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2nd Comment on "MULTIMAC IV and MULTIREG"

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1. Why Macroeconomic Input-Output Models?

Before discussing the two papers presented the question needs to be addressed why macroeconomic input-output (IO) models should be constructed and used.

The main argument is that they pay due attention to at least part of the sectoral differences existing in the economy. They need not to rely on the assumption of a single representative producer and on the hypothesis of one production function for all branches. By disaggregating the economy in some detail and by modelling the interdependencies between the various branches and groups of commodities, they extend the analytical potential of macroeconomic models considerably.

Part of the aggregation effects on macroeconomic variables is taken into account explicitly; there is no need to construct "auxiliary variables" to integrate such effects as in the case of explaining import demand in macromodels.

The sectoral disaggregation permits the analysis of structural developments and makes such models important tools to evaluate the structural implications of economic development. They are mighty instruments for scenario writing especially in the medium and long-term perspective. They are not necessarily equally ideal tools for short-term forecasting.

Shocks and political measures affecting only one group of commodities or one economic branch can be examined in a consistent manner in their effects on other goods or branches as well as on the whole economy. Kurt Kratena mentioned two nice examples which illustrate the special merits of IO based macromodels, the analysis of the effects of road pricing and the implications of an increase in investment in IT.

2. Criteria to be Met by Macroeconomic IO Models

Starting from industry and commodity detail macroeconomic IO models should have all the properties of a well elaborated macromodel. The core of the production side should be represented by the IO system. Gross production is then driven by final demand components, each of them itself represented by a structural equation system in the required commodity and industry detail.

The price model – starting from the cost structure - should capture the influence of changes in the costs of primary inputs and the interdependencies among commodity prices in the economy.

The demand model and the price model have to interact at the disaggregated level. Changes in prices should influence the volume and the composition of final demand and (more difficult to model) intermediate demands, on the other hand changes in volumes (including price dependent intermediate demands) ought to have implications on the prices.

Division of labour and the interrelationships between the various activities and commodities are not limited to the domestic market. If one wants to incorporate the "across the border interrelationships" in a similar way as the domestic ones it becomes necessary to make the national IO macromodel part of an international system of similar models. Such a link offers the capacity to evaluate effects from changes in other countries via the interrelationship of demand and price formation. Models focusing exclusively on the domestic economy tend to underestimate such implications as the larger part of repercussions works nowadays mainly through the international markets.

Although the "technical solution" is quite different, the basic problem is similar to the alternative of either estimating an isolated regional IO model or a multiregional model. The smaller the region (nation), the more important is to capture the "across the border effects" in a detailed way.

Any macroeconomic IO model has to pay attention to which extent the criteria are met on which IO analysis is based. Usually many modelling efforts are devoted to the questions whether the coefficients may be assumed stable or not. Less attention is paid to the need to have homogeneous aggregates. But lack of homogeneity in the valuation for example may do more harm to the empirical validity of the results than somewhat instable technical relations. Electricity (a really homogeneous product in the technical sense) appears in the Austrian IO table at prices which differ by the factor 1:9. The standard IO calculation assumes – if no revaluation is undertaken – that for the production of 1 unit of electricity in one industry 9 times more primary energy is requested than in the case of a delivery of 1 unit to a different branch.

Given this high relevance of homogeneity a lot of attention should be paid to find a level of aggregation which is adequate to the questions that should be addressed by the model.

Last but not least it deserves mentioning that it is by far more difficult to establish a consistent empirical foundation for an IO macromodel than for a model on the macro level.

3. Characteristics of MULTIMAC IV – A Disaggregated Econometric Model of the Austrian Economy

MULTIMAC IV is a macroeconomic IO model based on sets of behavioural equations which were estimated econometrically on the basis of Austrian data. In the good tradition of analysis carried out by the Austrian Institute for Economic Research (WIFO) it is designed in order to answer questions of relevance.

Since it was created with the intention to allow investigations, the results of which might be useful and helpful for policy makers in Austria, a lot of work was put into establishing a sound empirical basis. MULTIMAC IV is routed in the Austrian statistical system; the parameters are based on evidence derived from Austrian data, it can be seen a true Austrian model. Consequently, it does not belong to the family of Computable General Equilibrium Models, which are subject to the critique that "it is not just that the assumptions are descriptively unrealistic but that any correspondence to the real world is sacrified for the sake of analytical tractability" (BLAUG 1994, p. 131).

MULTIMAC IV consists of a demand model and a price model, although it is not quite clear how they are interlinked. As it is the case for most models of this type, some relationships are modelled in a rather simple way; on the other hand some of the modules (examples are private consumer expenditure and investment) are very well elaborated and rely on sophisticated methods.
In many respects MULTIMAC IV is a model of the type "working with what we have" (Stone, 1982). It makes use of most of the available data; the lack of statistical data quite often also appears as a limiting factor.

4. Characteristics of MULTIMAC IV – Problem Areas

MULTIMAC IV does not make an explicit distinction between commodities and industries, although the make matrices available in Austria clearly indicate that there is a considerable share of non-characteristic production.
Caused by the lack of data, not enough attention is paid to the dichotomy between domestic and national concepts. Private domestic consumption by categories for example is explained by disposable (national) income. Setting domestic and national income equal is not correct on the macro level either, but taking the numerical differences into account, perhaps tolerable. The problem is more pronounced on the level of specific commodity groups. The consumption of

services of hotels and restaurants in Austria for example is more affected by the disposable income of tourists coming to Austria than by the income of Austrians.

MULTIMAC IV is based on the IO table for 1990, although in the meanwhile tables for 1995 and 2000 have been released. The data base is thus not only out of date; a major disadvantage of the IO table for 1990 must also be seen in the fact that it was not fully compatible with national accounts. For the purpose of simplification a number of bridge matrices are kept constant although there is evidence that the structures change considerably over time.

