001**
hh13	0,0200	0,0156	0,0121	0,0059	0,0120	0,0027	0,0049	0,0060	0,0100	0,0075	**0,0968**	**0,0097**
hh14	0,0826	0,0723	0,0672	0,0403	0,0654	0,0205	0,0321	0,0407	0,0873	0,0573	**0,5659**	**0,0566**
hh15	0,0623	0,0533	0,0581	0,0371	0,0530	0,0180	0,0308	0,0380	0,0745	0,0518	**0,4768**	**0,0477**
hh16	0,0001	0,0001	0,0001	0,0002	0,0001	0,0000	0,0002	0,0001	0,0002	0,0001	**0,0012**	**0,0001**
Total Households	**1,0983**	**0,9869**	**1,0502**	**0,6087**	**0,8381**	**0,2418**	**0,4306**	**0,5863**	**0,9110**	**0,6509**	7,4026	0,7403
ent1	0,0960	0,0994	0,1126	0,1929	0,1224	0,0550	0,2542	0,1211	0,1780	0,1459	**1,3774**	**0,1377**
ent2	0,0530	0,0549	0,0622	0,1065	0,0676	0,0304	0,1404	0,0669	0,0983	0,0806	**0,7607**	**0,0761**
TOTAL	**1,2473**	**1,1412**	**1,2249**	**0,9081**	**1,0280**	**0,3272**	**0,8252**	**0,7742**	**1,1872**	**0,8774**	9,5407	0,9541

Source: author’s calculations based on SAM for Vietnam, 2000.

Table 5.4: Matrix M_{32} for Vietnam, 2000.

	lab1	lab2	lab3	lab4	lab5	lab6	lab7	lab8	lab9	lab10	lab11	lab12	capit	land	Total	Average
hh1	0,8054	0,6291	0,3740	0,8169	0,6960	0,6472	0,1736	0,1712	0,1703	0,1762	0,1735	0,1733	0,0231	0,5573	**5,5871**	**0,3991**
hh2	0,2309	0,4077	0,1025	0,1165	0,1394	0,1824	0,0439	0,0433	0,0431	0,0445	0,0439	0,0438	0,0082	0,0784	**1,5284**	**0,1092**
hh3	0,1462	0,1765	0,5326	0,1366	0,2568	0,1994	0,0348	0,0343	0,0342	0,0353	0,0348	0,0348	0,0035	0,0707	**1,7304**	**0,1236**
hh4	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0006	0,0001	**0,0021**	**0,0002**
hh5	0,1427	0,1099	0,2224	0,1966	0,1601	0,2038	0,0359	0,0355	0,0353	0,0365	0,0359	0,0359	0,0068	0,1057	**1,3630**	**0,0974**
hh6	0,0262	0,0238	0,0966	0,0802	0,0558	0,0119	0,0100	0,0099	0,0098	0,0101	0,0100	0,0100	0,0015	0,0165	**0,3724**	**0,0266**
hh7	0,0209	0,0209	0,0405	0,0259	0,0632	0,1254	0,0058	0,0058	0,0057	0,0059	0,0058	0,0058	0,0007	0,0097	**0,3420**	**0,0244**
hh8	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0003	0,0000	**0,0009**	**0,0001**
hh9	0,0157	0,0155	0,0156	0,0157	0,0157	0,0156	0,0678	0,0296	0,0222	0,0913	0,0288	0,0248	0,0017	0,0755	**0,4356**	**0,0311**
hh10	0,0747	0,0738	0,0741	0,0748	0,0745	0,0742	0,4027	0,3491	0,2797	0,1803	0,1874	0,1746	0,0141	0,2549	**2,2890**	**0,1635**
hh11	0,0847	0,0840	0,0846	0,0849	0,0847	0,0842	0,3540	0,5103	0,5985	0,3357	0,4501	0,4352	0,0067	0,1789	**3,3764**	**0,2412**
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0004	0,0001	**0,0013**	**0,0001**
hh13	0,0086	0,0085	0,0085	0,0086	0,0085	0,0085	0,0367	0,0227	0,0112	0,0316	0,0190	0,0068	0,0009	0,0562	**0,2362**	**0,0169**
hh14	0,0511	0,0507	0,0510	0,0512	0,0511	0,0508	0,1891	0,1311	0,0992	0,3723	0,3087	0,1138	0,0060	0,1317	**1,6578**	**0,1184**
hh15	0,0429	0,0426	0,0429	0,0430	0,0429	0,0427	0,1826	0,1878	0,2191	0,2252	0,2394	0,4789	0,0036	0,0421	**1,8359**	**0,1311**
hh16	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0004	0,0001	**0,0015**	**0,0001**
Total Households	**1,6504**	**1,6433**	**1,6455**	**1,6512**	**1,6490**	**1,6465**	**1,5372**	**1,5307**	**1,5287**	**1,5452**	**1,5377**	**1,5381**	**0,0784**	**1,5779**	**20,7598**	**1,4828**
ent1	0,1039	0,1036	0,1047	0,1039	0,1040	0,1033	0,0944	0,0940	0,0940	0,0957	0,0952	0,0959	0,5140	0,0978	**1,8044**	**0,1289**
ent2	0,0574	0,0572	0,0578	0,0574	0,0574	0,0571	0,0521	0,0519	0,0519	0,0529	0,0525	0,0530	0,2838	0,0540	**0,9964**	**0,0712**
TOTAL	**1,8116**	**1,8041**	**1,8080**	**1,8126**	**1,8104**	**1,8069**	**1,6838**	**1,6766**	**1,6746**	**1,6938**	**1,6854**	**1,6870**	**0,8762**	**1,7297**	**23,5606**	**1,6829**

Source: author's calculations based on SAM for Vietnam, 2000.

Table 5.5: Matrix M_{33} for Vietnam, 2000.

