Productivity Growth in EU agriculture: Policy Implications to Polish Agriculture

Masahiko Gemma

Waseda University, Tokyo, Japan

Mariusz Hamulczuk

Institute of Agricultural and Food Economics – NRI, Warsaw, Poland

The 2016 International Conference on competitiveness of the economy in the context of social policy measures

June 22-24, 2016

Jachranka, Poland

Problems

- Productivity is an inevitable source of sustainable development in agriculture.

- Visible differentiations exist in the changes of productivity growth rates among EU countries for the past 15 years.

- The impacts and roles of EU integration and CAP on agriculture for new member countries can be better understood in relation to changes in production performance among EU member countries.

- Roles of farmer support policies for productivity growth have not been well understood.

Objectives

- Discuss the roles of different policies for productivity growth in agriculture,

- highlight the development of TFP in the EU agriculture,

- assess whether TFP growths have been related to the levels of farm supports, and

- draw some policy implications for Polish agriculture.

Scope and significance of the study

- The agricultural production sector is chosen for growth accounting.
- A Solow type growth accounting model is used.
- New member perspectives are included,
- Supports for farmers are considered until the most recent years of the 2010s.
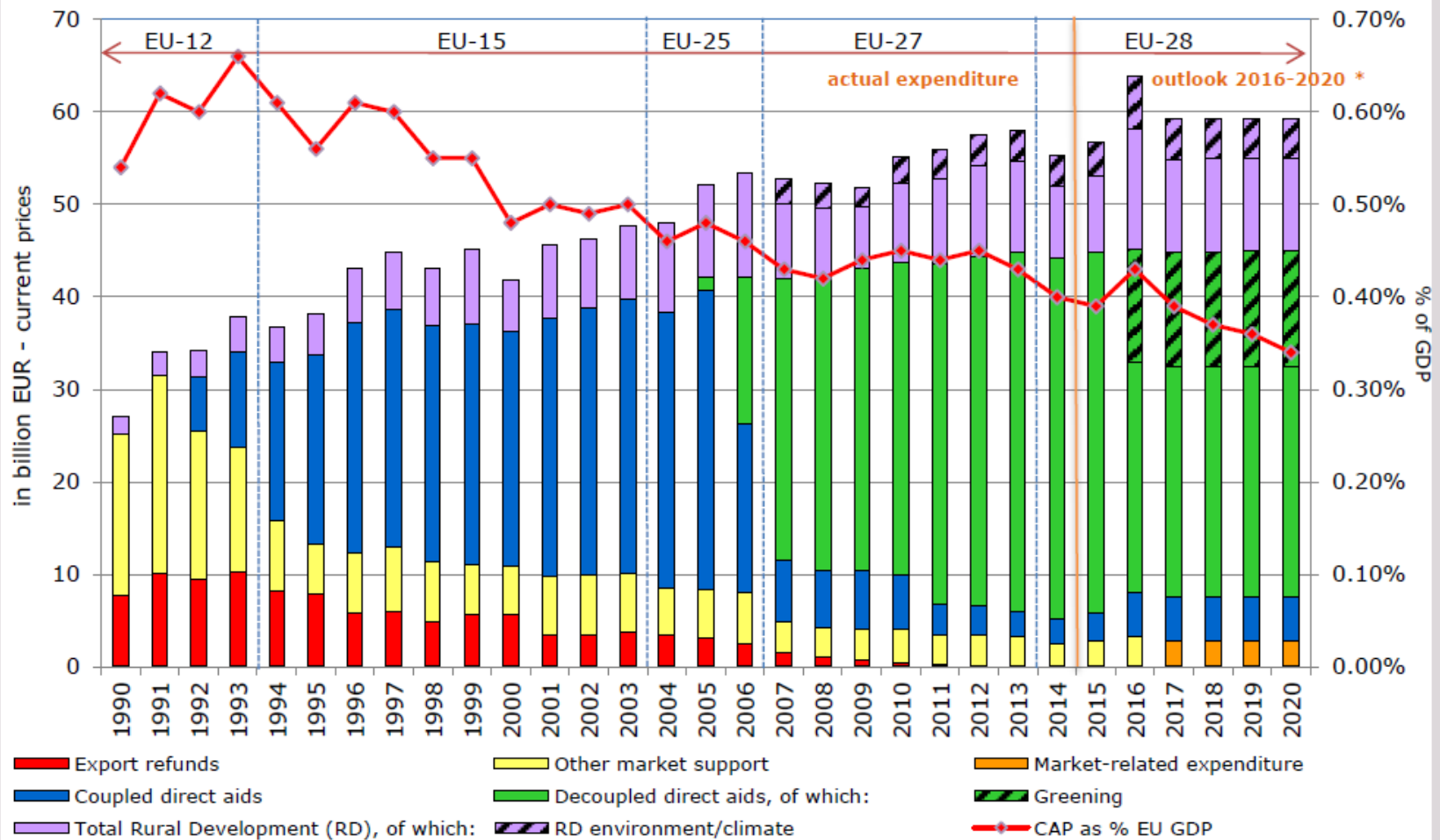- Consumer welfare aspects are argued.