The sectoral breakdown is not very balanced for a multipurpose model. The special emphasis put on energy related activities can however be explained by the fact that the model is meant to serve as the overall economic background for an energy specific model.

MULTIMAC IV is also a "stand alone model". As simulations with a previous Austrian model (which existed until 1995) indicated the integration of even an elementary national model into an international family is IO models is of high importance for a small country like Austria.

5. The Multi-regional Input-Output Model for Austria – Characteristics and Problem Areas

Describing the characteristics of the multiregional IO model for Austria is a very difficult task, it is almost impossible. The paper of very preliminary nature which was distributed discusses a few aspects of building such a model, but gives no general description. Even such basic information as the number of regions, the number of activities and the number of groups of commodities is missing. The transparencies used for the oral presentation – which covered most of the essential background information - were not made available in advance. Therefore, the following discussion will concentrate on the few issues raised in the paper.

The model will be based on a multiregional IO table for Austria based on and consistent with the national IO table for 2000. Consequently, a clear distinction is made between activities and commodities. This property must be seen as a major advantage.

For deriving regional structures, in some cases, use was made of special tabulation of the micro data. On the other hand the calculations for other components of the regional tables had to rely on rather simple (and often very questionable) assumptions. For deriving investment on a regional level for example the hypothesis was made that the ratio of investment by category and by industry to production in the respective industry is the same in all regions. Although the final estimate includes some "weighting effect" it is not quite clear why no use was made of data on investment by industries and regions available from the "Leistungs- und Strukturehebung" for 2000.

According to the paper it is planned to make a clear distinction between the region of production (and thus income generation) and the region of consumption. To model the flows of factor income between regions will be a real challenge. However, if a meaningful solution can be found, it will add substantially to the analytical power of the model.

The attempt not to assume stable input coefficients and fixed trade relationships between regions but instead to model both of them explicitly, is also a very promising and ambitious one. A gravity type model is used to explain changes in interregional trade relationships.

The estimation of the underlying interregional trade matrix itself was based on a sample survey. This approach has some advantages. As the authors correctly point out it allows for "cross hauling". But it is very doubtful whether a survey with a response rate of about 27 % can yield results of any empirical relevance. At the regional level and in a disaggregation by enterprises and commodity groups it is essential to have information for at least **all** the "big flows". The basic assumptions on which sampling theory rests are not given under the prevailing circumstances.

6. Data Situation for Macroeconomic IO Modelling in Austria

From both of the papers one may conclude that the availability of statistical data is the limiting factor. Quoting Cicero, public servants use to say: "Quod non est in actis, non in mundo". One could translate this statement into the language of an empirically oriented economist in the following way: "The knowledge about economic reality is limited by the availability and by the characteristics of the available statistical data." In the case of macroeconomic models and macroeconomic IO models economic reality is primarily perceived through the lenses of IO tables and national accounts.

At the end of a workshop on macroeconomic modelling in Austria, it therefore seems worthwhile to devote a few minutes to the present and future data situation in Austria.

On the one hand there are a number of very positive aspects:

- According to the European System of National Accounts ESA 1995 the compilation of IO tables is fully integrated into the system.
- Supply tables at producer prices and use tables at purchasers' prices have to be produced annually, symmetric tables and cross classifications of production accounts by industry and by sector every five years.

- Almost all the national accounts aggregates have to be provided at current and constant prices, this also applies to the annual transmission of supply and use tables.
- European legislation does not only define all the standards and concepts in very great detail, it also regulates which data in which classification has to be delivered to EUROSTAT at which date. The advantage of this situation for the user is, that he knows well in advance which data can be expected when.

Although more data and more coherent data will become available in the near future there are also some major disadvantages:

- In the European Union the compilation of statistical data is to a high degree standardised and regulated primarily with the operational role of statistical results in mind. This statement holds in particular for national accounts. Statistics is not longer primarily viewed as a scientific discipline in order to provide a well organized perception of reality, meeting the needs of empirical analysis. One example is the newly established standard to use the prices of the previous year for calculations at constant prices.
- National accounts and IO data has to be provided at the A (activity) 60 and P (product) 60 level of disaggregation, corresponding to the two digit level of NACE and CPA. The aggregates that are formed are neither homogeneous with respect to technology, nor homogeneous with respect to labour input. Branch 70 "Real estate activities" for example comprises very labour intensive service activities such as 70.31 "Real estate agencies" and activities such as 70.2 "Letting of own property" in which no or almost no labour input is required.
- Vertical integration – with all its undesired consequences for IO analysis – can also be found quite frequently. One example is activity 40 "Electricity", an industry in which both the production and the distribution of electricity are merged together. Other examples for this problem are activity 21 "Paper and paper production" and activity 20 "Production of wood and wood products".

Despite these shortcomings, the net implications for macroeconomic modelling will be very positive, if Statistics Austria can be persuaded to make the detailed material which is used internally in the process of compiling the data available to the qualified user. He or she will then find herself or himself in a position to compile a data set which is more adequate to his needs than the standard product.

Statistics Austria should also be asked to continue the calculations of national accounts at constant prices on the basis of a fixed year. This set of data, which was available for decades, is indispensable for many modelling purposes, especially in the field of constructing macroeconomic IO models. The costs are – compared to the total costs of providing national accounts – rather moderate.

Following the example of the Federal Statistical Office of Germany, Statistik Austria should be encouraged to offer special tabulations in accordance to the needs of model builders.

A much better empirical foundation of models in Austria could be achieved if the dialogue between Statistics Austria and modellers could be intensified. However, in order to make such a dialogue to a rewarding one, model builders will have to pay much more attention to the "material" they use in constructing their sophisticated models.

References

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