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Structural decomposition analysis, which is usually used within the input-output framework, makes it possible to break down changes in economic variables into their determinants. Structural decomposition techniques can also be applied in social accounting matrix (SAM) models, which provide a complete representation of circular flow by adding factorial income generation and household income distribution to the intersectorial transactions. In this paper, I use structural decomposition to reveal the factors that contribute to the changes in SAM multipliers over time. In particular, I analyse how modifying the patterns of intermediate demand, private consumption and factorial income distribution modifies the income generation process. I then use two social accounting matrices, one for 1990 and one for 1994, to make an empirical application for the Catalan economy. The results show fewer regional multipliers in 1994 than in 1990, and this is mainly because of a reduction in the structural coefficients of the model.

Comparing multipliers in the social accounting matrix framework

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Abstract. Structural decomposition analysis, which is usually used within the input-output framework, makes it possible to break down changes in economic variables into their determinants. Structural decomposition techniques can also be applied in social accounting matrix (SAM) models, which provide a complete representation of circular flow by adding factorial income generation and household income distribution to the intersectorial transactions. In this paper, I use structural decomposition to reveal the factors that contribute to the changes in SAM multipliers over time. In particular, I analyse how modifying the patterns of intermediate demand, private consumption and factorial income distribution modifies the income generation process. I then use two social accounting matrices, one for 1990 and one for 1994, to make an empirical application for the Catalan economy. The results show fewer regional multipliers in 1994 than in 1990, and this is mainly because of a reduction in the structural coefficients of the model.

1 Introduction

Since the pioneering contributions of Stone (1978), and Pyatt and Round (1979), social accounting matrices (SAM) have been a common instrument in economic analysis. The disaggregated nature of a social accounting matrix makes it a suitable tool for analysing the income generation process and this can help to clarify the underlying effects that contribute to expand income. The model of linear SAM multipliers, which has usually been used to make static analysis, can also be used to make comparisons over time. However, the literature on SAM-based methods hardly mentions dynamic multiplier comparisons.

For dynamic approaches, in recent decades the input-output model has primarily been used to study the factors that underlie the changes in an extensive set of variables. In fact, input-output structural decomposition has become a successful method for exploring the sources of growth in an economy. In this field, Rose and Casler (1996) presented a detailed review of the literature and Dietzenbacher and Los (1998) discussed some of the problems of empirical studies.

Structural decomposition analysis has developed two ways of dividing the multiplier differences into the changes in the structural coefficients of the input-output model. The first one, presented in Gowdy and Miller (1987), Rose and Chen (1991), and Han and Lakshmanan (1994), is based on an additive formula. The second, described in Casler and Hannon (1989), Casler and Hadlock (1997), and Oosterhaven and Van Der Linden (1997), is based on a multiplicative formula. On the other hand, structural decomposition methods have been applied to a wide variety of subjects such as international trade, energy uses, value added, technological changes and development planning issues.

The objective of this paper is to reveal the underlying causes behind the differences between two matrices of SAM multipliers. Specifically, I use structural decomposition analysis because it enables the overall multiplier differences to be divided into different parts. The main focus is to determine how changes in the components of the SAM model (intermediate demand, factorial income generation, factorial income distribution and private consumption) contribute to the final modifications in multipliers. This approach evaluates the flows of interdependences within the model separately and makes it possible to quantify their individual impacts on the overall multiplier differences. In the paper, the comparison analysis consists of an additive and a multiplicative decomposition of the overall multiplier differences. Two SAMs (one for 1990 and one for 1994) are used in the empirical application, which is for the Catalan economy.

2 Comparing matrices of SAM multipliers

The multiplier analysis starts by dividing the accounts of the social accounting matrix into two categories: endogenous and exogenous. The standard representation of the SAM model can be written as:

$$Y = [\mathrm{I} - \mathrm{A}]^{-1} X = \gamma X, \tag{1}$$

where Y is the vector of income from endogenous accounts, X is the vector of exogenous injections, I is the identity matrix and A is a square matrix of structural coefficients, calculated by dividing the transactions in the SAM by the corresponding column sum. In expression (1), $\gamma = [\mathrm{I} - \mathrm{A}]^{-1}$ is the matrix of multipliers, and the element γ_{ij} quantifies the increase in the income of account i because of a unitary and exogenous injection received by account *j*. So these elements show both the direct and indirect effects of the exogenous inflows received on the endogenous accounts.