Productivity growth

- Productivity is defined as y/x.
- Productivity growth is a key source for output growth.
- Productivity growth can be achieved through technological progress and production efficiency change.

Figure 2. Pathway of productivity growth
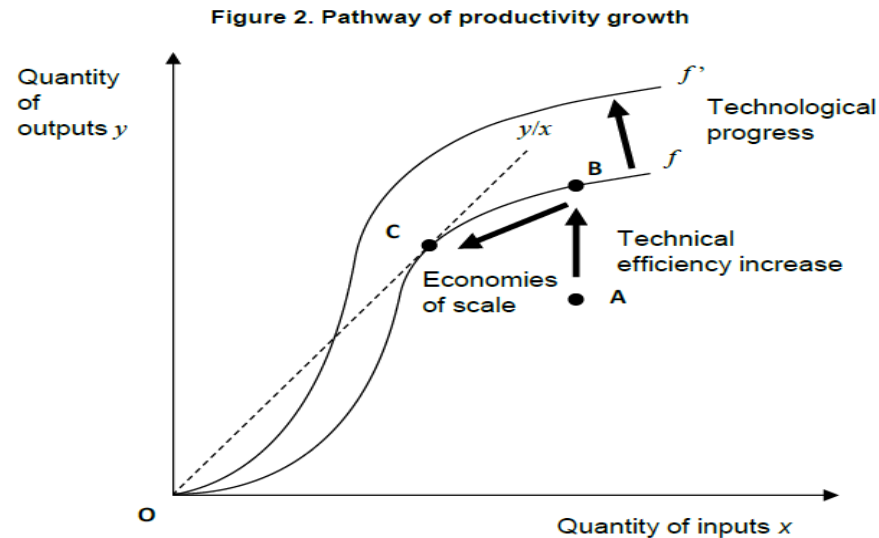
CAP evolution

CAP expenditure and CAP Reform path (current prices)

Policy impacts on Productivity – Literature review

- Most of theoretical studies suggest that subsidies may have a positive impact on farm production and at the same time a negative impact on farm productivity.

- Empirical literature discoveries mixed effects of subsidizing on farm productivity (hovever mostly negative).

- LATRUFFE, GUYOMARD, LE MOUËL (2009) - there is a strong significant negative relationship between managerial efficiency and CAP direct payments.

Policy impacts on Productivity – Literature review

- The impact studies of decoupled payments on farm outcomes for the U.S. agriculture produced the observations that the decoupled programs distorted the producer behaviors.

- The coupled programs did not improve production efficiency and productivity in EU agriculture.

Policy impacts on Productivity – Literature review

- KAZUKAUSKAS, NEWMAN & SAUER (2011), RIZOV, POKRIVCAK & CIAIAN (2013) - suggest that the decoupled payments are less distortive and enhance productivity in comparison to coupled payments.(The specialization along with decoupling policy resulted in improvement in productivity in the farm level for the sample farms in Ireland, Denmark and Germany KAZUKAUSKAS, NEWMAN and SAUER (2011).)

Policy impacts on Productivity – Literature review

- Mixed results we found for the relationship between producer support policies and agricultural productivity in the literature, dependent upon programs, timings of implementation, and economies under consideration.

- Many studies discuss the impact of farm supports on agricultural productivity. Not many discuss the impact of TFP on farm income and the gains of consumers.

Productivity measure

- TFP – indexes, based on Solow type growth accounting model:

$$Y = A(t) \, F \, (N, L, M, F, S)$$

$$\frac{Y2 - Y1}{Y1} * 100 = \frac{A2 - A1}{A1} * 100 + W_L \frac{L2 - L1}{L1} * 100 + W_N \frac{N2 - N1}{N1} * 100$$

$$+ W_F \frac{F2 - F1}{F1} * 100 + W_M \frac{M2 - M1}{M1} * 100 + W_S \frac{S2 - S1}{S1} * 100$$

Where:

