

The Roles of Technical Change and Efficiency Improvement for the Agricultural and Food Economies in the EU Member Countries

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What I did in this study

How the performances in the agricultural production sector have been different by country and over time was examined by applying the Malmquist approach for the production data of the EU member countries. TFP growth was decomposed into two sources: technical change effect and efficiency improvement effect.

What I found by this study

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- Previous studies

Increase in variability in TFP growth for agriculture has been observed among existed EU15 countries as well as new EU member countries after the EU enlargement of 2004.

This increase in variability in TFP growth for agriculture might have been induced partly by the emphasis on the importance of rural development through the Pillar II type policy measures of the CAP..

What I found in the previous study

The TFP based production growth has been observed after 2004 in the food industry for the sampled new EU member countries of Czech Republic and Slovenia. The performance seems to be better than the agricultural production sector. There seems to be the cases where Pillar II type policies benefitted the rural economy.

Significance of this current study

The difference in TFP can be understood better. Whether the TFP difference is caused by the difference in technical change or difference in production efficiency was examined. A comparison was made between new member countries and old member countries.

Background

The growth in total factor productivity (TFP) is inevitable as a source of growth in agriculture and the food industry. Finding the reasons for the difference in TFP growth can give us important policy implications.

Methodology

A Malmquist type growth accounting model was used to explain the sources of TFP growth, Technical change effect and efficiency improvement effect were examined.

Data: FAO STAT, Output: Net production value measured with 2004-2006 constant USD, and Inputs such as land, labor, fertilizer, machinery and livestock

Scope: Changes in TFP (total factor productivity) contribution in output growth were examined for the data of 1995-1999, 2000-2003 and 2004-2010 for the new member countries old-EU member countries.

Malmquist Decomposition Results for the EU member Countries

		EffCh	TechCh	PECh	SECh	TFPCh
1995-1999	Old Members	1.000	1.029	1.000	1.000	1.028
	New Members	0.983	1.043	0.988	1.002	1.017
2000-2003	Old Members	1.006	1.001	0.998	1.008	1.007
	New Members	1.033	0.978	1.009	1.026	1.010
2004-2010	Old Members	0.997	1.024	1.000	1.000	1.021
	New Members	1.011	1.020	1.011	1.001	1.030

Malmquist Decomposition Results for Polish Agriculture

	EffCh	TechCh	PECh	SECh	TFPCh
1995-1999	0.997	1.027	0.993	1.007	1.022
2000-2003	1.018	0.996	1.020	0.998	1.012
2004-2010	1.028	0.992	1.020	1.007	1.014

Observations

- TFP growth has been higher in new member countries for the periods of 2000-2003 and 2004-2010.
- The TFP growth for the period of 2004-2010 for new member countries has been the highest among these three periods.

Observations

- Technical change had been more important than efficiency change in achieving TFP growth for new member countries as well as old member countries in 1995-1999 and 2004-2010.

Observations and Implications

- Technical change had been more important than efficiency change in achieving TFP growth for new member countries as well as old member countries in 1995-1999 and 2004-2010.
- Efficiency effect has been negative in old member countries for 2004-2010. There exists room for improvement.

Observations and Implications

- For Poland, TFP growth has been lower than the average of the new member countries in 2004-2010.
- Technical change effect has been negative for 2004-2010. Efforts to utilize available technology would further induce TFP growth rates in Polish agriculture.