In the traditional assumption of Stone (1978), and Pyatt and Round (1979), activities, factors of production and households are considered to be endogenous components. So, matrix A has the following structure:

$$A = \begin{bmatrix} a & 0 & c \\ v & 0 & 0 \\ 0 & w & 0 \end{bmatrix},$$

where *a* contains the input-output coefficients, *c* contains the coefficients of households' sectorial consumption, *v* contains the factors of production coefficients and *w* contains the coefficients of factorial income to consumers. Note that expression (1) is an extension of the classical input-output model, as it includes a greater set of interdependencies than those of the input-output approach. The SAM model completes the circular flow of income by capturing not only the intermediate demand relations, but also the relations between factorial income distribution and private consumption.

Our comparative analysis assumes that there are two matrices of multipliers available (γ_1 and γ_0), for different periods of time. The only restriction is that the number of accounts must be the same, so we need an identical dimension in the matrices of structural coefficients (A_1 and A_0). The multiplier differences, therefore, are equal to:

$$\Delta\gamma = \gamma_1 - \gamma_0 = [I - A_1]^{-1} - [I - A_0]^{-1}. \tag{2}$$

To analyse the differences in more detail, we decompose matrix A by separating the blocks of coefficients that show the distinct interdependencies within the model:

$$A = A^{a} + A^{c} + A^{v} + A^{w}.$$

Matrix A^{a} contains the input-output coefficients and all the other elements are zero. Similarly, A^{c} contains the consumption coefficients, A^{v} contains the coefficients of factors and A^{w} contains the coefficients of factorial income distribution (with all the other elements being zero).

The first method we use to show how every circuit of interdependence contributes to the multiplier differences consists of an additive formula. Let A_1^{a} be the initial matrix of structural coefficients in which subset *a* has been replaced by its final values. Similarly, A_1^{c}, A_1^{v} and A_1^{w} are made up of the initial coefficients and the final values of *c*, *v* and *w*, respectively. The multiplier differences can then be calculated as:

$$\begin{aligned}\Delta\gamma &= [I - A_1^{a}]^{-1} - [I - A_0]^{-1} + [I - A_1^{c}]^{-1} - [I - A_0]^{-1} + \\ &\quad + [I - A_1^{v}]^{-1} - [I - A_0]^{-1} + [I - A_1^{w}]^{-1} - [I - A_0]^{-1} = \\ &= [\gamma^{a}{}_1 - \gamma_0] + [\gamma^{c}{}_1 - \gamma_0] + [\gamma^{v}{}_1 - \gamma_0] + [\gamma^{w}{}_1 - \gamma_0].\end{aligned}$$

This expression decomposes the overall multiplier differences into the effects of changing the input-output coefficients $[\gamma^{a}{}_1 - \gamma_0]$, the consumption coefficients $[\gamma^{c}{}_1 - \gamma_0]$, the factors coefficients $[\gamma^{v}{}_1 - \gamma_0]$ and, finally, the households income coefficients $[\gamma^{w}{}_1 - \gamma_0]$. For an accurate calculation, however, the last expression requires an interaction term to be added. This is because the modifications were made to the coefficients separately but they occur simultaneously. Hence:

$$\Delta\gamma = [\gamma^{a}{}_{1} - \gamma_{0}] + [\gamma^{c}{}_{1} - \gamma_{0}] + [\gamma^{v}{}_{1} - \gamma_{0}] + [\gamma^{w}{}_{1} - \gamma_{0}] +$$
$$+ [\gamma_1 - \gamma^{a}{}_{1}] - [\gamma^{c}{}_{1} - \gamma_{0}] - [\gamma^{v}{}_{1} - \gamma_{0}] - [\gamma^{w}{}_{1} - \gamma_{0}], \qquad (3)$$

where the last four components are the interaction term that can be interpreted as an error because the other components do not complete the overall multiplier differences.

