

Social accounting matrices and CGE models in policy analysis: Data needs and future developments

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Abstract. Sectoral policies and their impact on the economy as a whole have been a topic for research for some time. Regarding the methodology, there lack a general agreement on the suitable modelling for sector-wide approaches and the HIPC initiative. This paper assesses the suitability of social accounting matrices and CGE models to take into account the sector-specific issues at the national level. Based on recent contributions in the field, this paper creates a view of the needs to develop the models further, as well as the need to gather data needed for the analysis. The results show that there is a strong justification for the application of social accounting matrices and CGE models to policy analysis, if the data requirements are satisfied.

Keywords: social accounting matrices, computable general equilibrium models, sector-wide approaches, HIPC initiative.

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“Policy reforms are an integral and continuing feature of economic development. In recent years, many countries have accelerated the pace of reforms due to a variety of causes that include adjustment to the debt crisis and recurrent external price shocks, exhaustion of central planning as an approach to accelerated economic growth, lessons derived from the successes achieved by other countries, transitions to democracy that make poverty, equity and sustainability issues more important, significant advances in economic theory, and ideological shifts. These reforms address a staggering range of issues, from the microeconomic to the sectoral and macroeconomic levels.”

Sadoulet and de Janvry (1995), in the Preface of ‘Quantitative Development Policy Analysis’.

1. Introduction

There is hardly anything more challenging than carrying out policy-relevant up-to-date economic research. As stated by Sadoulet and de Janvry (1995), the economic conditions in developing countries have undergone a major shift over last few decades. Development assistance has taken various shapes since beginning of the 1980s, in the form of structural adjustment and stabilisation programs, as well as more recently due to a shift to sector investment programs (SIPs).

This paper deals with two new tools of aid administration or, more precisely, poverty alleviation. These tools are sector investment programs and heavily indebted poorest countries initiative (HIPC) for debt forgiveness. For each of the two instruments, no single methodology for impact assessment has been proposed. Therefore, this paper will take advantage of this shortage by exploring the usefulness of the national accounts’ based techniques in assessing the impacts. It is also established that the HIPC initiative and sector-wide approach have close interaction, since the national poverty reduction strategy must cover the sector investments too. This is because the programs aim at poverty reduction at the sector level, which should be achieved following nationally set plan for poverty alleviation.

The use of social accounting matrices and computable general equilibrium models has become a standard approach to study the developing countries from various starting points¹. However, as reviewed in this paper, the application of these techniques to sector investment programs, whether on productive or non-productive sectors², has not become a standard practise. This is perhaps because of the limited experiences gained from such programs so far, but more likely resulting from the assessment methodologies used in the main donor agencies.

This paper has been written from the perspective of developing country policy reforms, for an obvious reason. The policy reforms discussed will be applicable only in the poorest countries, which qualify for the recipients of official development assistance (ODA). This will have two important implications on the research. First, the data shortcomings are more present in the

¹ The focus of this paper is not on particular methodology presentation, which has been done in various papers in-depth, instead this paper focus on the possible ideological items that still need to be sorted out in order to achieve methodological advances. The reason is, of course, that there is need to produce relevant results which would also allow to compare different countries with one another.

² The terminology here refers to productive sectors as those contributing directly to economic activity (agriculture, energy and transport) and to nonproductive sectors as those promoting growth more indirectly through investments in people (education, health and other social sector interventions).

developing country context, which justifies the focus on data improvement. Second, developing countries are more likely to carry out large-scale reforms than developed countries, where economic structures are more established on a sound macroeconomic policy framework.

The 1990s debate on the adjustment and its impact on the poor and income distribution has simulated the discussion presented in this paper. The influential Cornell study in the 1990s concluded (Sahn et al. 1996), contrary to what was assumed at time, that adjustment in many cases did not hurt the poor. The study utilised a multi-country use of CGE models to carry out simulations of the adjustment policies impacts on the poor. As will be discussed later in this paper, the study not only applied the CGE framework to poverty-related studies, but also raised a number of important points that need to be taken into consideration when the CGE methodology is applied into policy research.

