Pretopological Analysis on the Social Accounting Matrix for an Eighteen-Sector Economy: The Mexican Financial System*

Andrés Blancas¹ and Valentín Solís²

¹ Instituto de Investigaciones Económicas, Universidad Nacional Autónoma de México, UNAM. neria@servidor.unam.mx
² Facultad de Economía, UNAM.valentinsolis@mexico.com

Summary. This paper analyzes the structural relationships of the financial transactions represented in a Social Accounting Matrix (SAM) for the Mexican economy through a pretopological approach. Based on a simple binary relationship between incomes and expenditures of institutional accounts, the pretopology is used as a mathematical tool to get an insight into the economic structure represented by the SAM. Such an analysis can be useful to identify the set of relationships between several institutional accounts, ordered according to their influence or domination.

Key words: JEL: C00, C69, G20, N20 Key Words: Social accounting matrix, pretopology, pseudoclosure, minimal closed set.

7.1 Introduction

The broad acceptance of a SAM like a data system and a conceptual framework to capture the interdependence within a socioeconomic structure has stimulated several extensions in the economic analysis. This event can be traced in the development of the system of national accounts proposed by United Nations since 1968 and its latest revision in 1993; as well in the use of SAM data to built up economic models in a well-behaved way. For example, the computable general equilibrium (CGE) models, are based on data in the form of a SAM, of the sort proposed by [24] and elaborated by [19]. Such models are used for macroeconomic and economic policy analysis in the 1980s by [11], and in the 1990s by [26], and by [12]. From an accounting multiplier approach,[5] has stated that there might be a "structural financial vulnerability" of the economy due to the fact that the financial transactions represented

* A preliminary version of this paper was presented at the New Tools of Qualitative Analysis of Economic Dynamics Workshop, CIMAT-Guanajuato, México. September, 2002.
in a SAM data system are weakly linked. The development of techniques to evaluate the interdependence of the economy has been the main concern of [17] and [22], directing his research to unify the graph theoretic and topological tools in the context of an input-output analysis and social accounting modeling.

This paper analyzes the structural relationships of the financial transactions through a pretopological approach applied to a SAM for the Mexican economy. Based on a simple binary relationship between incomes and expenditures of institutional accounts, the pretopology is used as a mathematical tool to inquire into the economic structure represented by a SAM. Such a method maps the sequence of pseudoclosure sets that converge toward closed topological sets or elementary closed sets. This information is utilized to obtain the so-called minimal closed sets, which constitute kernels that are used to characterize interdependent homogenous parts of such structure.

Section 2 presents a SAM for an eighteen-sector economy and its relationship with the pretopological approach. Section 3 shows some pretopological concepts and a computational algorithm. Finally, section 4 points out some results derived from the pretopological analysis of a SAM framework.

7.2 The Social Accounting Matrix and the Pretopology Approach

A SAM is a double-entry bookkeeping table used to display national income and product, interindustry, flows of funds, and other combined sets of accounts. Table 1 shows a SAM for an eighteen-sector economy that displays the accounting relationships between the real and financial sides of the Mexican economy in 1990.

This SAM table is an extension of what [27] have yet developed, and it was elaborated with data from [2], [3], [9], [13], [14] and [21]. All entries of the matrix are set out in nominal terms and totals for corresponding rows and columns are the same. Note that SAM row-column identities hold only in current price terms. The rows of this SAM record incomes (receipts) and the column expenditures (payments).

This table for an eighteen-sector economy distinguishes four general accounts: 1. Production Activities, 2. Factors of Production, 3. Current Account of Institutions, and 4. Capital Account of Institutions. It contains 35 specific accounts; each row and column pair represents an account with incoming in the row and spending in the column.

The 'real side' of the economy is represented by the production activities, factor of production transactions, and current account transactions of domestic and foreign institutions, accounts 1 through 26. The real side generates saving flows and the available savings put restrictions on the changes in assets and liabilities that appear in the saving and flow of funds sections that represent the 'financial side' of the economy, accounts 27 through 34. These