The second method for dividing the multiplier differences is based on a multiplicative decomposition. If we post-multiply both sides of $\gamma = [I - A]^{-1}$ by [I - A] and take the derivative respect to time:

$$\Delta\gamma = \gamma\ \Delta A\ \gamma.$$

In discrete time intervals, this expression does not hold and an interaction term must be added. Following Casler and Hadlock (1997), the measurements over discrete time intervals can be approximated through:

$$\Delta\gamma = \gamma\ \Delta A\ \gamma + \frac{1}{2}[\gamma\ \Delta A\ \Delta\gamma + \Delta\gamma\ \Delta A\ \gamma]. \qquad (4)$$

As matrix $\Delta\gamma$ in the interaction term is unknown, it must be sequentially replaced by its definition in (4). This procedure yields:

$$\Delta\gamma = \gamma\ \Delta A\ \gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A\ \gamma) + (\gamma\ \Delta A)^{m+1}\ \Delta\gamma]$$
$$+\frac{1}{2}\sum_{k=1}^{m}[(\gamma\ \Delta A\ \gamma)(\Delta A\ \gamma)^{k} + \Delta\gamma\ (\Delta A\ \gamma)^{m+1}] =$$
$$= \gamma\ \Delta A\ \gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A\ \gamma) + (\gamma\ \Delta A\ \gamma)(\Delta A\ \gamma)^{k}].$$

Note that $[(\gamma\ \Delta A)^{m+1}\Delta\gamma]$ and $[\Delta\gamma\ (\Delta A\ \gamma)^{m+1}]$ tend to zero for small values of *m*, so we can remove it. If we introduce the division of matrix A, it follows that:

$$\begin{aligned}\Delta\gamma = {} & \gamma\ \Delta A^{a}\gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A^{a}\ \gamma) + (\gamma\ \Delta A^{a}\ \gamma)(\Delta A\ \gamma)^{k}] + \\ & + \gamma\ \Delta A^{c}\gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A^{c}\ \gamma) + (\gamma\ \Delta A^{c}\ \gamma)(\Delta A\ \gamma)^{k}] + \\ & + \gamma\ \Delta A^{v}\gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A^{v}\ \gamma) + (\gamma\ \Delta A^{v}\ \gamma)(\Delta A\ \gamma)^{k}] + \\ & + \gamma\ \Delta A^{w}\gamma + \frac{1}{2}\sum_{k=1}^{m}[(\gamma\Delta A)^{k}(\gamma\ \Delta A^{w}\ \gamma) + (\gamma\ \Delta A^{w}\ \gamma)(\Delta A\ \gamma)^{k}]. \quad (5)\end{aligned}$$

In our empirical application, a value of *m* equal to six approaches the interaction term to zero in all the decomposed effects. Expression (5) breaks down the multiplier differences into the individual contributions of the different components captured by the SAM model.

The additive and the multiplicative decompositions (expressions (3) and (5)) will clarify the reasons for the multiplier differences. In particular, they will enable us to determine how changes in every circuit of the circular flow modify the ability of agents and institutions to create income.

3 Empirical application for the Catalan economy

This section uses two social accounting matrices for the Catalan economy (one for 1990 and one for 1994), which were built with an identical structure. Specifically, the productive system is described by seventeen accounts. We considered two categories of factors, labour and productive capital, which reflect the value added generation and its distribution throughout the economy. Households were divided into socioeconomic groups according to the activity of the head of the family (active or inactive) and the levels of income. The active groups were divided into ten categories of income and the inactive groups were divided into three. Our SAMs also included one public institution that collects taxes, requires public expenditure and transfers income to the households. The capital account describes the saving-investment of all the economic agents. Finally, the international trade was divided into three accounts: the Rest of Spain, the Rest of Europe, and the Rest of the World.

The multiplier model involves introducing 32 accounts of the SAMs endogenously. These are for the seventeen activities, the two factors of production and the thirteen households of the economy. This criterion of endogeneity, therefore, reflects the process of income generation as a circular flow between production, distribution and consumption.

Table 1 shows the multiplier differences in the two years of reference ($\Delta\gamma$). In this table, the first accounts are for the seventeen activities and the factors of production. The active households are from account 20 to account 29 and the inactive ones are from account 30 to account 32. All the consumers are ordered in increasing levels of income. Reading down the columns in table 1 shows how the effects of income on the accounts have changed because of an exogenous and unitary inflow to the account in the column. On the other hand, reading across the rows shows how the effects of income on the account in the row have changed because of an exogenous and unitary inflow to the others.