1 – Base Year, 2 – Current Year,

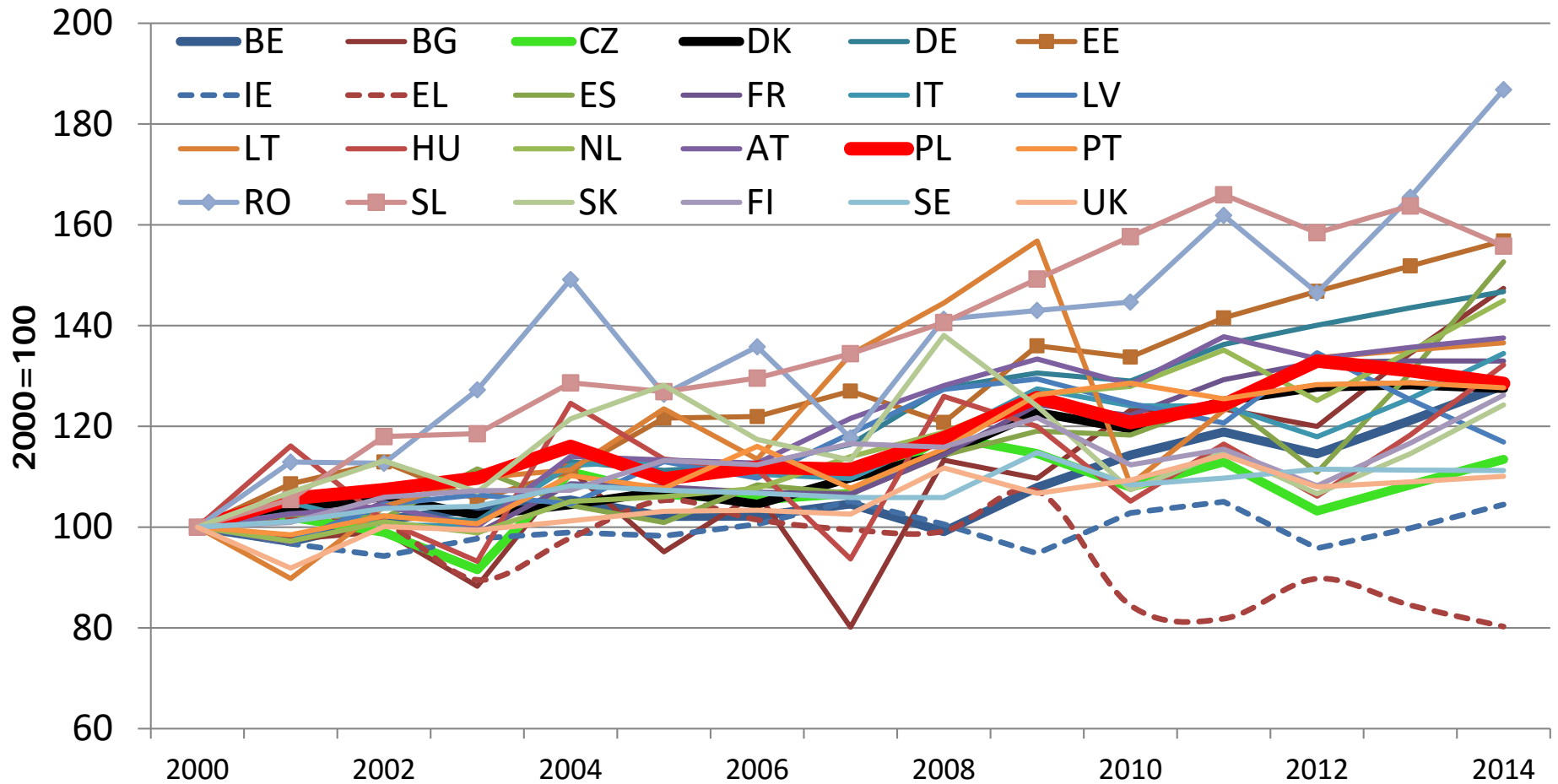Y – Output (Net production value, 2004-2006 int. USD, PPP adj.),

N - Land, L -Labor, F -Fertilizer, M –Machinery, S – Livestock A(t): Total Factor Productivity (TFP, technological change, residuals), W – weights on inputs.
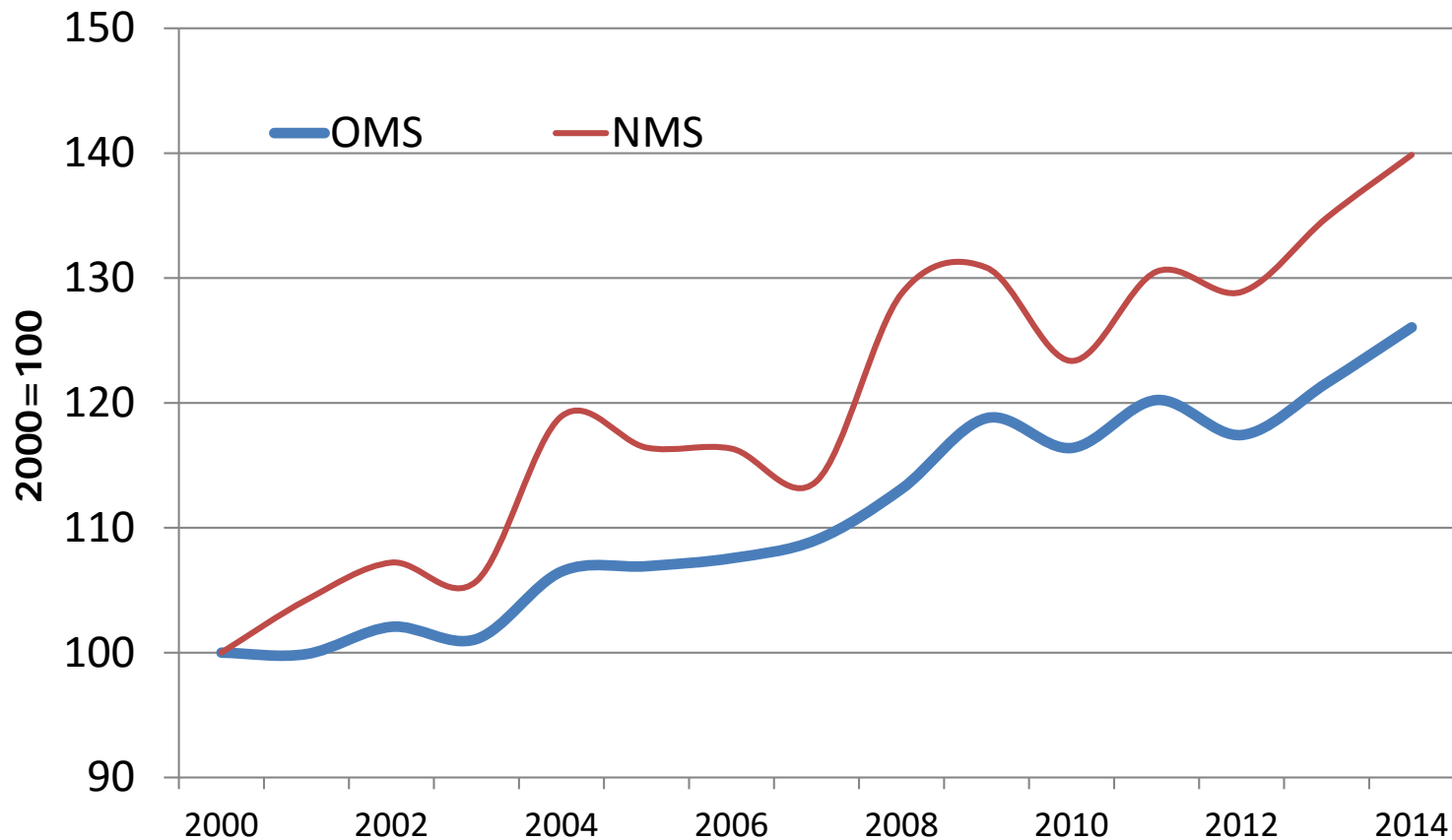
- Data: 2000-2014 for 24 EU countries, FAOSTAT

