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Selected Poster prepared for presentation at the 2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31- Aug. 2

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Introduction

As Blank (2008, p. 302) notes, off-farm income earned by farm household plays at least two major roles in agriculture. In a macroeconomic role, off-farm income is a neglected index of a country’s economic development. In a microeconomic role, off-farm income is one of the most important government tools available to farm households. Blank (2008, p. 153) further emphasizes: “Current, economy-wide demand for labor is the engine of ‘growth’ in American agriculture. A growing real wage is a sufficient condition for rural household income growth.” Gardner (2005) also points out that this is the dominant explanation for the catch-up of farm to urban household income levels observed over recent decades in the U.S.

Like in the U.S., off-farm income represents a high and generally increasing percentage of average farm operator household income in Taiwan. Off-farm income accounted for about 80 percent of total farm household income in 2014, the major contribution of off-farm income for farm household and rural development are too important to be ignored.

Objectives

In recent decades, the major trends of commercialization, globalization, science and technology are all ongoing and interrelated. The impacts of trade liberalization (e.g., WTO, PTA, or TPP) on Taiwan’s agriculture sector has been an important issue in policy debates. Most of the debates focus on decreases in major indicators, e.g., total output value in production agriculture sector, food security, food self-sufficiency rate and off-farm income of farm household. Almost all of them neglect or ignore those potential increases in off-farm employment and income from local economic growth with trade liberalization.

Methods SAM-based GEMTEE

In this study, we built the SAM-based GEMTEE (General Equilibrium Model for Taiwanese Economy and Environment) model—a recursive dynamic computable general equilibrium (CGE) model that depicts the economy of Taiwan and its demographic structure through time—a flexible mechanism to reflect how fertility respond to income, demographic policies, as well as demographers’ perspectives. The GEMTEE model is a CGE model derived from the Manaksh-type CGE model (Zhou and Rimmer 2002) and is calibrated to the 2006 Social Accounting Matrix of Taiwan as the benchmark.

With the funding support from the 2012-2014 sustainable research project, our team has cooperated with the Australian Bureau of Agricultural, Resources and Energy (ABARES) and established a dynamic CGE model and database. This new model is called GEMTEE (General Equilibrium Model) for Taiwan Economy and Environment where the process of population ageing and physical capital investment are treated endogenously. The major purpose of this project is to construct a dynamic computable general equilibrium (CGE) model and its database to address policy-related issues related to sustainable development including realignment of natural resources (e.g., water, land, energy) and human resource, environmental protection, and green tax reform. The sub-projects include (1) Towards an environment-economy integrated inter-regional computable general equilibrium model and database; (2) Computable general equilibrium analysis emphasizing on population growth and employment protection; (3) Social-economic impact assessment of environmental fiscal reform; (4) A Dynamic CGE model for baseline forecasting and policy simulations with emphasis on renewable energies; and (5) Evaluating the effects of climate change on water markets and potential adaptation strategies. In this paper, GEMPACK software programs to solve, indicating that the software programs, see the Harrison and Peacock (1996).

Main Result & Discussion

Simulation scenarios design

Impact of cross-strait trade liberalization on Taiwan’s average farm household income

Conclusions

Simulation results demonstrate that Taiwan’s GDP will increase by 1.78%, but total agriculture output will decrease by 0.59%. For per farm household income, although on-farm income decreases by NT$1,648, off-farm income will increase by NT$10,580. In total, per farm household income increases by NT$8,932 with cross-strait trade liberalization. With trade liberalization as the engine of growth and trade adjustment assistance (TAA) mechanism in work, economic growth in Taiwan’s agriculture may be maintained and in the long run off-farm income and employment will increase to provide a "safety net" for rural households.