	hh1	hh2	hh3	hh4	hh5	hh6	hh7	hh8	hh9	hh10	hh11	hh12	hh13	hh14	hh15	hh16	Total Households	ent1	ent2	Totals	Average
hh1	1,2177	0,2027	0,2125	0,1964	0,2123	0,1969	0,2015	0,2119	0,1933	0,1697	0,1661	0,1707	0,1982	0,1796	0,1786	0,1422	**4,0502**	0,0241	0,0383	**4,1127**	**0,2285**
hh2	0,0548	1,0511	0,0535	0,0497	0,0535	0,0497	0,0507	0,0536	0,0488	0,0429	0,0420	0,0432	0,0499	0,0454	0,0452	0,0359	**1,7699**	0,0041	0,0217	**1,7957**	**0,0998**
hh3	0,0430	0,0403	1,0422	0,0393	0,0420	0,0393	0,0399	0,0422	0,0385	0,0340	0,0334	0,0341	0,0393	0,0359	0,0359	0,0283	**1,6076**	0,0034	0,0065	**1,6175**	**0,0899**
hh4	0,0001	0,0001	0,0001	1,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	**1,0018**	0,0012	0,0001	**1,0031**	**0,0557**
hh5	0,0447	0,0418	0,0438	0,0406	1,0436	0,0407	0,0414	0,0437	0,0398	0,0351	0,0345	0,0353	0,0408	0,0372	0,0370	0,0293	**1,6292**	0,0092	0,0073	**1,6458**	**0,0914**
hh6	0,0121	0,0115	0,0120	0,0112	0,0119	1,0112	0,0113	0,0120	0,0110	0,0098	0,0096	0,0098	0,0112	0,0103	0,0103	0,0080	**1,1732**	0,0011	0,0035	**1,1778**	**0,0654**
hh7	0,0071	0,0067	0,0070	0,0066	0,0070	0,0066	1,0067	0,0070	0,0064	0,0057	0,0056	0,0057	0,0066	0,0060	0,0060	0,0047	**1,1014**	0,0008	0,0009	**1,1031**	**0,0613**
hh8	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	1,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	**1,0008**	0,0005	0,0000	**1,0013**	**0,0556**
hh9	0,0160	0,0149	0,0157	0,0142	0,0156	0,0146	0,0147	0,0152	1,0142	0,0125	0,0123	0,0125	0,0144	0,0132	0,0132	0,0104	**1,2239**	0,0019	0,0028	**1,2286**	**0,0683**
hh10	0,0761	0,0710	0,0748	0,0683	0,0743	0,0696	0,0701	0,0731	0,0678	1,0599	0,0590	0,0600	0,0686	0,0633	0,0634	0,0498	**2,0691**	0,0041	0,0426	**2,1158**	**0,1175**
hh11	0,0859	0,0814	0,0856	0,0787	0,0842	0,0808	0,0795	0,0832	0,0779	0,0701	1,0697	0,0696	0,0779	0,0738	0,0748	0,0571	**2,2302**	0,0045	0,0157	**2,2504**	**0,1250**
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1,0001	0,0001	0,0001	0,0001	0,0001	**1,0011**	0,0006	0,0001	**1,0019**	**0,0557**
hh13	0,0088	0,0081	0,0085	0,0077	0,0085	0,0078	0,0080	0,0083	0,0077	0,0067	0,0065	0,0067	1,0079	0,0071	0,0070	0,0056	**1,1209**	0,0010	0,0014	**1,1233**	**0,0624**
hh14	0,0519	0,0491	0,0516	0,0473	0,0508	0,0486	0,0479	0,0499	0,0469	0,0421	0,0418	0,0418	0,0470	1,0444	0,0449	0,0344	**1,7402**	0,0034	0,0153	**1,7589**	**0,0977**
hh15	0,0434	0,0414	0,0435	0,0402	0,0427	0,0413	0,0403	0,0423	0,0396	0,0359	0,0358	0,0356	0,0395	0,0378	1,0384	0,0290	**1,6268**	0,0025	0,0083	**1,6376**	**0,0910**
hh16	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1,0001	**1,0013**	0,0008	0,0001	**1,0023**	**0,0557**
Total Households	**1,6618**	**1,6203**	**1,6510**	**1,6004**	**1,6469**	**1,6072**	**1,6124**	**1,6428**	**1,5921**	**1,5246**	**1,5166**	**1,5253**	**1,6018**	**1,5544**	**1,5552**	**1,4350**	**25,3478**	**0,0630**	**0,1647**	**25,5756**	**1,4209**
ent1	0,1043	0,1020	0,1065	0,0991	0,1031	0,1030	0,0975	0,1038	0,0981	0,0920	0,0925	0,0919	0,0968	0,0969	0,0995	0,0745	**1,5614**	1,0039	0,0102	**2,5756**	**0,1431**
ent2	0,0576	0,0563	0,0588	0,0547	0,0569	0,0569	0,0539	0,0573	0,0542	0,0508	0,0511	0,0508	0,0535	0,0535	0,0549	0,0411	**0,8623**	0,0022	1,0056	**1,8701**	**0,1039**
TOTAL	**1,8236**	**1,7786**	**1,8164**	**1,7543**	**1,8069**	**1,7670**	**1,7637**	**1,8040**	**1,7444**	**1,6675**	**1,6602**	**1,6680**	**1,7521**	**1,7047**	**1,7096**	**1,5506**	**27,7716**	**1,0691**	**1,1806**	**30,0212**	**1,6678**

Source: author's calculations based on SAM for Vietnam, 2000.

Table 6.2: Decomposition of the global multiplier m_{H5A1} of matrix M

Column j (injection)	Row i (effect of injection to)	Househols groups	Decomposition of multiplier m_{H5A1} of matrix M						
			Direct-Direct Effects	**Indirect-Direct Effects**	**Total Effect from A1**	**Direct-Indirect Effects**	**Indirect-Indirect Effects**	**Total Effect on Hs**	**Total multiplier mH5A1**
A1	**H5**	hh1	0,0089	0,0013	0,0102	0,0505	0,0086	0,0590	**0,0692**
A1	**H5**	hh2	0,0021	0,0003	0,0024	0,0573	0,0096	0,0668	**0,0692**
A1	**H5**	hh3	0,0014	0,0003	0,0017	0,0580	0,0096	0,0676	**0,0692**
A1	**H5**	hh4	0,0000	0,0000	0,0000	0,0594	0,0099	0,0692	**0,0692**
A1	**H5**	hh5	0,0366	0,0063	0,0430	0,0227	0,0035	0,0263	**0,0692**
A1	**H5**	hh6	0,0002	0,0001	0,0003	0,0592	0,0098	0,0690	**0,0692**
A1	**H5**	hh7	0,0002	0,0000	0,0002	0,0592	0,0098	0,0690	**0,0692**
A1	**H5**	hh8	0,0000	0,0000	0,0000	0,0594	0,0099	0,0692	**0,0692**
A1	**H5**	hh9	0,0008	0,0001	0,0009	0,0586	0,0098	0,0684	**0,0692**
A1	**H5**	hh10	0,0033	0,0003	0,0036	0,0561	0,0095	0,0656	**0,0692**
A1	**H5**	hh11	0,0025	0,0004	0,0029	0,0569	0,0095	0,0663	**0,0692**
A1	**H5**	hh12	0,0000	0,0000	0,0000	0,0594	0,0099	0,0692	**0,0692**
A1	**H5**	hh13	0,0005	0,0000	0,0006	0,0588	0,0098	0,0686	**0,0692**
A1	**H5**	hh14	0,0016	0,0003	0,0019	0,0578	0,0096	0,0674	**0,0692**
A1	**H5**	hh15	0,0011	0,0002	0,0013	0,0583	0,0096	0,0680	**0,0692**
A1	**H5**	hh16	0,0000	0,0000	0,0000	0,0594	0,0099	0,0692	**0,0692**

Source: author's calculations based on SAM for Vietnam, 2000.

Note: A1:Activity rice; H5:Household Rural Female Farm-employed. H5 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation.