TFP indexes
for selected countries

Legend: BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, IT, LV, LT, HU, NL, AT, PL, PT, RO, SL, SK, FI, SE, UK

Y-axis: 2000=100 (60 to 200)

X-axis: 2000 to 2014

- **Volatile TFP growths**
- **Highly diversified TFP growths**
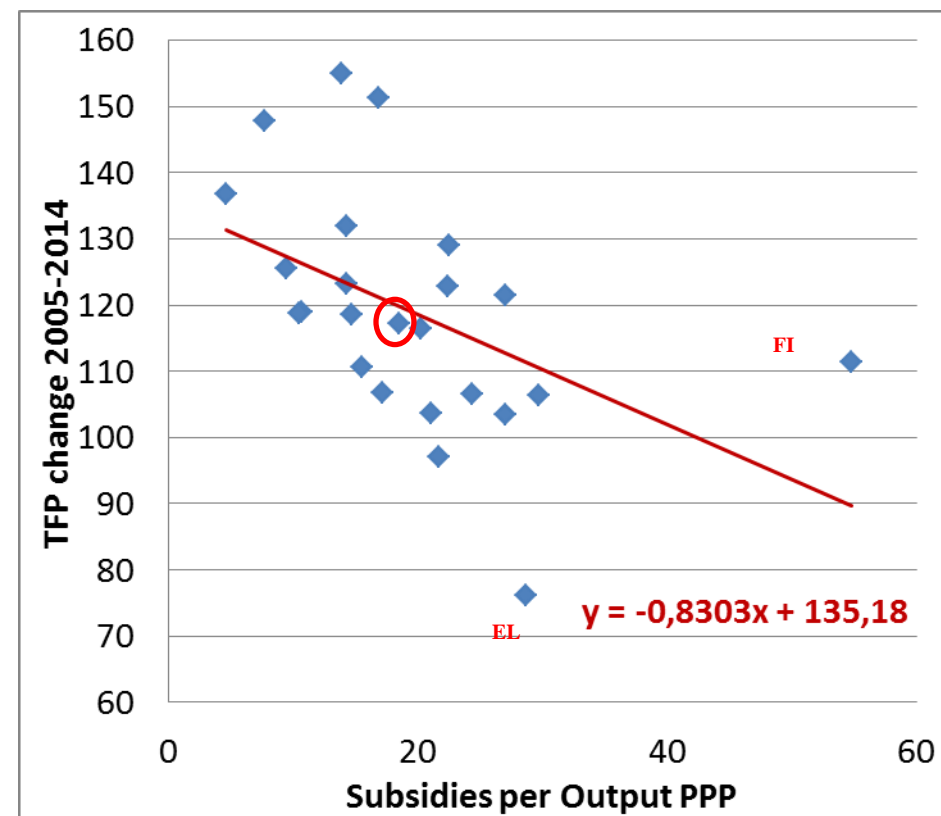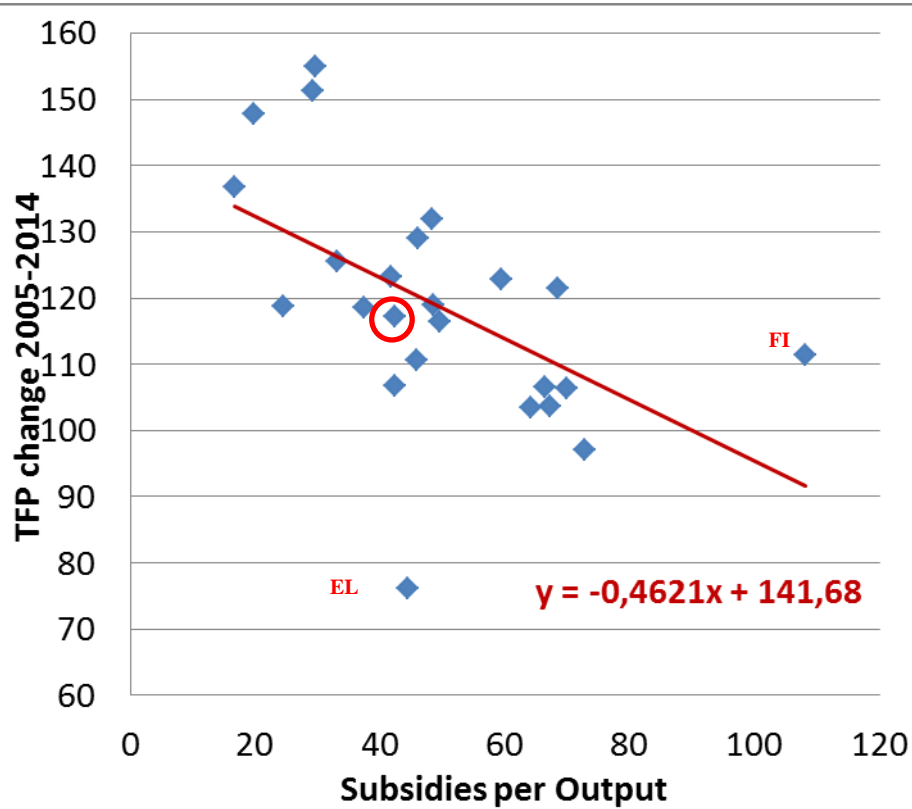
TFP indexes
for selected countries

