Parameter Estimation of Production Functions Based on Social Accounting Matrices (SAM) in General Equilibrium (GE) Model Framework Computation

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Numerical specification of regional or economy-wide equilibrium analysis for solution of GE models crucially depends on whether calibration and estimation are performed, so to be capable of reproducing the complete benchmark data set as an equilibrium solution of the model.

Calibration, introduced by Johansen (1960), that's, estimation on a single data point (Jorgenson, 1984) doesn't cause problems. As far as the crucial parameters of the production function are concerned, these are either imputed or econometrically estimated by using cross or time series data. Along the lines suggested by Arrow *et alii* (1961), Jorgenson proposed and implemented an alternative approach to estimate the elasticities of substitution consisting of generating complete systems of demand functions for inputs in each branch, with quantities of inputs demanded as functions of prices and output. This approach would require the construction of a consistent time series of inter-branch transactions tables, that is, a consistent series of Social Accounting Matrices (SAMs), and therefore Jorgenson alternatively made resort to an econometric model based on a production function for each of the selected 35 industrial sectors in the time series data base of the United States economy.

However, predicted values from a separate econometric production system have the potential to grossly violate product balance conditions for some years of historical data, as, while the estimated parameters might provide a highly plausible description of the historical production data set, they will not be fully compatible with the general equilibrium system they are designed to represent (Arndt *et alii* (2002)).

In this paper, in the furrow drawn by the calibration and estimation approach, and based on the seeds put by the original Jorgenson's idea of SAM based parameter estimation, we suggest a new entropy based procedure with nested CES production functions in which the substitution, efficiency, and distribution parameters, and therefore the elasticities of substitution, are estimated on the basis of the data set represented by the SAM.

Key Words: General Equilibrium Models, Social Accounting Matrices, elasticities of substitution, production function