In this paper, an attempt is made to summarise the key findings so far as well as the possible future developments that are of importance when the policies are forward oriented. The paper is structured as follows. First, Chapter 2 summarises some of the debate on policy-oriented studies in developing countries, with apparent focus on macroeconomic policy changes. Following from this, Chapter 3 moves further to poverty-alleviation studies, to show the advantages of linking socio-economic data with macroeconomic data, the national accounts. In Chapter 4, some notations on the data required are given. This will form basis for the empirical application to Indonesia and planned education sector investments, presented in Chapter 5. Finally, Chapter 6 presents some concluding remarks.

2. Debate on policy-oriented economic modelling revisited

Obviously, the very debate on the use of economy-wide models to assess the policy impacts dates back to late 1970s and early 1980s, when influential works of Stone, Pyatt, Round and Thorbecke were published. These papers set the standard for later work in producing social accounting matrices (SAMs) for policy-oriented economic research. Also, the manual of Dervis, De Melo and Robinson, titled 'General Equilibrium Models for Development Policy', appeared in 1982. More work on the methodology appeared during the 1980s, with more empirical studies emerging towards the end of the decade.

Before examining the rationale for using economy-wide, national accounts based models, it is useful to capture some of the practices in the economic studies. In terms of aid volumes and related studies, two Bretton Woods institutions stand out, the World Bank and the International Monetary Fund (IMF). Modelling frameworks used by the two have focused around various optimisation approaches, leaving issues such as income distribution outside the scope of growth targets. In the context of structural adjustments, economic analyses have been carried out frequently, both by the World Bank staff and individual researchers. Not surprisingly, the evidence is mixed. In the early studies, such as Cornia et al. (1987) the adjustment was considered to produce adverse income effects, especially on the poor. However, other work by the World Bank and Sahn et al. (1996) arrived to different conclusions.

More recent studies have studied impacts of various investment schemes on developing economies, using models based on SAM and CGE frameworks. In Andersson et al. (2000) the

authors use a Walrasian type of general equilibrium model applied to Zambian data to analyse various types of investment schemes and their growth impact. This study the authors consider a prototype study in its field, since they acknowledge the difficulty in finding up-to-date and accurate data. The problems are similar to those reported in Nokkala (2001a), where the simulations of Zambian agriculture sector investment using a SAM approach were subject to number of limitations in original data. To illustrate the level of problems experienced, the Central Statistical Office (CSO) of Zambia withdrew from the project of compiling the SAM due to doubts to produce reliable data set³.

Perhaps the quote from Sadoulet and de Janvry captures nicely the very essence of the debate: “In conclusion, the construction of a disaggregated SAM is very demanding in terms of data. And, even when statistical material is available, the reconciliation of information from various sources and surveys requires considerable effort. Nevertheless, this cannot be avoided, as a consistent characterization of the inter-dependencies of economic and social system is necessary to analyze the implications of policies.” According to the authors, three sets of data are required for the SAM construction:

- Activity and commodity balances
- Disaggregation of value added
- Incomes and outlays of private institutions

The data is obtained from the national accounts or, when compiled, input-output or supply and use tables. Practices vary at country level significantly, but most of the poorest countries do not produce supply and use tables in full detail, due to the complexity of data collection. For the purposes of policy analysis, it remains a question whether the commodity balances are of most importance, with the exception of nutrition balances perhaps in the case of agricultural sector investment programs. In most cases, it could be argued that the standard input-output tables would suffice in the analyses proposed here.