- **Higher TPF growth in NMS – (convergence)**
- **Correlations observed in TFP changes between two groups**

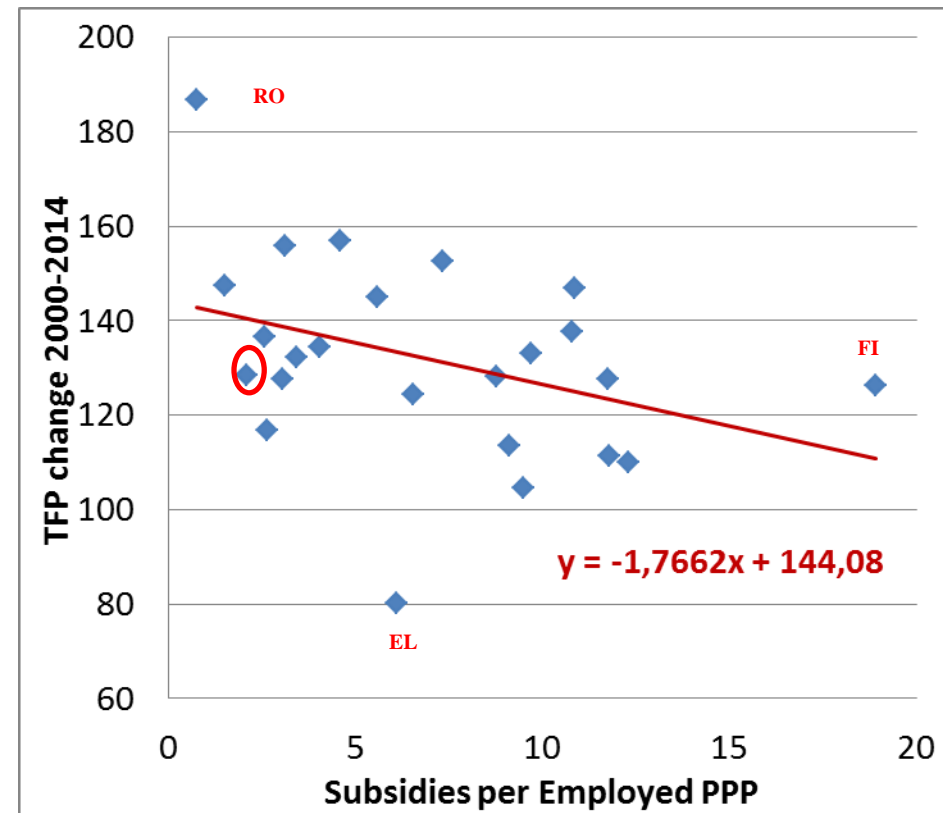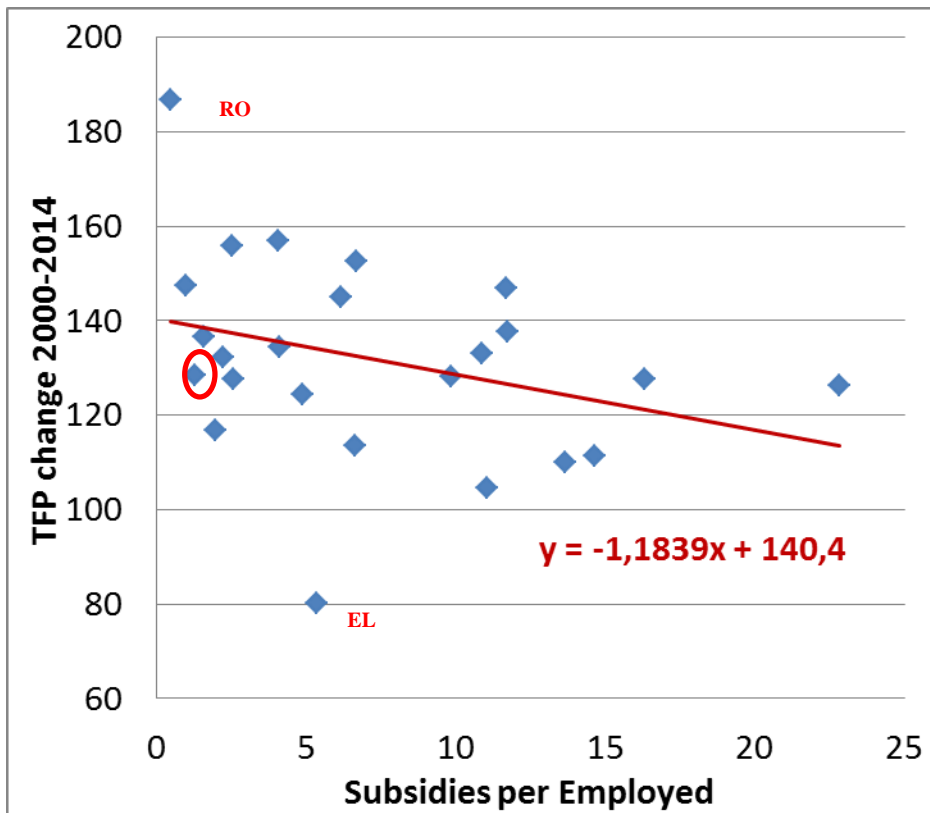# Income support in relation to Output vs TFP (2000-2014)