(PLACE TABLE 1 HERE)

Table 1 shows that the columns of activities generally display negative values. The reductions in multipliers were especially significant in minerals and other industries, which had negative differences in all the column values. The ability of the productive system to increase regional income therefore fell in the period of analysis. We should point out, however, the following exceptions to this general rule: energy, chemistry, food, finance, private services and public services, whose column multipliers increased between 1994 and 1990. The rows of activities also show negative differences, and this means that the ability of the productive system to increase income when the endogenous accounts receive exogenous inflows was lower in 1994. However, table 1 shows positive values in the rows of construction, commerce, transportation, private services and public services. On the other hand, the households' columns have negative effects on agriculture and industry, whereas the households' effects on energy, services and factors increased in 1994. The values in consumers' rows are negative and this means that their ability to absorb income fell in the period of analysis.

In general, most differences in table 1 are null or negative and this shows that Catalan multipliers were lower in 1994 than in 1990. Specifically, 82 elements are zero (8% of the total), 505 elements are negative (49.3%), and only the remaining 437 elements are positive (42.7%).

Table 2 summarises the results for both the additive and the multiplicative decompositions. The structural coefficients decreased by an average of -0.00074 between 1990 and 1994. However, we can see asymmetric behaviours in the individual components of the SAM model. While input-output coefficients, factors of production coefficients and income distribution coefficients decreased in 1994 (-0.00235, -0.00964 and -0.00318, respectively), private consumption coefficients increased by 0.00148. Table 2 also shows that the changes in coefficients and their contribution to regional multipliers are in the same direction. So our results show that a reduction in structural coefficients is combined with a negative effect on multipliers, and vice versa. In fact, only private consumption coefficients contributed positively to the changes in multipliers, while the other blocks in the model contributed negatively.

(PLACE TABLE 2 HERE)

An interesting finding is that there are no substantial differences between the two approaches and for both the additive and the multiplicative approaches results are similar. In summary, the conclusions of the two decompositions are parallel and this could be evidence of the robustness of our results.

In order to get deeper insight into the above results, the table below shows an overview of some changes in the Catalan economy between 1990 and

1994. During this period, the nominal GDP increased by 30.5%. For each of the components of demand, exports increased by 55.0%, private consumption increased by 34.3%, public expenditure increased by 36.2% and investment increased by 10.6%. On the other hand, imports were 53.4% higher in 1994 than in 1990, and factors of production rose by 27.1% and 32.6% respectively. From the two SAMs we can also calculate that the intermediate transactions increased by 22%.

(PLACE TABLE 3 HERE)

Table 3 suggests that aggregate regional variables behaved asymmetrically in the period of reference. While trade operations and private consumption increased significantly, intermediate transactions, wages and salaries, and investment did not increase so much. To sum up, the Catalan economy between 1990 and 1994 grew mainly because of international trade relationships, while domestic demand was less dynamic (with the exception of private consumption). As we have described above, the endogenous components of the SAM model capture the circular flow relationships in the domestic economy and leave the foreign agents in the exogenous block. The consequence of all this is that the model shows a recession in the ability of endogenous agents to create income, which leads to a reduction of regional SAM multipliers.

From our results, we can see how important it is to break down the overall multiplier differences. These changes are the result of the combination of individual effects, which are difficult to identify in the final process. All of this suggests that when we compare matrices of SAM multipliers, we must focus on the individual changes in the elements that take part in the circular flow of income.

4 Conclusions

In this paper I have used structural decomposition analysis to compare the multipliers from the social accounting matrix framework. Specifically, I have divided the overall changes in multipliers into the effects of changes in the individual circuits of income captured by the SAM model. I have empirically applied the comparison method to the Catalan economy by using two SAMs (one for 1990 and one for 1994). The results show that Catalan multipliers were smaller in 1994 than in 1990. These changes in multipliers can be explained by the negative contributions of input-output transactions, factorial income generation and income distribution to consumers.

For policy purposes it is essential to improve our knowledge about the income generation process. The context of comparison I have presented in this paper identifies several aspects that can clarify why there are differences in the income effects captured by social accounting models.

Acknowledgements

I acknowledge the institutional support of the *Ministerio de Educación y Cultura* (grants SEC2003-06630 and SEJ2004-07477), the *Generalitat de Catalunya* (grant XT2004-0095) and the *CentrA* (*Fundación Centro de*

Estudios Andaluces). I also thank three anonymous referees for their constructive comments leading to the present version.