3. Poverty-related policy studies

3.1 What are poverty studies all about?

Poverty, as often noted, has a habit to persist. Therefore, any measures taken to alleviate poverty must fulfil the minimum conditions of a) being sufficiently large interventions to produce the required improvement and b) being directed towards sustainable poverty alleviation goals, not only to provide temporary relief on acute poverty. From the perspective of past aid, assessment have more or less come to conclusion that aid has been effective in providing poverty alleviation, if not directly aimed at measures to alleviate poverty. More indirect measures have been used, most notably structural adjustment programs. This field of literature will not be reviewed here, because it has been discussed in other works, most notably in research by the World Bank (see, for example World Bank 2002). However, some of the useful findings will be discussed in this paper regarding the use of CGE models in poverty impact assessment.

³ The SAM was constructed by Adam and Bevan (1998).

Two recent studies on the use of SAMs and CGE models on HIPC initiative's impact assessment have emerged (Bigsten et al. 2001, Nokkala 2001b). The findings are not exactly consistent in the case of Zambia, so some consideration on the possible differences in outcomes is in order. Bigsten et al. simulate the impacts of debt relief in Zambia and Tanzania using two computable general equilibrium models. The paper sketches the necessary components needed for the analysis in the neoclassical framework to use CGE models in the analysis of the impact of the HIPC initiative.

Regarding the impact of HIPC, authors assume in both of the papers that resources, which become available due to lower debt service on the existing loans⁴ will be injected to the economy by the government. The establishment of the link between aid recipient's budgetary allocation and actual expenditures is difficult to establish, due to fungibility of aid⁵. Technically, the two main ways to utilise the increasing government expenditure, due to funds released from debt service, are reducing taxes or increasing government expenditure. As the tax base is virtually non-existent in poorest countries, the most likely assumption is to increase the government spending. This leads to another problem, noted in Bigsten et al. (2001). There is still a need to target the expenditures across sectors, as poverty reduction strategies could focus on health, education, transport or agriculture sectors, among others. Investment in human capital can produce gains in the long-run, as opposed to investments in physical capital, which can quickly increase the economic incentives.

The difference in findings between using a SAM or a CGE model can be explained by a number of factors relating to the model characteristics. First of all, the SAM framework, which is a static one, will not capture the price adjustments but only the initial shock. As the analyses were of preliminary nature, specification of targeted investments may not accurately reflect the actual outcomes following from the debt relief. In terms of the model specifications, Tanzania CGE had three sectors, whereas the Zambia CGE had 7 sectors and the Zambia SAM had 33 accounts. This of course itself leads to differences in targeting of the debt relief. Moreover, the authors have adopted somewhat different approach to injecting the funds: Bigsten et al. (2001) operate on a highly specified set of policies, whereas Nokkala (2001b) assumed a more straight-forward increase in the investment demand, which led to increases in sectoral output.

In the context of sector investment programs, no real breakthrough has been achieved, in terms of single technique to study the poverty impact. In fact, in his paper Okidegbe (1998), when discussing the economic analysis for agricultural sector investments, does not mention the use of economy-wide models⁶. In fact, apart from basically deviating from the project type of cost-benefit analysis, the methodology proposed is based on analysing survey materials etc., rather than focusing on complex economic modelling. However, part of the proposal is also to carry out multiple regressions to estimate production functions, yet this approach leaves it somewhat unclear what is to be gained in terms of poverty analysis.

⁴ The HIPC initiative is only a partial relief for any country in debt, for one reason due to loans from institutions other than those participating in the HIPC initiative.

⁵ The fungibility of aid refers to the use of aid to purposes other than originally intended. In the case of the HIPC or the sector investment programs, it would mean that some portion of the investment-targeted expenditure would shift to current expenditure, wages etc.

⁶ Most of the work at present on sector-wide approach is carried out as part of the standard aid evaluation practices, which has led to application of standard menu of tools for analysis. This, in its turn, has led to limited methodological developments in assessment.