Table 6.3: Decomposition of the global multiplier m_{H10A1} ***of matrix M***

Column j (injection)	Row i (effect of injection to)	Househols groups	Decomposition of multiplier m_{H10A1} of matrix M						
			Direct-Direct Effects	Indirect-Direct Effects	Total Effect from A1	Direct-Indirect Effects	Indirect-Indirect Effects	Total Effect on Hs	Total multiplier mH10A1
A1	**H10**	hh1	0,0152	0,0022	0,0174	0,1193	0,0137	0,1330	**0,1504**
A1	**H10**	hh2	0,0036	0,0005	0,0041	0,1309	0,0154	0,1463	**0,1504**
A1	**H10**	hh3	0,0024	0,0004	0,0028	0,1321	0,0155	0,1476	**0,1504**
A1	**H10**	hh4	0,0000	0,0000	0,0000	0,1345	0,0159	0,1504	**0,1504**
A1	**H10**	hh5	0,0026	0,0005	0,0031	0,1319	0,0154	0,1473	**0,1504**
A1	**H10**	hh6	0,0004	0,0001	0,0005	0,1342	0,0158	0,1499	**0,1504**
A1	**H10**	hh7	0,0003	0,0001	0,0004	0,1342	0,0158	0,1500	**0,1504**
A1	**H10**	hh8	0,0000	0,0000	0,0000	0,1345	0,0159	0,1504	**0,1504**
A1	**H10**	hh9	0,0014	0,0002	0,0015	0,1331	0,0157	0,1489	**0,1504**
A1	**H10**	hh10	0,0990	0,0103	0,1093	0,0355	0,0056	0,0411	**0,1504**
A1	**H10**	hh11	0,0043	0,0007	0,0050	0,1302	0,0152	0,1454	**0,1504**
A1	**H10**	hh12	0,0000	0,0000	0,0000	0,1345	0,0159	0,1504	**0,1504**
A1	**H10**	hh13	0,0009	0,0001	0,0010	0,1336	0,0158	0,1494	**0,1504**
A1	**H10**	hh14	0,0027	0,0005	0,0032	0,1318	0,0154	0,1472	**0,1504**
A1	**H10**	hh15	0,0018	0,0004	0,0022	0,1327	0,0155	0,1482	**0,1504**
A1	**H10**	hh16	0,0000	0,0000	0,0000	0,1345	0,0159	0,1504	**0,1504**

Source: author's calculations based on SAM for Vietnam, 2000.

Note: A1:Activity rice; H10:Household Urban Male Self-employed. H10 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation

Table 6.4: Decomposition of the global multiplier m_{H14A1} of matrix M

Column j (injection)	Row i (effect of injection to)	Househols groups	Decomposition of multiplier m_{H14A1} of matrix M						
			Direct-Direct Effects	Indirect-Direct Effects	Total Effect from A1	Direct-Indirect Effects	Indirect-Indirect Effects	Total Effect on Hs	Total multiplier mH14A1
A1	**H14**	hh1	0,0103	0,0015	0,0119	0,0604	0,0103	0,0707	**0,0826**
A1	**H14**	hh2	0,0025	0,0003	0,0028	0,0683	0,0114	0,0798	**0,0826**
A1	**H14**	hh3	0,0017	0,0003	0,0019	0,0691	0,0115	0,0806	**0,0826**
A1	**H14**	hh4	0,0000	0,0000	0,0000	0,0708	0,0118	0,0826	**0,0826**
A1	**H14**	hh5	0,0018	0,0003	0,0021	0,0690	0,0115	0,0805	**0,0826**
A1	**H14**	hh6	0,0003	0,0001	0,0003	0,0705	0,0117	0,0822	**0,0826**
A1	**H14**	hh7	0,0002	0,0000	0,0002	0,0706	0,0117	0,0823	**0,0826**
A1	**H14**	hh8	0,0000	0,0000	0,0000	0,0708	0,0118	0,0826	**0,0826**
A1	**H14**	hh9	0,0009	0,0001	0,0011	0,0699	0,0117	0,0815	**0,0826**
A1	**H14**	hh10	0,0039	0,0004	0,0043	0,0669	0,0114	0,0782	**0,0826**
A1	**H14**	hh11	0,0030	0,0005	0,0035	0,0678	0,0113	0,0791	**0,0826**
A1	**H14**	hh12	0,0000	0,0000	0,0000	0,0708	0,0118	0,0826	**0,0826**
A1	**H14**	hh13	0,0006	0,0001	0,0007	0,0702	0,0117	0,0819	**0,0826**
A1	**H14**	hh14	0,0443	0,0079	0,0521	0,0265	0,0039	0,0305	**0,0826**
A1	**H14**	hh15	0,0013	0,0003	0,0016	0,0695	0,0115	0,0810	**0,0826**
A1	**H14**	hh16	0,0000	0,0000	0,0000	0,0708	0,0118	0,0826	**0,0826**

Source: author's calculations based on SAM for Vietnam, 2000.

Note: A1:Activity rice; H14:Household Urban Female Self-employed. H14 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation

Table 6.7: Decomposition of the global multiplier m_{H5F1} of matrix M

Column j (injection)	Row i (effect of injection to)	Househols groups	Decomposition of multiplier m_{H5F1} of matrix M						
			Direct-Direct Effects	**Indirect-Direct Effects**	**Total Effect from F1**	**Direct-Indirect Effects**	**Indirect-Indirect Effects**	**Total Effect on Hs**	**Total multiplier mH5F1**
F1	**H5**	hh1	0,0264	0,0000	0,0264	0,1162	0,0000	0,1162	**0,1427**
F1	**H5**	hh2	0,0074	0,0000	0,0074	0,1353	0,0000	0,1353	**0,1427**
F1	**H5**	hh3	0,0045	0,0000	0,0045	0,1381	0,0000	0,1381	**0,1427**
F1	**H5**	hh4	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh5	0,1031	0,0000	0,1031	0,0396	0,0000	0,0396	**0,1427**
F1	**H5**	hh6	0,0006	0,0000	0,0006	0,1421	0,0000	0,1421	**0,1427**
F1	**H5**	hh7	0,0006	0,0000	0,0006	0,1421	0,0000	0,1421	**0,1427**
F1	**H5**	hh8	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh9	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh10	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh11	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh12	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh13	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh14	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh15	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**
F1	**H5**	hh16	0,0000	0,0000	0,0000	0,1427	0,0000	0,1427	**0,1427**

Source: author's elaboration based on Vietnam SAM, 2000
Note: F1:Factor Rural Male Low education; H5:Household Rural Female Farm-employed. H5refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation

ANNEX

Table A4.1: Vietnam SAM, 2000.