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Table 1. Multiplier differences ($\Delta\gamma$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Agriculture	-0.053	-0.008	-0.004	-0.033	-0.008	-0.013	-0.015	-0.110	-0.019	-0.022	-0.034	-0.022	-0.046	-0.025	-0.021	-0.022	-0.029
2. Energy	0.003	0.016	-0.007	-0.105	0.029	-0.006	-0.011	0.012	-0.001	-0.014	-0.030	-0.015	-0.011	-0.030	-0.002	-0.004	-0.010
3. Metals	-0.004	-0.003	-0.038	-0.015	-0.003	-0.055	-0.031	-0.003	-0.003	-0.006	-0.014	-0.031	-0.010	-0.007	-0.004	-0.006	-0.007
4. Minerals	0.001	0.002	0.000	-0.035	0.005	0.001	0.000	0.006	0.000	0.000	-0.001	0.000	0.002	0.001	0.001	0.002	0.001
5. Chemistry	-0.021	-0.008	-0.006	-0.085	-0.029	-0.023	-0.024	-0.015	-0.026	-0.050	-0.123	-0.030	-0.030	-0.019	-0.012	-0.026	-0.038
6. Machinery	-0.001	0.003	-0.004	-0.046	0.008	-0.022	-0.029	0.004	-0.005	-0.011	-0.025	-0.053	-0.024	-0.015	-0.005	-0.008	-0.018
7. Automobiles	-0.001	0.002	-0.001	-0.012	0.001	-0.002	-0.062	0.000	-0.003	-0.004	-0.008	-0.003	-0.011	-0.007	-0.002	-0.001	-0.004
8. Food	-0.027	0.002	-0.006	-0.055	0.003	-0.014	-0.020	-0.010	-0.019	-0.023	-0.040	-0.021	-0.051	-0.027	-0.018	-0.016	-0.028
9. Textile	-0.008	0.000	-0.002	-0.032	-0.004	-0.011	-0.016	-0.006	-0.156	-0.015	-0.053	-0.011	-0.012	-0.012	-0.007	-0.008	-0.014
10. Paper	-0.002	0.001	-0.001	-0.021	0.002	-0.004	-0.005	0.001	-0.004	-0.073	-0.014	-0.007	-0.010	-0.011	-0.008	-0.021	-0.011
11. Other Industries	0.000	0.003	-0.001	-0.019	0.004	-0.006	-0.014	0.005	-0.002	-0.006	-0.049	-0.011	-0.008	-0.010	-0.001	-0.002	-0.005
12. Construction	0.004	0.008	0.000	-0.005	0.007	0.003	0.001	0.007	0.002	0.002	-0.003	0.005	0.010	0.004	0.007	0.013	0.008
13. Commerce	0.070	0.085	0.002	-0.064	0.090	0.042	0.013	0.115	0.034	0.024	-0.036	0.066	0.069	0.038	0.058	0.074	0.060
14. Transportation	0.016	0.016	0.000	-0.024	0.022	0.007	0.001	0.029	0.006	0.003	-0.009	0.011	0.014	0.003	0.010	0.012	0.010
15. Finance	0.006	0.013	-0.004	-0.059	0.029	-0.008	0.012	0.028	0.006	-0.013	-0.026	-0.052	-0.035	-0.057	-0.057	-0.019	-0.008