An attempt to study the impact of agricultural sector investment programs impact on economy and poverty was provided in Nokkala (2001a). The study provides analysis of first two years of Zambian ASIP based on estimates of expenditures under the program framework. The results, which aimed to discuss the magnitude rather than the absolute impact of the program showed that the actual program expenditure, which was well below planned levels led to considerable reduction in output levels. In addition, the household income was considerably lower in the actual expenditure scenario, as opposed to other scenarios created by using the full program expenditure estimates. This would seem to suggest that equally important to targeting the funds is the need to disburse the funds in full, otherwise the targets set will not be met.

So, in a nutshell the overall goal of the poverty studies is to provide efficient means to assess poverty reduction across the sectors and between countries. As a special case of poverty impact assessment, the poverty reduction strategies, aimed at supporting debt relief in developing countries, will be reviewed in more detail in the following section.

3.2 The role of HIPC on poverty policies

The poverty reduction papers were first introduced as means to enhance the HIPC initiative in the poorest countries. Following from the lessons learned when preparing the papers, more countries were attracted to produce similar documents, with the target of having all the poorest countries to produce a strategy paper. The obvious benefit from this would be that the countries would assess their poverty and means of coping with it in a realistic framework. This would of course make it easier for the donor community as well to see what courses of action are needed in various countries, both in terms of reviewing their current involvement and in terms of future aid allocation decisions.

As noted in Bigsten et al. (2001), all poverty reduction strategy papers aim to shift more public spending towards poverty-reducing programs. These policies will aim to increase expenditures in key sectors with respect to economic development, including among others education and health. In fact, most of the sector programs in planning or implementation stages are already taking place in either of the two. The rationale for these sectors is that improvements in health conditions as well as increase in the skilled labour force are likely to foster sustainable development in the countries.

Whilst the qualifying of a country under the HIPC initiative is based on national Poverty Reduction Strategy Paper (PRSP), the components of this program should be inherited from the sector administration. As an example, country like Zambia has a number of sector investment programmes running (in agriculture, health, transport and education), which all have poverty alleviation set as the primary goal. Therefore, later work on the national poverty alleviation strategy should build on the sector level targets, supplementing them at areas (gender, environment etc.), which do not fall under any given sector. The sector framework, when used as a basis for PRSP will generally make the modelling work more simplistic, as the guidelines for expenditure allocation can be obtained from the sector investment programs, even when no prior information regarding the use of released funds is available. Examples of expenditure allocations from other case studies can be utilised in the producing scenarios of future expenditures.

4. Required improvements

4.1 Establishing the counter-factual

Research carried out can be *ex post* or *ex ante*, meaning that analysis are future-oriented (forecasting) or backwards-oriented (backcasting). In the former, the approach is to investigate the future outcomes of policies proposed. In the latter, the policies implemented are evaluated against the expected results. In any case, the question of defining the counter-factual is a critical one. By counter-factual we usually understand the situation in the absence of the proposed set of reforms, e.g., what would have happened if the policies proposed had not been implemented? In real life, there are two options: they will be executed or they will not. Because only one of the two can happen, it is impossible to observe the counterfactual in reality. Thus, we need to establish one.

Counterfactual can be constructed as a baseline scenario for forecasting exercises, which means a continuation of the existing policy framework, or, in the absence of any policy, a no policy scenario. Sadoulet and de Janvry (1995) note that calculating this base run has four purposes:

- To replicate the observed impact of the policy package is essential in order to validate the model.
- To obtain some endogenous variables which are not directly observable.
- Baseline simulation can be used to decompose the effects of endogenous variables on specific noncontrollable factors.
- Most importantly, the base run is used as a benchmark against which the impact of counterfactual scenarios is measured.

What follows from the setting up of a base run is the phase of “quantitative policy analysis” (Sadoulet and de Janvry 1995). At this stage, the research is directed to creating various policy packages that policy-makers would be looking to implement. Contrasting these with each other and the base run will give a range of possible outcomes, between which the policy-makers can make choices depending on the set goals.