Label	Content
	PRODUCTION ACTIVITIES
act1	Activity rice
act2	Activity other agricultural
act3	Activity fish and livestock
act4	Activity mining and oil
act5	Activity food processing
act6	Activity manufacturing
act7	Activity Water, gas, and electricity
act8	Activity construction
act9	Activity trade
act10	Activity other services
	FACTORS OF PRODUCTION
lab1	Factor Rural Male Low-education
lab2	Factor Rural Male Medium-education
lab3	Factor Rural Male High-education
lab4	Factor Rural Female Low-education
lab5	Factor Rural Female Medium-education
lab6	Factor Rural Female High-education
lab7	Factor Urban Male Low-education
lab8	Factor Urban Male Medium-education
lab9	Factor Urban Male High-education
lab10	Factor Urban Female Low-education
lab11	Factor Urban Female Medium-education
lab12	Factor Urban Female High-education
capit	Factor capital
land	Factor land
	ENDOGENOUS INSTITUTIONS
hh1	Household Rural Male Farm-employed
hh2	Household Rural Male Self-employed
hh3	Household Rural Male Wage-employed
hh4	Household Rural Male Non-employed
hh5	Household Rural Female Farm-employed
hh6	Household Rural Female Self-employed
hh7	Household Rural Female Wage-employed
hh8	Household Rural Female Non-employed
hh9	Household Urban Male Farm-employed
hh10	Household Urban Male Self-employed
hh11	Household Urban Male Wage-employed
hh12	Household Urban Male Non-employed
hh13	Household Urban Female Farm-employed
hh14	Household Urban Female Self-employed
hh15	Household Urban Female Wage-employed
hh16	Household Urban Female Non-employed
Ent1	Enterprises State ownership
ent2	Enterprises Non-state ownership
	EXOGENOUS ACCOUNTS
ent3	Enterprises Foreign ownership
VAT	State Value Added Tax
Mduty	State Import Duty
Xduty	State Export Duty
State	State Recurrent Budget
CapAcc	Savings-Investment
Invent	Inventory
ROW	Rest of the World
Total	Total

Source: author’s elaboration based on Tarp Jensen et al. (2004).

Table A5.1: Matrix of Global Multipliers (M), Vietnam, 2000.

	act1	act2	act3	act4	act5	act6	act7	act8	act9	act10
act1	1,1896	0,1175	0,2022	0,0751	0,4747	0,0298	0,0502	0,0713	0,1117	0,0831
act2	0,1727	1,1496	0,1762	0,0650	0,1627	0,0478	0,0473	0,0719	0,0908	0,0721
act3	0,1262	0,1149	1,1920	0,0716	0,1618	0,0290	0,0491	0,0692	0,1123	0,0786
act4	0,0166	0,0145	0,0196	1,0459	0,0140	0,0256	0,0257	0,1223	0,0135	0,0147
act5	0,2838	0,2585	0,2782	0,1663	1,2776	0,0656	0,1114	0,1577	0,2501	0,1888
act6	0,6928	0,5589	0,6614	0,4211	0,5288	1,3890	0,5149	0,8927	0,4854	0,4882
act7	0,0377	0,0423	0,0394	0,0433	0,0412	0,0279	1,1231	0,0462	0,0463	0,0505
act8	0,0047	0,0071	0,0048	0,0072	0,0047	0,0027	0,0119	1,0135	0,0077	0,0117
act9	0,1323	0,1023	0,1438	0,0762	0,1838	0,0500	0,0594	0,1235	1,1008	0,0826
act10	0,3548	0,3142	0,3607	0,3010	0,3020	0,1068	0,1563	0,3009	0,4316	1,3496
Total Activities	**3,0111**	**2,6798**	**3,0785**	**2,2726**	**3,1514**	**1,7742**	**2,1493**	**2,8690**	**2,6501**	**2,4198**
% Column Total	**54,36**	**53,64**	**55,32**	**54,76**	**60,06**	**72,53**	**55,39**	**64,39**	**52,16**	**57,33**
lab1	0,3296	0,2735	0,3058	0,1863	0,2202	0,0566	0,1194	0,1838	0,1661	0,1455
lab2	0,0490	0,0544	0,0623	0,0454	0,0408	0,0132	0,0289	0,0448	0,0384	0,0343
lab3	0,0060	0,0073	0,0099	0,0089	0,0064	0,0025	0,0057	0,0088	0,0072	0,0066
lab4	0,0954	0,1403	0,1940	0,0938	0,1264	0,0432	0,0474	0,0777	0,2035	0,1103
lab5	0,0190	0,0236	0,0429	0,0205	0,0267	0,0093	0,0102	0,0168	0,0447	0,0241
lab6	0,0039	0,0062	0,0089	0,0041	0,0054	0,0019	0,0021	0,0034	0,0088	0,0048
lab7	0,2543	0,1805	0,2111	0,0911	0,1565	0,0372	0,0835	0,0958	0,1192	0,1101
lab8	0,0396	0,0359	0,0413	0,0367	0,0362	0,0142	0,0360	0,0392	0,0462	0,0455
lab9	0,0084	0,0076	0,0092	0,0141	0,0107	0,0053	0,0141	0,0151	0,0174	0,0176
lab10	0,0550	0,0723	0,0610	0,0452	0,0687	0,0278	0,0293	0,0450	0,1375	0,0751
lab11	0,0174	0,0161	0,0197	0,0172	0,0246	0,0106	0,0111	0,0171	0,0541	0,0292
lab12	0,0067	0,0058	0,0078	0,0069	0,0097	0,0042	0,0044	0,0068	0,0216	0,0117
capit	0,1885	0,1952	0,2211	0,3789	0,2404	0,1081	0,4993	0,2378	0,3495	0,2867
land	0,2078	0,1560	0,0664	0,0203	0,0953	0,0107	0,0140	0,0205	0,0295	0,0224
Total Factors	**1,2806**	**1,1748**	**1,2614**	**0,9693**	**1,0680**	**0,3447**	**0,9056**	**0,8127**	**1,2438**	**0,9238**
% Column Total	**23,12**	**23,52**	**22,67**	**23,36**	**20,35**	**14,09**	**23,34**	**18,24**	**24,48**	**21,89**
hh1	0,3631	0,3439	0,3775	0,2115	0,2779	0,0761	0,1300	0,1961	0,2792	0,1938
hh2	0,0914	0,0854	0,0970	0,0605	0,0689	0,0195	0,0391	0,0576	0,0640	0,0502
hh3	0,0645	0,0640	0,0765	0,0450	0,0535	0,0158	0,0274	0,0420	0,0577	0,0405
hh4	0,0001	0,0001	0,0001	0,0002	0,0001	0,0001	0,0003	0,0001	0,0002	0,0002
hh5	0,0689	0,0683	0,0776	0,0435	0,0563	0,0161	0,0268	0,0396	0,0616	0,0411
hh6	0,0145	0,0168	0,0217	0,0117	0,0147	0,0047	0,0068	0,0103	0,0198	0,0120
hh7	0,0095	0,0101	0,0129	0,0071	0,0088	0,0027	0,0042	0,0064	0,0107	0,0069
hh8	0,0000	0,0001	0,0001	0,0001	0,0001	0,0000	0,0001	0,0001	0,0001	0,0001
hh9	0,0323	0,0263	0,0219	0,0113	0,0213	0,0055	0,0092	0,0115	0,0216	0,0152
hh10	0,1504	0,1161	0,1113	0,0609	0,0989	0,0262	0,0553	0,0619	0,0926	0,0757
hh11	0,1386	0,1142	0,1162	0,0732	0,1069	0,0338	0,0632	0,0757	0,1315	0,0984
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0002	0,0001	0,0001	0,0001
hh13	0,0200	0,0156	0,0121	0,0059	0,0120	0,0027	0,0049	0,0060	0,0100	0,0075
hh14	0,0826	0,0723	0,0672	0,0403	0,0654	0,0205	0,0321	0,0407	0,0873	0,0573
hh15	0,0623	0,0533	0,0581	0,0371	0,0530	0,0180	0,0308	0,0380	0,0745	0,0518
hh16	0,0001	0,0001	0,0001	0,0002	0,0001	0,0000	0,0002	0,0001	0,0002	0,0001
Total Households	**1,0983**	**0,9869**	**1,0502**	**0,6087**	**0,8381**	**0,2418**	**0,4306**	**0,5863**	**0,9110**	**0,6509**
% Column Total	**19,83**	**19,75**	**18,87**	**14,67**	**15,97**	**9,88**	**11,10**	**13,16**	**17,93**	**15,42**
ent1	0,0960	0,0994	0,1126	0,1929	0,1224	0,0550	0,2542	0,1211	0,1780	0,1459
ent2	0,0530	0,0549	0,0622	0,1065	0,0676	0,0304	0,1404	0,0669	0,0983	0,0806
Total	**5,5390**	**4,9958**	**5,5647**	**4,1500**	**5,2475**	**2,4461**	**3,8800**	**4,4560**	**5,0811**	**4,2211**