16. Private Services	0.026	0.061	0.000	-0.039	0.062	0.022	0.009	0.055	0.017	0.013	-0.022	0.045	0.058	0.029	0.053	0.068	0.065
17. Public Services	0.001	0.003	0.000	-0.004	0.002	0.001	-0.001	0.002	0.000	0.000	-0.003	0.002	0.002	0.001	0.002	0.003	0.002
18. Labour	0.022	0.035	0.002	-0.165	0.065	0.002	-0.102	0.036	-0.049	-0.023	-0.114	-0.012	-0.006	-0.019	-0.018	0.034	0.018
19. Capital	-0.014	0.122	-0.027	-0.194	0.058	-0.010	-0.001	0.027	-0.012	-0.049	-0.137	0.038	0.029	-0.007	0.070	0.069	0.045
20. A1	0.000	0.002	0.000	-0.005	0.001	-0.001	-0.001	0.000	-0.001	-0.001	-0.003	0.000	0.000	-0.001	0.000	0.001	0.000
21. A2	0.000	0.004	-0.001	-0.012	0.003	-0.001	-0.004	0.001	-0.003	-0.003	-0.009	-0.001	-0.001	-0.003	0.000	0.001	-0.001
22. A3	-0.001	0.007	-0.002	-0.018	0.004	-0.002	-0.005	0.001	-0.004	-0.005	-0.013	-0.001	-0.001	-0.004	0.000	0.002	-0.002
23. A4	-0.001	0.007	-0.002	-0.021	0.005	-0.002	-0.006	0.002	-0.005	-0.006	-0.015	-0.002	-0.001	-0.004	0.000	0.003	-0.002
24. A5	-0.001	0.010	-0.002	-0.026	0.006	-0.003	-0.007	0.002	-0.006	-0.007	-0.018	-0.002	-0.001	-0.005	0.001	0.004	-0.002
25. A6	-0.001	0.010	-0.002	-0.028	0.006	-0.003	-0.009	0.002	-0.007	-0.008	-0.020	-0.002	-0.002	-0.006	0.000	0.004	-0.003
26. A7	-0.001	0.009	-0.002	-0.029	0.007	-0.003	-0.010	0.002	-0.008	-0.008	-0.021	-0.003	-0.002	-0.006	-0.001	0.003	-0.003
27. A8	-0.001	0.013	-0.003	-0.037	0.009	-0.004	-0.012	0.003	-0.009	-0.010	-0.026	-0.003	-0.002	-0.007	0.000	0.005	-0.003
28. A9	-0.002	0.020	-0.005	-0.051	0.013	-0.005	-0.014	0.005	-0.011	-0.014	-0.036	-0.002	-0.001	-0.009	0.003	0.009	-0.002
29. A10	-0.003	0.038	-0.008	-0.093	0.025	-0.008	-0.025	0.011	-0.018	-0.024	-0.066	-0.001	0.000	-0.014	0.008	0.018	0.001
30. I1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31. I2	0.000	0.003	-0.001	-0.005	0.001	0.000	0.000	0.001	0.000	-0.001	-0.004	0.001	0.001	0.000	0.002	0.002	0.001
32. I3	-0.001	0.006	-0.001	-0.014	0.003	-0.001	-0.003	0.001	-0.003	-0.004	-0.010	0.000	0.000	-0.002	0.001	0.003	0.000