The recent developments in planning and implementing sector investment programs (SIPs) focusing on, apart from their sector-specific contribution, to poverty alleviation, set new challenges to data required in SAM and CGE analyses. Although we are dealing with sector investment programs, which by definition operate within a given sector only, we are

In this paper, using the example of the existing data available for Indonesia, it is shown what types of information are needed to complement the existing data to assess the impact of an education sector investment program within the CGE framework.

There are three methods of carrying out poverty studies within the SAM framework (Thorbecke and Jung 1996), based on the multiplier decomposition⁷. The earliest, introduced by Pyatt and Round and Stone, the matrix of multipliers in the SAM was decomposed into four additive components, which indicate the ways in which the economic flows circulate in the economy. Another method, by Defourny and Thorbecke, focused on structural path

⁷ For full treatment, see Thorbecke and Jung (1996).

analysis showing the complete network through which influence goes through socio-economic system. At this point, a more appropriate measure is the one proposed in the paper, which focuses on the extent to which various production activities affect household income and, hence, poverty alleviation. Furthermore, this approach will be tested with regards to poverty impact of the Agricultural sector investment program (ASIP) in Zambia in another study by the author.

4.2 Guessing the policies right

Regarding methodological advances, the main needs are in determining how the policy impacts are dealt with. As an example, programs that run over a number of years, as is the case with sector investment programs, will be difficult to assess in the static framework for analysis. A methodology to overcome this is proposed in the connection of studying the agricultural sector investment program (ASIP) in Zambia (Nokkala 2001a). In the study, the impact was counted over two years, 1996 and 1997, and converted to single shock by deflating the expenditures to base year value. The shock was then inserted into a SAM, showing the output and income effects of the proposed policies. The obvious problem with the approach is that it does not really measure the adjustment in the economy following from the shock, because within the SAM framework prices and response elasticities are fixed. These adjust more likely with the lag, so the results obtained can be considered as the initial response.

This approach has its noted weaknesses, based on the characteristics of the data framework. First, the matrix is static. This means that the analysis cannot include the dynamics of economic adjustment, due to price and demand changes. This may not necessarily be a problem, if the analyses are carried out as per year average, deflated to the base year value, as has been done in this study. The shocks create economic changes of secondary class, not shown in the results. There are two techniques to extend the static framework: adjusting the cells of the matrix to new totals (for example using the RAS-method) or creating a dynamic system based on the SAM, such as the computable general equilibrium model (CGE). The second limitation of the SAM deals with the socio-economic classification of the households. Obviously, the more detailed the disaggregation of the household account, the more informative the results concerning the distributional aspects of the policies studied. In this study, the household account was merely used to study the difference between the study regions, and the employment effects of the changes in the level of funds. If more detailed data were available, it would be possible to carry out more in-depth analysis of the intra-regional impacts of the policy packages. (Kola and Nokkala 2002).

Regarding the usefulness of CGE models in policy analysis, the paper by de Maio et al. (1999) captures the problems as well as advantages of the CGE. They review the 'Cornell studies' of structural adjustment and its impact on the poor, results of which appeared earlier on in the World Development (Sahn et al. 1996). The paper heavily criticizes the earlier work on a number of critical points.

First of all, a CGE model is only useful in estimating policy effects if it represents a good approximation of the economy it describes. This can be verified by checking that the behavioural assumptions in the model are in line with the information available regarding the economy. Second way of doing the verification is to check whether the model and its

predictions correspond to actual developments over time, something the authors refer to as 'tracking record' (De Maio et al. 1999).

Second point in the Cornell study that falls under criticism is the use of assumed fixed coefficients, for which the authors have not given any justification. Items such as full employment at labour markets or constant elasticity of substitution in the production function do not fit the characteristics of typical African economy. Thus, unless model specification are more realistic in the assumptions, it is highly unlikely that they will present the economy they are trying to.

