A CGE Model for Labor Migration Analysis Using Labor Micro Consistent Matrix

Topic: CGE and econometric input-output modeling I
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ABSTRACT
This paper studies the sectoral impacts of labor migration. Theoretically, labor migration increases labor supply and decreases cost of production in the host country in favor of labor-intensive sectors. Although emigrant labors will gain higher knowledge and thus may increase efficiency when come back to the origin country, migration will decrease human capital, welfare, and economic growth of the origin country. Therefore, it will diminish the activity of labor-intensive sectors in the host country. In this study, we numerically measure the impacts of different counterfactual scenarios of migration on sectoral production and welfare in Iran.

This paper employs LMGE, a multi-sector, multi-labor computable General Equilibrium model, to study the impacts of labor migration. We have distinguished between “skilled-labor” and “unskilled-labor” which may be employed in domestic labor market or abroad. Labor supply is determined endogenously by leisure decision. The Household’s optimization behavior determines the demand functions for commodities and leisure. Finally, time allocation between leisure and work determines labor supply.

The model is calibrated based on 2001 Labor Micro Consistent Matrix (L-MCM). L-MCM is a modified Social Accounting Matrix (SAM) which includes 147 commodities and 99 production activities. In L-MCM, each row portrays a market balance, and each column shows either zero profit condition or income balance condition. L-MCM shows the financial flows between all economic agents through markets or transfer payments. In L-MCM, a positive number shows value of earnings, while a negative number is value of expenditures.

Our preliminary findings suggest that although outflow of skilled labor will increase its wage, it decreases skilled labor employment in all sectors and reduces the activity level for all sectors and mainly for the agriculture sector. The initial results also indicate that unskilled labor inflow will increase unskilled labor employment in all sectors except for oil and gas sector. The food and beverage, metals, and energy sectors enjoy more from labor inflow.

APPENDIX: LMGE MODEL
LMGE provides interactions between different activities, households, and agents, through numerous markets of goods, services, and factors of production. Each household has an initial endowment of labor and capital. Household’s utility optimization determines demand for each commodity. On the other hand, producers buy labor and capital from households and produce goods and services in a cost minimization or profit maximization problem. These demand and supply functions interact in different markets. In this framework, at any price, the total value of consumer expenditure equals consumer income. A set of prices and levels of production in each sector characterize equilibrium in the model, such that market demand equals supply for all commodities.

In our model, the economy is characterized by seven different sectors including oil and gas sector, food production, agriculture, energy sector, metals sector, other manufacturing, and services. Production factors consist of skilled labor, unskilled labor, and capital. Production nests of inputs include Capital (K), Labor (L), and Intermediate Goods (M). Activities mix the production inputs in a nested Constant Elasticity of Substitution functions (NCES) and produce the commodities. The representative household has an endowment of labor and capital.

According to theories of labor economics, we assume a trade-off between consumption and leisure. That means if households need to increase consumption, they had to decrease leisure in order to raise labor supply. In LMGE, the supply of skilled labor is a function of opportunity cost of leisure, price index of composite goods, potential income, share parameters, and elasticity of substitution between leisure and consumption. Similarly, the demand for consumption composite (consumption) depends mainly on potential income, relative prices, and elasticity of substitution between leisure and consumption.

Households may supply labor to different sectors. We assume that labor is not perfectly mobile across sectors. That means the economic resources would not be reallocated completely according to new equilibrium prices and wages. It also implies that factors are not sector-specific. There is an optimization behavior to find the optimal level of labor supply to each sector. Labor owner tries to maximize the revenue from labor supply considering an elasticity of transformation across sectors as well as different sectoral wages.