Source: author's elaboration based on Vietnam SAM, 2000.

Table A5.1: Matrix of Global Multipliers (M), Vietnam, 2000, (cont.).

	lab1	**lab2**	**lab3**	**lab4**	**lab5**	**lab6**	**lab7**	**lab8**	**lab9**	**lab10**	**lab11**	**lab12**	**capit**	**land**
act1	0,2123	0,2087	0,2077	0,2122	0,2113	0,2105	0,1517	0,1477	0,1459	0,1547	0,1503	0,1479	0,0091	0,1842
act2	0,1736	0,1672	0,1660	0,1748	0,1717	0,1716	0,1221	0,1193	0,1181	0,1240	0,1208	0,1197	0,0074	0,1508
act3	0,2044	0,2013	0,1977	0,2044	0,2030	0,2042	0,1537	0,1495	0,1475	0,1565	0,1520	0,1497	0,0090	0,1814
act4	0,0185	0,0183	0,0181	0,0185	0,0184	0,0183	0,0154	0,0152	0,0151	0,0156	0,0154	0,0154	0,0008	0,0170
act5	0,4540	0,4515	0,4515	0,4527	0,4539	0,4521	0,3537	0,3452	0,3411	0,3606	0,3515	0,3457	0,0200	0,4055
act6	0,6680	0,6660	0,6570	0,6643	0,6628	0,6618	0,6123	0,6089	0,6083	0,6192	0,6161	0,6224	0,0314	0,6327
act7	0,0434	0,0437	0,0437	0,0433	0,0434	0,0433	0,0481	0,0477	0,0475	0,0491	0,0488	0,0486	0,0022	0,0448
act8	0,0057	0,0057	0,0059	0,0058	0,0058	0,0057	0,0055	0,0055	0,0055	0,0056	0,0056	0,0057	0,0003	0,0055
act9	0,1429	0,1425	0,1427	0,1426	0,1428	0,1423	0,1216	0,1199	0,1193	0,1231	0,1214	0,1210	0,0065	0,1316
act10	0,4746	0,4764	0,4953	0,4773	0,4792	0,4727	0,4781	0,4833	0,4885	0,4831	0,4871	0,5002	0,0232	0,4613
Total Activities	**2,3975**	**2,3814**	**2,3856**	**2,3960**	**2,3921**	**2,3825**	**2,0621**	**2,0423**	**2,0368**	**2,0915**	**2,0691**	**2,0763**	**0,1098**	**2,2147**
% Column Total	**39,60**	**39,54**	**39,53**	**39,57**	**39,56**	**39,51**	**37,77**	**37,64**	**37,61**	**37,96**	**37,82**	**37,88**	**5,42**	**38,72**
lab1	1,1665	0,1643	0,1644	0,1668	0,1660	0,1655	0,1338	0,1319	0,1311	0,1359	0,1337	0,1334	0,0074	0,1504
lab2	0,0338	1,0335	0,0336	0,0339	0,0338	0,0336	0,0280	0,0277	0,0276	0,0285	0,0281	0,0281	0,0015	0,0309
lab3	0,0056	0,0055	1,0056	0,0056	0,0056	0,0056	0,0048	0,0048	0,0047	0,0049	0,0048	0,0048	0,0003	0,0052
lab4	0,1057	0,1049	0,1053	1,1058	0,1056	0,1052	0,0893	0,0884	0,0881	0,0906	0,0895	0,0897	0,0048	0,0970
lab5	0,0224	0,0222	0,0223	0,0224	1,0223	0,0223	0,0191	0,0189	0,0188	0,0193	0,0191	0,0192	0,0010	0,0206
lab6	0,0046	0,0046	0,0046	0,0046	0,0046	1,0046	0,0039	0,0039	0,0039	0,0040	0,0039	0,0039	0,0002	0,0043
lab7	0,1180	0,1165	0,1167	0,1182	0,1177	0,1173	1,0953	0,0940	0,0935	0,0968	0,0953	0,0951	0,0053	0,1067
lab8	0,0318	0,0317	0,0320	0,0319	0,0319	0,0317	0,0282	1,0281	0,0281	0,0286	0,0284	0,0286	0,0015	0,0297
lab9	0,0101	0,0101	0,0103	0,0101	0,0101	0,0100	0,0094	0,0094	1,0095	0,0096	0,0095	0,0097	0,0005	0,0096
lab10	0,0578	0,0575	0,0581	0,0578	0,0578	0,0575	0,0509	0,0506	0,0506	1,0515	0,0512	0,0515	0,0027	0,0537
lab11	0,0205	0,0205	0,0208	0,0206	0,0206	0,0204	0,0186	0,0185	0,0185	0,0188	1,0187	0,0189	0,0010	0,0193
lab12	0,0081	0,0081	0,0082	0,0081	0,0081	0,0081	0,0073	0,0073	0,0073	0,0074	0,0074	1,0075	0,0004	0,0076
capit	0,2040	0,2034	0,2057	0,2041	0,2042	0,2030	0,1855	0,1846	0,1846	0,1880	0,1869	0,1884	1,0096	0,1921
land	0,0561	0,0548	0,0544	0,0563	0,0557	0,0556	0,0400	0,0390	0,0385	0,0407	0,0396	0,0390	0,0024	1,0488
Total Activities	**1,8452**	**1,8375**	**1,8419**	**1,8462**	**1,8440**	**1,8403**	**1,7141**	**1,7068**	**1,7048**	**1,7246**	**1,7160**	**1,7178**	**1,0385**	**1,7757**
% Column Total	**30,48**	**30,51**	**30,52**	**30,49**	**30,50**	**30,52**	**31,39**	**31,46**	**31,48**	**31,30**	**31,37**	**31,34**	**51,30**	**31,04**
hh1	0,8054	0,6291	0,3740	0,8169	0,6960	0,6472	0,1736	0,1712	0,1703	0,1762	0,1735	0,1733	0,0231	0,5573
hh2	0,2309	0,4077	0,1025	0,1165	0,1394	0,1824	0,0439	0,0433	0,0431	0,0445	0,0439	0,0438	0,0082	0,0784
hh3	0,1462	0,1765	0,5326	0,1366	0,2568	0,1994	0,0348	0,0343	0,0342	0,0353	0,0348	0,0348	0,0035	0,0707
hh4	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0006	0,0001
hh5	0,1427	0,1099	0,2224	0,1966	0,1601	0,2038	0,0359	0,0355	0,0353	0,0365	0,0359	0,0359	0,0068	0,1057
hh6	0,0262	0,0238	0,0966	0,0802	0,0558	0,0119	0,0100	0,0099	0,0098	0,0101	0,0100	0,0100	0,0015	0,0165
hh7	0,0209	0,0209	0,0405	0,0259	0,0632	0,1254	0,0058	0,0058	0,0057	0,0059	0,0058	0,0058	0,0007	0,0097
hh8	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0003	0,0000
hh9	0,0157	0,0155	0,0156	0,0157	0,0157	0,0156	0,0678	0,0296	0,0222	0,0913	0,0288	0,0248	0,0017	0,0755
hh10	0,0747	0,0738	0,0741	0,0748	0,0745	0,0742	0,4027	0,3491	0,2797	0,1803	0,1874	0,1746	0,0141	0,2549
hh11	0,0847	0,0840	0,0846	0,0849	0,0847	0,0842	0,3540	0,5103	0,5985	0,3357	0,4501	0,4352	0,0067	0,1789
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0004	0,0001
hh13	0,0086	0,0085	0,0085	0,0086	0,0085	0,0085	0,0367	0,0227	0,0112	0,0316	0,0190	0,0068	0,0009	0,0562
hh14	0,0511	0,0507	0,0510	0,0512	0,0511	0,0508	0,1891	0,1311	0,0992	0,3723	0,3087	0,1138	0,0060	0,1317
hh15	0,0429	0,0426	0,0429	0,0430	0,0429	0,0427	0,1826	0,1878	0,2191	0,2252	0,2394	0,4789	0,0036	0,0421
hh16	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0004	0,0001
Total Activities	**1,6504**	**1,6433**	**1,6455**	**1,6512**	**1,6490**	**1,6465**	**1,5372**	**1,5307**	**1,5287**	**1,5452**	**1,5377**	**1,5381**	**0,0784**	**1,5779**
% Column Total	**27,26**	**27,28**	**27,26**	**27,27**	**27,27**	**27,31**	**28,15**	**28,21**	**28,22**	**28,04**	**28,11**	**28,06**	**3,87**	**27,58**
ent1	0,1039	0,1036	0,1047	0,1039	0,1040	0,1033	0,0944	0,0940	0,0940	0,0957	0,0952	0,0959	0,5140	0,0978
ent2	0,0574	0,0572	0,0578	0,0574	0,0574	0,0571	0,0521	0,0519	0,0519	0,0529	0,0525	0,0530	0,2838	0,0540
Total	**6,0543**	**6,0230**	**6,0356**	**6,0547**	**6,0465**	**6,0297**	**5,4600**	**5,4258**	**5,4162**	**5,5099**	**5,4705**	**5,4811**	**2,0245**	**5,7201**