A number of additional points of criticism were made, which all weaken the findings of Sahn et al. (1996) in terms of the credibility of the conclusions. The policy impact subject to study (adverse income effects on poor) is considered to take place in the short-run, however the study was focusing on the medium and long-term impact assessment. This implies that a key feature of successful analysis is to get the time frame in order as well. Household classifications, as carried out in the study, do not reflect the differences between the countries but rather attempt to homogenise the countries in study. There are advantages of this, which allows for comparability between the countries, while at the same time the disadvantage is the non-representative country-specific framework. Finally, the lack of reliable data already noted in the case of other poverty studies is also of concern in this particular case. The most notable failure in this respect is the tracking over time of produced parameters.

The shortages in the Sahn et al. (1996) study can be used as a check-list for future studies, to ensure the proper treatment of poverty impact assessment. These findings and model improvements will be taken into consideration in the study of Indonesian education sector investments in the next section of the paper.

5. Application: Indonesia education sector

Note: This section of the paper will be completed hopefully by early October with results from the simulations of Indonesian education sector investment programs' impact on the economy and poverty. As it currently stands, it provides guidelines on how the assessment will be carried out and what are the lessons learned from previous studies.

5.1 Indonesia education sector investment program

Indonesia was affected negatively by the Asian financial crisis that took place in the late 1990s.

Currently there is no program running in the Indonesia education sector that would fall into the category of sector investments. The proposed investment program, in terms of its magnitude and coverage, will focus on primary education and the expenditures will be expected to be along the recent programs in other countries. The program components are currently in planning at the Asian Development Bank (ADB), which is to launch activities later on in 2002. However, since there is data available of similar exercises elsewhere, an estimate will be produced to analyse the baseline scenario versus the program expenditures in the spirit of forecasting exercise.

The purpose is to create the baseline scenario, with current level of education expenditure, contrasted with the proposed education sector investment expenditures. This data will be used to calculate the output impact and the poverty alleviation impact.

5.2 Computable General Equilibrium model for Indonesia

Indonesia has been one of the first developing countries for thorough improvement of national accounts, starting in the 1970s with heavy involvement of the Netherlands in supporting collection and compilation of national accounts data (Pyatt and Thorbecke 1976). Therefore, it is also quite natural that subsequent research has produced economic data for modelling purposes. A particular feature of constructing the Indonesian SAMs is that the government has conducted massive household surveys at frequent intervals to produce the required data for SAM construction.

The latest CGE for Indonesia is WAYANG model of the Indonesia economy (Fane and Warr 2002). The major advantage of this model in carrying out poverty analysis is that it contains ten household groups, differentiated by socio-economic characteristics. The possibilities to utilise this CGE model with additional data from the education sector will be explored in the subsequent work in order to produce the policy simulations. It is most likely that the model will require modifications to set the education sector-specific data in most appropriate use in the model, most notably to make the distinction between capital and recurrent expenditures.

5.3 Additional data needs for policy simulations

The information available will give us the resources available and some guidelines for the targeting of the expenditure within the CGE framework. Some estimates will be needed of the change in the level of funds available in the education sector, as the program is likely to generate some additional resources to the sector, whilst it also replaces old project type expenditure.

There is a need to construct a feasible set of activities that would give the opportunity to assess the economy-wide impacts of the sector investment program. This set of activities will include the following:

- Current expenditures (especially wages, which will have an impact on consumption)
- Investment in physical infrastructure (construction services)
- Training (consultation services); and
- Other items

Since the approach adopted here is that the sector-wide approach will cover both recurrent and capital expenditures, there is no need to make a distinction between the two in terms of the program size, as both types of expenditures will be disbursed under the program framework. However, they will have different channels of influence within the economy. The recurrent expenditures will mainly influence the demand side, whereas the capital expenditures will have an impact on the supply side. These need to be modelled in different ways, along the methodology proposed in Bigsten et al. (2001).