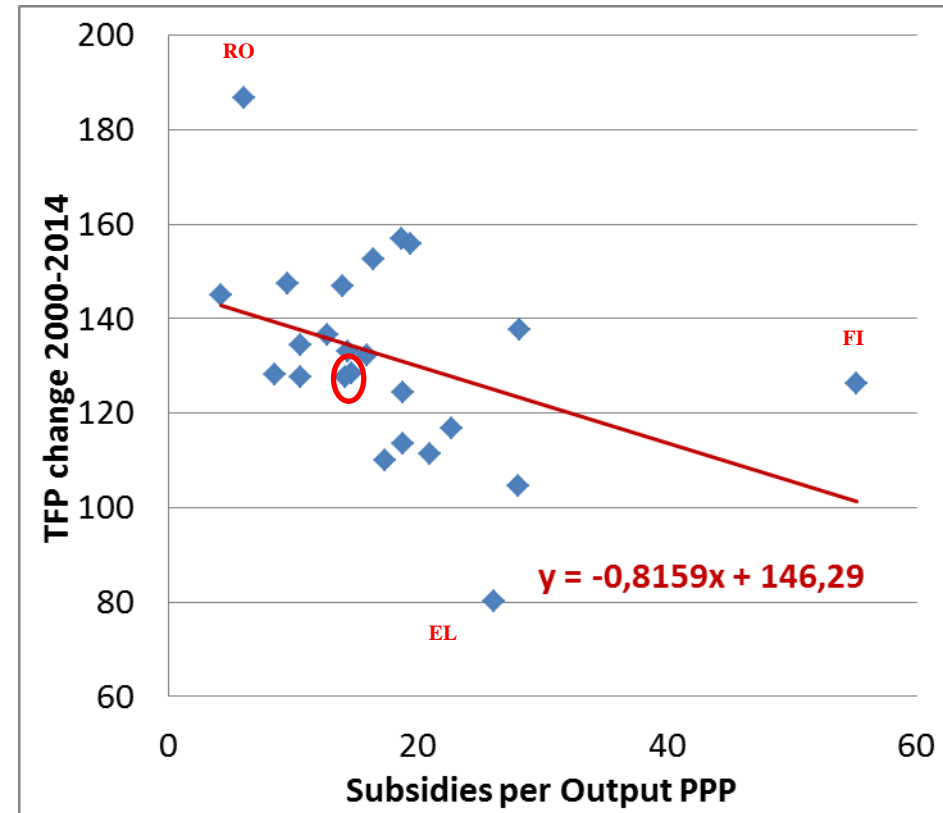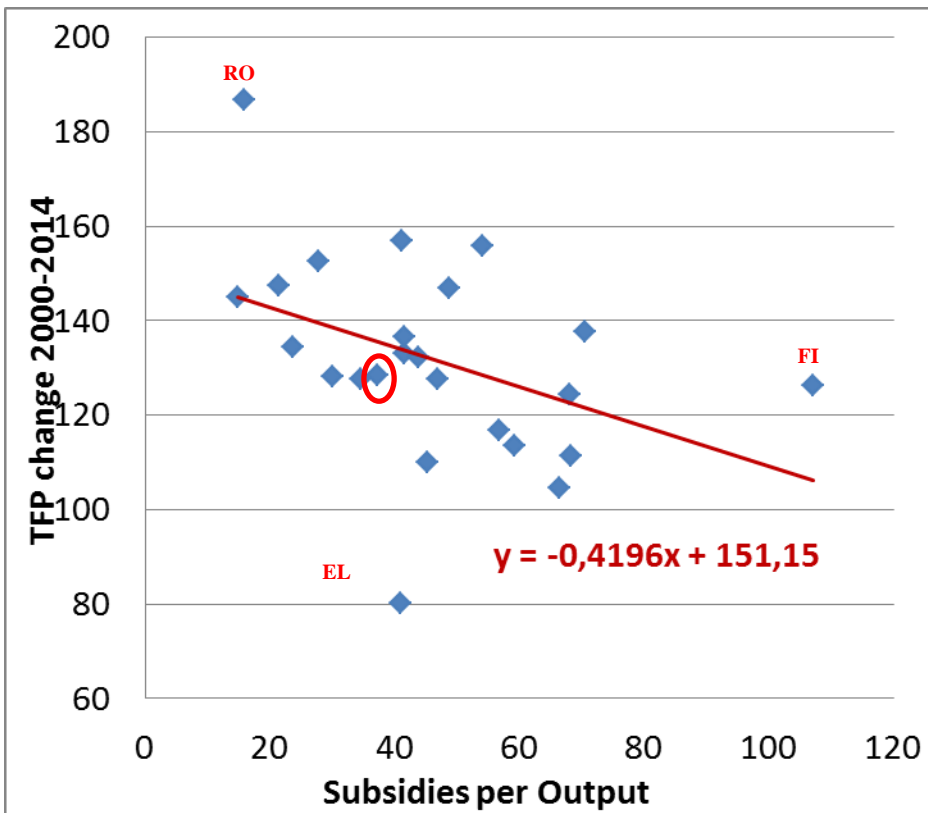
- A negative correlation between TFP change and average subsidies per output
- Statistically significant relationship