Source: author's elaboration based on Vietnam SAM, 2000.

Table A5.1: Matrix of Global Multipliers (M), Vietnam, 2000, (cont.).

	hh1	**hh2**	**hh3**	**hh4**	**hh5**	**hh6**	**hh7**	**hh8**	**hh9**	**hh10**	**hh11**	**hh12**	**hh13**	**hh14**	**hh15**	**hh16**	**ent1**	**ent2**	**Totals**
act1	0,2192	0,1976	0,2100	0,1666	0,2051	0,1863	0,2008	0,1854	0,1821	0,1490	0,1401	0,1467	0,1942	0,1612	0,1509	0,1320	0,0077	0,0183	**7,6123**
act2	0,1829	0,1496	0,1628	0,1495	0,1804	0,1361	0,1541	0,1663	0,1482	0,1199	0,1143	0,1276	0,1525	0,1262	0,1223	0,1122	0,0064	0,0146	**6,2892**
act3	0,2097	0,1938	0,1941	0,2120	0,2054	0,1782	0,2066	0,2445	0,1834	0,1512	0,1411	0,1624	0,2046	0,1626	0,1534	0,1333	0,0076	0,0181	**7,2811**
act4	0,0190	0,0176	0,0182	0,0180	0,0185	0,0162	0,0165	0,0234	0,0167	0,0150	0,0148	0,0152	0,0191	0,0157	0,0160	0,0121	0,0007	0,0017	**1,8067**
act5	0,4617	0,4409	0,4621	0,3736	0,4275	0,4284	0,4486	0,3948	0,4104	0,3485	0,3281	0,3399	0,4351	0,3782	0,3526	0,3113	0,0166	0,0411	**14,6766**
act6	0,6752	0,6623	0,6626	0,6102	0,6581	0,6000	0,6157	0,6763	0,6086	0,5984	0,5952	0,5963	0,6878	0,6252	0,6507	0,4820	0,0252	0,0659	**25,0597**
act7	0,0430	0,0446	0,0439	0,0421	0,0435	0,0437	0,0425	0,0498	0,0445	0,0478	0,0459	0,0568	0,0465	0,0526	0,0505	0,0494	0,0017	0,0049	**2,8493**
act8	0,0057	0,0057	0,0060	0,0057	0,0058	0,0059	0,0053	0,0058	0,0055	0,0053	0,0055	0,0052	0,0051	0,0055	0,0059	0,0041	0,0002	0,0006	**1,2385**
act9	0,1442	0,1405	0,1451	0,1286	0,1387	0,1379	0,1383	0,1339	0,1311	0,1200	0,1161	0,1164	0,1382	0,1261	0,1243	0,0975	0,0053	0,0136	**5,8706**
act10	0,4668	0,4737	0,5103	0,5009	0,4835	0,5275	0,4280	0,4806	0,4713	0,4587	0,4918	0,4380	0,3946	0,4715	0,5231	0,3205	0,0183	0,0493	**17,7666**
Total Activities	**2,4275**	**2,3261**	**2,4153**	**2,2073**	**2,3664**	**2,2600**	**2,2565**	**2,3608**	**2,2018**	**2,0137**	**1,9929**	**2,0046**	**2,2776**	**2,1247**	**2,1498**	**1,6543**	**0,0898**	**0,2279**	**90,4506**
% Column Total	**47,52**	**47,32**	**47,52**	**46,49**	**47,20**	**46,82**	**46,86**	**47,19**	**46,63**	**45,99**	**45,89**	**45,87**	**47,32**	**46,54**	**46,73**	**43,77**	**7,54**	**15,32**	**45,20**
lab1	0,1702	0,1575	0,1652	0,1525	0,1658	0,1522	0,1571	0,1656	0,1501	0,1308	0,1277	0,1322	0,1545	0,1388	0,1374	0,1106	0,0062	0,0152	**7,3271**
lab2	0,0344	0,0323	0,0338	0,0317	0,0338	0,0315	0,0319	0,0341	0,0309	0,0274	0,0270	0,0276	0,0314	0,0289	0,0290	0,0228	0,0013	0,0031	**2,3067**
lab3	0,0057	0,0054	0,0056	0,0053	0,0056	0,0053	0,0053	0,0057	0,0052	0,0047	0,0046	0,0047	0,0052	0,0049	0,0050	0,0038	0,0002	0,0005	**1,2198**
lab4	0,1071	0,1019	0,1063	0,1001	0,1051	0,1003	0,1004	0,1064	0,0973	0,0872	0,0862	0,0871	0,0990	0,0920	0,0926	0,0714	0,0040	0,0099	**4,9560**
lab5	0,0226	0,0217	0,0226	0,0213	0,0222	0,0214	0,0213	0,0226	0,0207	0,0186	0,0184	0,0186	0,0210	0,0196	0,0198	0,0151	0,0008	0,0021	**1,8382**
lab6	0,0047	0,0045	0,0047	0,0044	0,0046	0,0044	0,0044	0,0047	0,0043	0,0038	0,0038	0,0038	0,0043	0,0040	0,0041	0,0031	0,0002	0,0004	**1,1734**
lab7	0,1205	0,1117	0,1174	0,1081	0,1175	0,1086	0,1112	0,1168	0,1066	0,0931	0,0912	0,0938	0,1089	0,0987	0,0980	0,0781	0,0044	0,0108	**5,4208**
lab8	0,0321	0,0310	0,0325	0,0304	0,0318	0,0313	0,0298	0,0317	0,0298	0,0274	0,0277	0,0272	0,0292	0,0288	0,0297	0,0219	0,0012	0,0031	**2,2394**
lab9	0,0101	0,0100	0,0105	0,0098	0,0101	0,0103	0,0094	0,0100	0,0096	0,0092	0,0094	0,0090	0,0092	0,0096	0,0101	0,0071	0,0004	0,0010	**1,4021**
lab10	0,0582	0,0562	0,0590	0,0544	0,0573	0,0565	0,0541	0,0563	0,0538	0,0496	0,0498	0,0486	0,0532	0,0519	0,0534	0,0394	0,0022	0,0056	**3,1858**
lab11	0,0206	0,0202	0,0212	0,0195	0,0203	0,0206	0,0193	0,0200	0,0193	0,0181	0,0183	0,0176	0,0190	0,0189	0,0196	0,0141	0,0008	0,0020	**1,7822**
lab12	0,0081	0,0080	0,0084	0,0077	0,0080	0,0081	0,0076	0,0079	0,0076	0,0072	0,0072	0,0070	0,0075	0,0075	0,0078	0,0056	0,0003	0,0008	**1,3087**