6. Conclusions

“Economic analysis of sector investment programs should use appropriate criteria – including a clear public rationale for the expenditure, motivated by a desire either to correct a market failure or to alleviate poverty. Otherwise public spending simply crowds out private supply, resulting in few net benefits to the economy.”

Suthiwart-Narueput 1998

As shown in this paper, currently the analytical framework on sector investment programs and debt relief merely sets out the indicators to observe the impacts, not the methodologies to assess the impact. In this respect, the suitability of SAM and CGE approaches to analyses of the two recent aid formats is worth exploring. Whilst the impacts of the two will take place on the sectoral level, there is a need to look at them from the macroeconomic perspective as well. The models, when based on national accounts and supplemented with sufficient sector data, to justify the use of the framework, should provide an approach suitable for both types of policy studies.

Should we feel that current level of data is sufficient to carry out the research to assess the sector investment programs' poverty impacts? It seems like the use of SAMs and CGE models would offer an appealing way of carrying out the research on poverty alleviation, using the methodology outlined in Chapter 4 to link data on poverty and the expected impacts of new policies. However, it is also with great concern that the possible shortcomings should be documented and any underlying deviations from standard practices or assumptions regarding any variables should be carefully documented and justified.

As noted by Sadoulet and de Janvry (1995), temptation to simply use CGE modelling for all purposes should be avoided. This is for two obvious reasons: From technical side, producing CGE models that capture the whole range of economic activities is not feasible, as parameters of the models need to be guessed rather than genuinely produced. The second obstacle is more policy-oriented: when the phenomena in study are microeconomic, sector-specific or purely macroeconomic, CGE models do not add to traditional econometric analysis. From the point of view of sector investment programs this does not need to be a constraining factor, as the impacts spill over the sector to other parts of the economy, thus justifying a broader framework for assessment.

It is clear that country by country the data available and possibilities to obtain missing data vary to great extent. However, we do know, based on the limited experiences regarding the impact assessment of sector policies and the HIPC initiative what constitutes the 'minimum shopping list' for researchers:

- National accounts based SAM, with possibility to extend the framework to a CGE model.
- Policy-relevant subset of data on sector-specific issues.
- Poverty profile or other data on poverty that can be linked to national accounts data.

Although consisting of merely three points, the list is far from easy to obtain in the current situation. Most of the poverty data, unless collected by central statistical body, will not most likely to be directly usable together with national accounts data. However, in this respect the introduction of poverty reduction strategy papers could be the research, by conducting studies

that would collect useful data for impact assessment purposes as well. Unfortunately, the processes are still very much driven by the multilateral development agencies, which do not fully integrate the methodologies discussed in this paper into their evaluation framework. More consensus in this regard is required to achieve additional improvements.

Obviously, regarding the case of Indonesia presented in this paper, the next step is to collect the missing data to complete the proposed exercise. Magnitude of expected results is hard to define at this point, but they are likely to show a variety of developments over a range of sectors. The results are expected to be along the lines of Jung and Thorbecke (2001) in terms of assessing the impact of education on growth and poverty. Their findings are that significant poverty alleviation can be achieved by targeting educational expenditure to poor households. This is an important aspect of education expenditure, as it has been noted that, in terms of pure economic growth, investments or income transfers to poor do not generate significant gains as opposed to more broad-based policy packages. This will be an important aspect policy-wise, when gains from the poverty alleviation can out-weight the pure economic rates of return set for the traditional project assessment.

In conclusion, the poverty-related study could be much more precisely carried out when utilising SAM and CGE framework. However, to allow for country comparisons, there is an increasing need to construct the models compatible, using similar specification for basic models and, when necessary, construct sub-models for sector-specific impact analysis. So far, individual model specifications have not been based on systematic use of certain base year data or SNA93 based input-output data, which in the long run would be the way to harmonise the datasets used.

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