

Total factor productivity in Vietnamese agriculture and its determinants

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Abstract

This research aims at providing a depth analysis of total factor productivity in Vietnamese agriculture and its determinants. Specifically, the research focuses on four major aspects: (a) measuring agricultural total factor productivity growth; (b) regional analysis of agricultural total factor productivity; (c) determinants of provincial agricultural total factor productivity levels; and (d) convergence in agricultural total factor productivity. The works on those aspects in this thesis could be considered as separate essays.

The research uses both Data Envelopment Analysis and Stochastic Frontier Analysis to measure the sources of agricultural total factor productivity growth in Vietnam, based on provincial level data in the period 1990-2006. It concludes that (a) total factor productivity had grown during the period; (b) shift of the production possibility frontier (technical change) was the major source of total factor productivity growth, while actual production moved further away from the frontier (technical efficiency reduction); (c) pure technical efficiency change was the most important reason for explaining technical efficiency reduction; and (d) there was a trend of technical efficiency diversification among provinces.

Regional analysis of total factor productivity in Vietnamese agriculture has been done in this thesis by using both global meta-frontier Malmquist index and meta-frontier Stochastic Frontier Analysis. By grouping all provinces into six regions, the thesis concludes that (a) not only gaps in agricultural production technology existed, but also these gaps widened among regions; North Midlands and Central Coast lagged further behind; (b) North provinces and Central Coast were better in exploiting their production condition efficiently, while South provinces were better in applying new production technology. The gaps in production technology among those regions were well explained by regional characteristics, especially input ratios (land per labour, tractor per labour).

By using the concept of shadow price, implicit input value share and Tornqvist total factor productivity index, a model examining determinants of provincial differences in agricultural total factor productivity level was constructed in this thesis. It concludes that Vietnam's agriculture has become relatively more capital-intensive during the period 1990-2006. The research found several important on-farm and off-farm determinants of agricultural total factor productivity such as provincial GDP per capita, credit access of agricultural household, land quality, size of agricultural population, percentage of non-farm rural population in total agricultural population, farm size, size of land plot, and land fragmentation.

This thesis also tests the productivity convergence hypothesis in Vietnam's agriculture by using both cross-section beta convergence and stochastic long-run convergence. It concludes provinces in the same regions with similar production conditions showed stronger evidence for convergence in their agricultural total factor productivity levels.

This thesis suggests several policies for improving agricultural total factor productivity, which focused on three major issues of Vietnam's agriculture: labour immobility, land consolidation and mechanization. Such policies include promoting labour mobility and resources accumulation in the agricultural sector, agricultural land consolidation, promoting agricultural credit, encouraging agricultural production technology transfer and resource mobility among provinces, developing irrigation activities and developing large scale agricultural areas.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller	PEC	Pure Technical Efficiency Change
AMS	Aggregate Measurement of Support	RREGFIT	Robust Regression Fitness Stata command
BPC	Best Practice Gap Change	SE	Scale Efficiency
BPG	Best Practice Gap	SEC	Scale Efficiency Change
DC	Developed Countries	SFA	Stochastic Frontier Analysis
DEA	Data Envelopment Analysis	SOEs	State Owned Enterprises
GSO	General Statistics Office of Vietnam	TC	Technical Change
LDC	Less Developed Countries	TE	Technical Efficiency
MARD	Ministry of Agriculture and Rural Development of Vietnam	TEC	Technical Efficiency Change
MENA	Middle East and North African countries	TFP	Total Factor Productivity
MLE	Maximum Likelihood Estimation	TGC	Technological Gap Ratio Change
MOF	Ministry of Finance of Vietnam	TGR	Technological Gap Ratio
OECD	Organization for Economic Co-operation and Development	VLSS	Vietnam Living Standard Survey
OLS	Ordinary Least Squares	VND	Vietnamese Dong
PE	Pure Technical Efficiency	WTO	World Trade Organization