capit	0,2048	0,2004	0,2092	0,1947	0,2025	0,2022	0,1915	0,2039	0,1926	0,1808	0,1817	0,1806	0,1902	0,1902	0,1954	0,1462	0,0077	0,0200	**9,3444**
land	0,0584	0,0509	0,0544	0,0462	0,0558	0,0473	0,0520	0,0515	0,0482	0,0392	0,0371	0,0399	0,0508	0,0420	0,0399	0,0355	0,0021	0,0048	**3,0197**
Total Activities	**0,8574**	**0,8115**	**0,8508**	**0,7862**	**0,8402**	**0,8002**	**0,7953**	**0,8375**	**0,7760**	**0,6971**	**0,6900**	**0,6976**	**0,7834**	**0,7359**	**0,7415**	**0,5746**	**0,0316**	**0,0795**	**46,5244**
% Column Total	**16,78**	**16,51**	**16,74**	**16,56**	**16,76**	**16,58**	**16,51**	**16,74**	**16,43**	**15,92**	**15,89**	**15,96**	**16,28**	**16,12**	**16,12**	**15,20**	**2,66**	**5,34**	**23,25**
hh1	1,2177	0,2027	0,2125	0,1964	0,2123	0,1969	0,2015	0,2119	0,1933	0,1697	0,1661	0,1707	0,1982	0,1796	0,1786	0,1422	0,0241	0,0383	**12,1489**
hh2	0,0548	1,0511	0,0535	0,0497	0,0535	0,0497	0,0507	0,0536	0,0488	0,0429	0,0420	0,0432	0,0499	0,0454	0,0452	0,0359	0,0041	0,0217	**3,9576**
hh3	0,0430	0,0403	1,0422	0,0393	0,0420	0,0393	0,0399	0,0422	0,0385	0,0340	0,0334	0,0341	0,0393	0,0359	0,0359	0,0283	0,0034	0,0065	**3,8347**
hh4	0,0001	0,0001	0,0001	1,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0012	0,0001	**1,0068**
hh5	0,0447	0,0418	0,0438	0,0406	1,0436	0,0407	0,0414	0,0437	0,0398	0,0351	0,0345	0,0353	0,0408	0,0372	0,0370	0,0293	0,0092	0,0073	**3,5085**
hh6	0,0121	0,0115	0,0120	0,0112	0,0119	1,0112	0,0113	0,0120	0,0110	0,0098	0,0096	0,0098	0,0112	0,0103	0,0103	0,0080	0,0011	0,0035	**1,6833**
hh7	0,0071	0,0067	0,0070	0,0066	0,0070	0,0066	1,0067	0,0070	0,0064	0,0057	0,0056	0,0057	0,0066	0,0060	0,0060	0,0047	0,0008	0,0009	**1,5243**
hh8	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0000	1,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0005	0,0000	**1,0030**
hh9	0,0160	0,0149	0,0157	0,0142	0,0156	0,0146	0,0147	0,0152	1,0142	0,0125	0,0123	0,0125	0,0144	0,0132	0,0132	0,0104	0,0019	0,0028	**1,8402**
hh10	0,0761	0,0710	0,0748	0,0683	0,0743	0,0696	0,0701	0,0731	0,0678	1,0599	0,0590	0,0600	0,0686	0,0633	0,0634	0,0498	0,0041	0,0426	**5,2541**
hh11	0,0859	0,0814	0,0856	0,0787	0,0842	0,0808	0,0795	0,0832	0,0779	0,0701	1,0697	0,0696	0,0779	0,0738	0,0748	0,0571	0,0045	0,0157	**6,5784**
hh12	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1,0001	0,0001	0,0001	0,0001	0,0001	0,0006	0,0001	**1,0041**
hh13	0,0088	0,0081	0,0085	0,0077	0,0085	0,0078	0,0080	0,0083	0,0077	0,0067	0,0065	0,0067	1,0079	0,0071	0,0070	0,0056	0,0010	0,0014	**1,4562**
hh14	0,0519	0,0491	0,0516	0,0473	0,0508	0,0486	0,0479	0,0499	0,0469	0,0421	0,0418	0,0418	0,0470	1,0444	0,0449	0,0344	0,0034	0,0153	**3,9826**
hh15	0,0434	0,0414	0,0435	0,0402	0,0427	0,0413	0,0403	0,0423	0,0396	0,0359	0,0358	0,0356	0,0395	0,0378	1,0384	0,0290	0,0025	0,0083	**3,9503**
hh16	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	0,0001	1,0001	0,0008	0,0001	**1,0050**
Total Activities	**1,6618**	**1,6203**	**1,6510**	**1,6004**	**1,6469**	**1,6072**	**1,6124**	**1,6428**	**1,5921**	**1,5246**	**1,5166**	**1,5253**	**1,6018**	**1,5544**	**1,5552**	**1,4350**	**0,0630**	**0,1647**	**53,7380**
% Column Total	**32,53**	**32,96**	**32,48**	**33,71**	**32,85**	**33,29**	**33,48**	**32,84**	**33,72**	**34,82**	**34,92**	**34,90**	**33,28**	**34,05**	**33,80**	**37,97**	**5,29**	**11,07**	**26,86**
ent1	0,1043	0,1020	0,1065	0,0991	0,1031	0,1030	0,0975	0,1038	0,0981	0,0920	0,0925	0,0919	0,0968	0,0969	0,0995	0,0745	1,0039	0,0102	**5,7574**
ent2	0,0576	0,0563	0,0588	0,0547	0,0569	0,0569	0,0539	0,0573	0,0542	0,0508	0,0511	0,0508	0,0535	0,0535	0,0549	0,0411	0,0022	1,0056	**3,6272**
Total	**5,1085**	**4,9163**	**5,0824**	**4,7478**	**5,0135**	**4,8273**	**4,8155**	**5,0022**	**4,7222**	**4,3782**	**4,3431**	**4,3702**	**4,8130**	**4,5654**	**4,6009**	**3,7795**	**1,1905**	**1,4880**	**200,0975**