# Income support in relation to Output vs TFP (2005-2014)

- **A negative correlation between TFP change and average subsidies per output**
- **Statistically significant relationship**

Income support per employed vs TFP (2000-2014)

$$y = -1,1839x + 140,4$$

$$y = -1,7662x + 144,08$$

- A negative correlation, but statistically not significant relationship

Income support per employed vs TFP (2005-2014)

$$y = -0{,}6014x + 123{,}97$$

$$y = -1{,}0171x + 127{,}36$$

- A negative correlation, but statistically not significant relationship
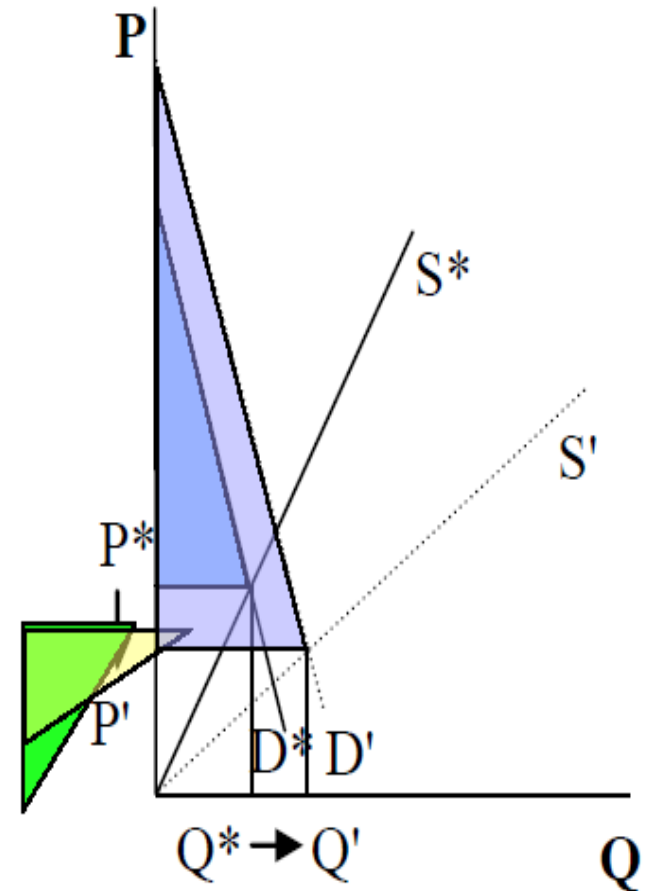
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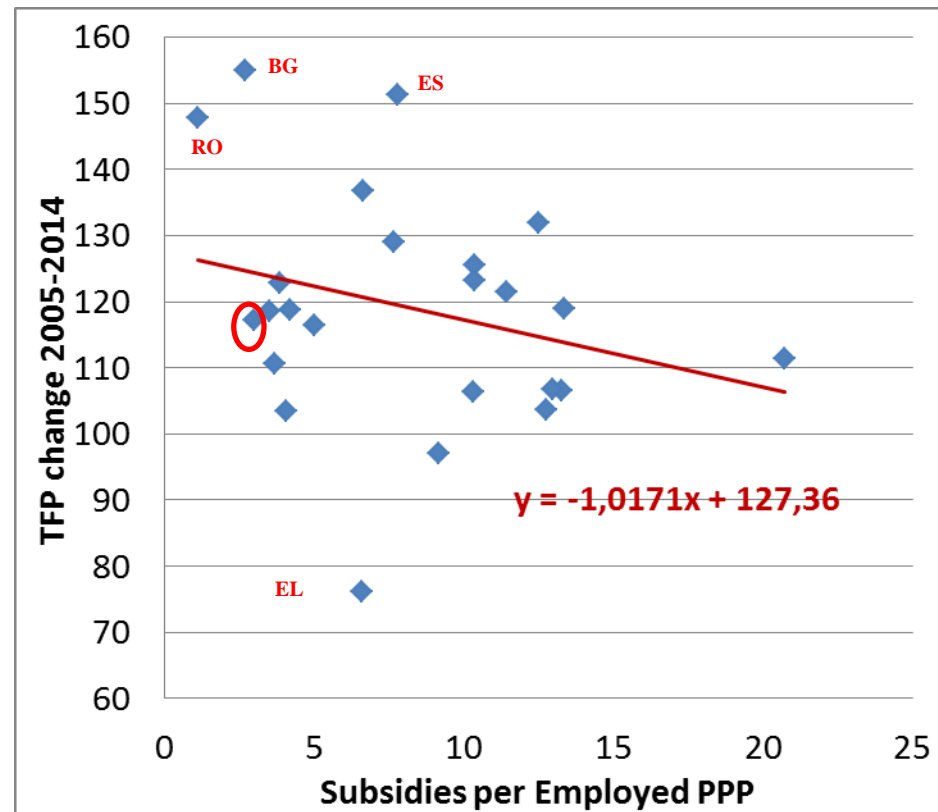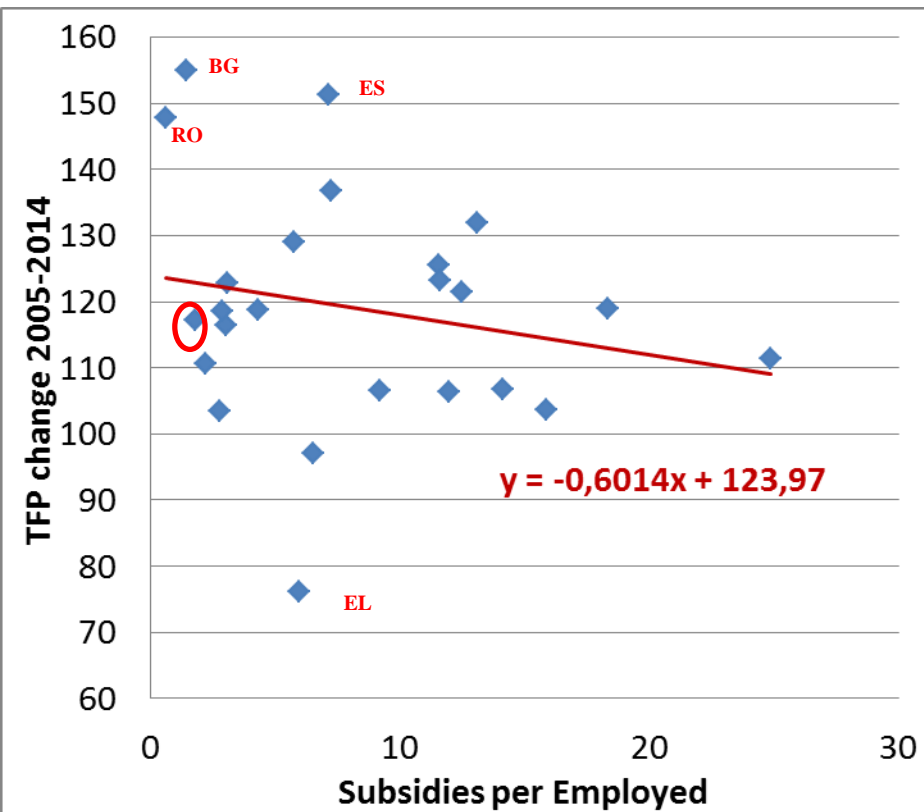
Conclusions and implications

- Economic theory suggests several possible mechanisms through which farm payments might influence the efficiency and structural change in agriculture.

- TFP growths in the analysed period were highly volatile and diversyfied amog EU countries.

- TFP growth rate was higer in NMS than OMS – (convergence was observed.)

- Performed analysis indicates that TFP growth is higher in less supported countries.

- Farm support policies might not be effective for productivity growth in agriculture.

- Future work involves:

- Application of panel data and models, and

- Micro level analysis based on FADN data to examine the real reactions of individual agricultural producers for a specific country such as Poland.

Further discussions

If demand is inelastic, typically the case for agricultural and food products, the shift in supply, created by productivity growth, will decrease producer surplus and increase consumer surplus. Most benefits of productivity growth go to the hands of consumers. For social welfare, the sum of producer surplus and consumer surplus, we observe a gain. <u>The relationship between productivity growth and farm income will need to be studied. This approach will be useful to understand the effectiveness of structural and modernization policies.</u>

<u>The story will be different if we can promote agricultural and food products with elastic demand</u>. Policies to differentiate products, such as geographical indication (GI) certification programs, can induce gains to producers in response to productivity growth.

Thank you for your attention