Table 1 (continued). Multiplier differences ($\Delta\gamma$)

	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. Agriculture	-0.027	-0.030	-0.054	-0.052	-0.041	-0.037	-0.032	-0.033	-0.029	-0.029	-0.027	-0.018	-0.082	-0.054	-0.042
2. Energy	-0.003	0.006	0.004	0.007	0.010	0.013	0.013	0.010	0.012	0.010	0.005	0.003	-0.020	-0.014	-0.010
3. Metals	-0.005	-0.005	-0.008	-0.008	-0.007	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006	-0.004	-0.009	-0.006	-0.007
4. Minerals	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.000	0.000	0.000
5. Chemistry	-0.015	-0.013	-0.024	-0.021	-0.016	-0.014	-0.012	-0.013	-0.011	-0.012	-0.014	-0.010	-0.036	-0.025	-0.024
6. Machinery	-0.008	-0.003	-0.008	-0.006	-0.002	-0.001	0.000	-0.001	0.000	0.000	-0.004	-0.003	-0.021	-0.015	-0.014
7. Automobiles	-0.005	-0.002	-0.005	-0.004	-0.002	-0.001	0.000	-0.001	-0.001	-0.001	-0.003	-0.002	-0.009	-0.007	-0.008
8. Food	-0.030	-0.023	-0.049	-0.045	-0.029	-0.023	-0.018	-0.022	-0.016	-0.017	-0.022	-0.014	-0.107	-0.073	-0.052
9. Textile	-0.011	-0.008	-0.015	-0.013	-0.009	-0.007	-0.006	-0.007	-0.006	-0.006	-0.008	-0.006	-0.026	-0.018	-0.016
10. Paper	-0.006	-0.003	-0.007	-0.006	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	-0.004	-0.003	-0.014	-0.010	-0.009
11. Other Industries	-0.004	-0.001	-0.003	-0.002	0.000	0.001	0.002	0.001	0.001	0.001	-0.001	-0.001	-0.011	-0.008	-0.007
12. Construction	0.004	0.008	0.011	0.011	0.012	0.012	0.011	0.010	0.011	0.010	0.008	0.006	0.003	0.001	0.003
13. Commerce	0.035	0.089	0.125	0.132	0.131	0.134	0.129	0.117	0.118	0.112	0.079	0.052	0.041	0.021	0.028
14. Transportation	0.004	0.013	0.016	0.017	0.018	0.019	0.019	0.017	0.017	0.016	0.011	0.008	0.005	0.002	0.002
15. Finance	-0.008	0.003	0.000	0.003	0.008	0.010	0.011	0.008	0.010	0.009	0.001	0.000	-0.025	-0.019	-0.017
16. Private Services	0.027	0.065	0.086	0.087	0.088	0.090	0.090	0.081	0.087	0.081	0.061	0.044	0.021	0.010	0.022
17. Public Services	0.001	0.004	0.004	0.005	0.005	0.005	0.006	0.005	0.007	0.005	0.004	0.003	-0.001	-0.001	0.000
18. Labour	-0.001	0.025	0.028	0.032	0.039	0.042	0.043	0.037	0.041	0.037	0.021	0.015	-0.026	-0.021	-0.013
19. Capital	0.012	0.054	0.066	0.071	0.078	0.083	0.083	0.073	0.078	0.073	0.048	0.034	-0.017	-0.017	-0.002
20. A1	-0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	-0.001	-0.001	0.000
21. A2	-0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.003	0.002	0.001	0.001	-0.003	-0.002	-0.001
22. A3	-0.005	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.002	0.001	-0.004	-0.003	-0.002
23. A4	-0.006	0.003	0.003	0.003	0.004	0.005	0.005	0.004	0.005	0.004	0.002	0.002	-0.004	-0.003	-0.002
24. A5	-0.008	0.004	0.004	0.005	0.006	0.006	0.007	0.006	0.006	0.006	0.003	0.002	-0.005	-0.004	-0.003
25. A6	-0.009	0.004	0.004	0.005	0.006	0.007	0.007	0.006	0.006	0.006	0.003	0.002	-0.006	-0.004	-0.003
26. A7	-0.010	0.004	0.004	0.004	0.006	0.006	0.007	0.006	0.006	0.006	0.003	0.002	-0.006	-0.005	-0.003
27. A8	-0.011	0.005	0.005	0.006	0.008	0.009	0.009	0.008	0.009	0.008	0.004	0.003	-0.007	-0.006	-0.004
28. A9	-0.012	0.008	0.009	0.010	0.012	0.014	0.014	0.012	0.013	0.012	0.007	0.005	-0.009	-0.007	-0.004
29. A10	-0.016	0.016	0.018	0.020	0.025	0.027	0.027	0.023	0.026	0.024	0.014	0.010	-0.015	-0.013	-0.007
30. I1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31. I2	0.000	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	-0.001	-0.001	0.000

32. I3	-0.003	0.002	0.003	0.003	0.004	0.004	0.004	0.003	0.004	0.003	0.002	0.001	-0.003	-0.002	-0.001

Table 2. Decomposition of the multiplier differences

Components of the SAM model	**Coefficients**			**Additive decomposition**		**Multiplicative decomposition**	
	Number coefficients	Average difference	Standard deviation	Average difference	Standard deviation	Average difference	Standard deviation
Input-output relations (A^a)	289	-0.00235	0.01342	-0.00240	0.01623	-0.00194	0.01699
Private consumption (A^c)	221	0.00148	0.01294	0.00768	0.01659	0.00726	0.01577
Factors of production (A^v)	34	-0.00964	0.03000	-0.00207	0.01021	-0.00208	0.01025
Factorial income distribution (A^w)	26	-0.00318	0.00468	-0.00323	0.00373	-0.00330	0.00380
Interaction term				-0.00030	0.00160	-0.00026	0.00235
Total	1024	**-0.00074**	0.01100	**-0.00032**	0.02800	**-0.00032**	0.02800

Table 3. Changes (%) in nominal GDP

GDP – Demand		**GDP – Income**	
Private consumption	34.3%	Wages and salaries	27.1%
Public expenditure	36.2%	Profits	32.6%
Investment	10.6%	Taxes production and consumption	24.0%
Exports	55.0%	Imports	53.4%
Total GDP	**30.5%**		