Source: author’s elaboration based on Vietnam SAM, 2000.

Table A6.5: Decomposition of the global multiplier m_{H5F1} of matrix M

Column j (injection)	Row i (effect of injection to)	Household groups	Decomposition of multiplier m_{H1A5} of matrix M Direct-Direct Effects	Indirect-Direct Effects	Total Effect from A5	Direct-Indirect Effects	Indirect-Indirect Effects	Total Effect on Hs	Total multiplier mH1A5
A5	**H1**	hh1	0,0593	0,1539	0,2132	0,0178	0,0470	0,0647	**0,2779**
A5	**H1**	hh2	0,0023	0,0064	0,0087	0,0747	0,1945	0,2692	**0,2779**
A5	**H1**	hh3	0,0022	0,0048	0,0070	0,0748	0,1961	0,2709	**0,2779**
A5	**H1**	hh4	0,0000	0,0000	0,0000	0,0770	0,2009	0,2779	**0,2779**
A5	**H1**	hh5	0,0023	0,0051	0,0075	0,0747	0,1957	0,2705	**0,2779**
A5	**H1**	hh6	0,0007	0,0010	0,0018	0,0763	0,1998	0,2762	**0,2779**
A5	**H1**	hh7	0,0004	0,0007	0,0011	0,0767	0,2002	0,2768	**0,2779**
A5	**H1**	hh8	0,0000	0,0000	0,0000	0,0770	0,2009	0,2779	**0,2779**
A5	**H1**	hh9	0,0005	0,0021	0,0026	0,0765	0,1987	0,2753	**0,2779**
A5	**H1**	hh10	0,0021	0,0086	0,0106	0,0750	0,1923	0,2673	**0,2779**
A5	**H1**	hh11	0,0030	0,0078	0,0109	0,0740	0,1930	0,2671	**0,2779**
A5	**H1**	hh12	0,0000	0,0000	0,0000	0,0770	0,2009	0,2779	**0,2779**
A5	**H1**	hh13	0,0002	0,0013	0,0016	0,0768	0,1995	0,2763	**0,2779**
A5	**H1**	hh14	0,0021	0,0052	0,0073	0,0750	0,1957	0,2707	**0,2779**
A5	**H1**	hh15	0,0019	0,0038	0,0057	0,0752	0,1970	0,2722	**0,2779**
A5	**H1**	hh16	0,0000	0,0000	0,0000	0,0770	0,2009	0,2779	**0,2779**

Source: author's elaboration based on Vietnam SAM, 2000
Note: A5: Activity Food Processing; H1: Household Rural Male Farm-employed. H1 refers to the household types directly affected by the exogenous injection, while households in the third column refer to all household types indirectly interested by the exogenous variation

ELENCO DEI **QUADERNI DEL DIPARTIMENTO DI ECONOMIA PUBBLICA E TERRITORIALE** PUBBLICATI

n. 1/2008 Italo Magnani, *Il pubblico e il privato nella economia della città*
n. 2/2008 Italo Magnani, *Note a margine di una recente opera sull'indirizzo sociologico della scienza delle finanze italiana*
n. 3/2008 Italo Magnani, *La riforma sociale nella formazione di Nitti economista*
n. 4/2008 Marisa Bottiroli Civardi, Renata Targetti Lenti and Rosaria Vega Pansini, *Multiplier Decomposition, Poverty and Inequality in Income Distribution in a SAM Framework: The Vietnamese Case*

****

n. 1/2006 Italo Magnani, *Città. L'intreccio pubblico-privato nella formazione dell'ordine sociale spontaneo*

****

n. 1/2005 Paola Salardi, *How much of Brazilian Inequality can be explained?*
n. 2/2005 Italo Magnani, *Economisti Campani: a proposito della pubblicazione di due inediti di Carlo Antonio Broggia*
n. 3/2005 Italo Magnani, *Ricordo del Professor Giannino Parravicini*
n. 4/2005 Italo Magnani, *A proposito degli "Studi in onore di Mario Talamona"*

****

n. 1/2004 Italo Magnani, *Il "Paretaio"*
n. 2/2004 Italo Magnani, *L'economia di Luigi Einaudi: ovvero la virtù del buon senso*
n. 3/2004 Marisa Bottiroli Civardi e Enrica Chiappero Martinetti, *Povertà between and within groups: a reformulation of the FGT class of index*
n. 4/2004 Marco Missaglia, *Demand policies for long run growth: being Keynesian both in the short and in the long run?*
n. 5/2004 Andrea Zatti, *La tariffazione dei parcheggi come strumento di gestione della mobilità urbana: alcuni aspetti critici*

****

n. 1/2003 Giorgio Panella, *La gestione delle aree protette: il finanziamento dei parchi regionali*
n. 2/2003 Marco Stella, *A Ban on Child Labour: the Basu and Van's Model Applied to the Indian "Carpet-Belt" Industry*
n. 3/2003 Marco Missaglia e Paul de Boer, *Employment programs in Palesatine: food-for-work or cash-for-work?*

Ottobre, 2008