

# Productivity growth in agriculture among EU member countries: implications for the future CAP policies of rural development

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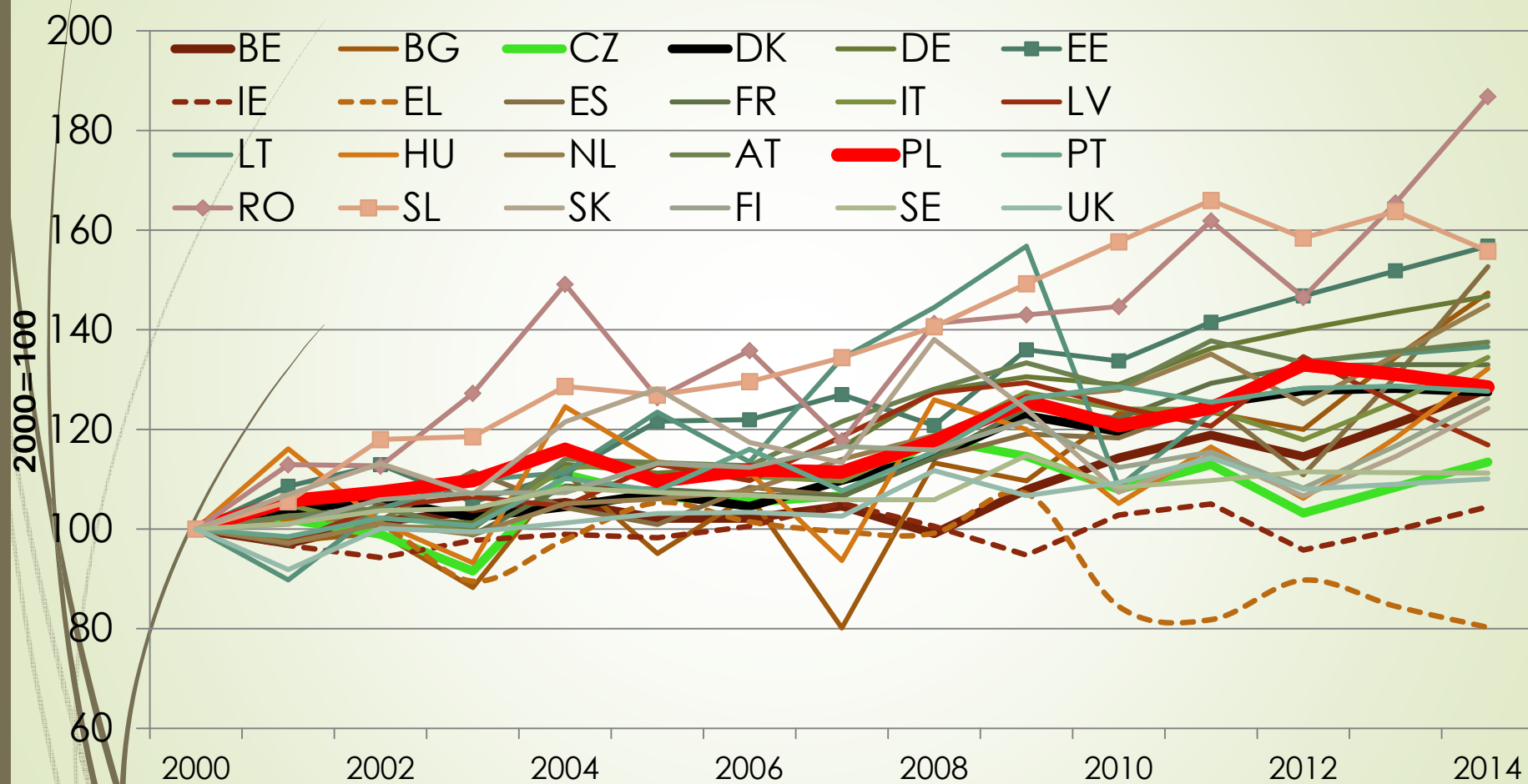
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## **Empirical evidences from the case studies of the CAP in the European Union after 2000**

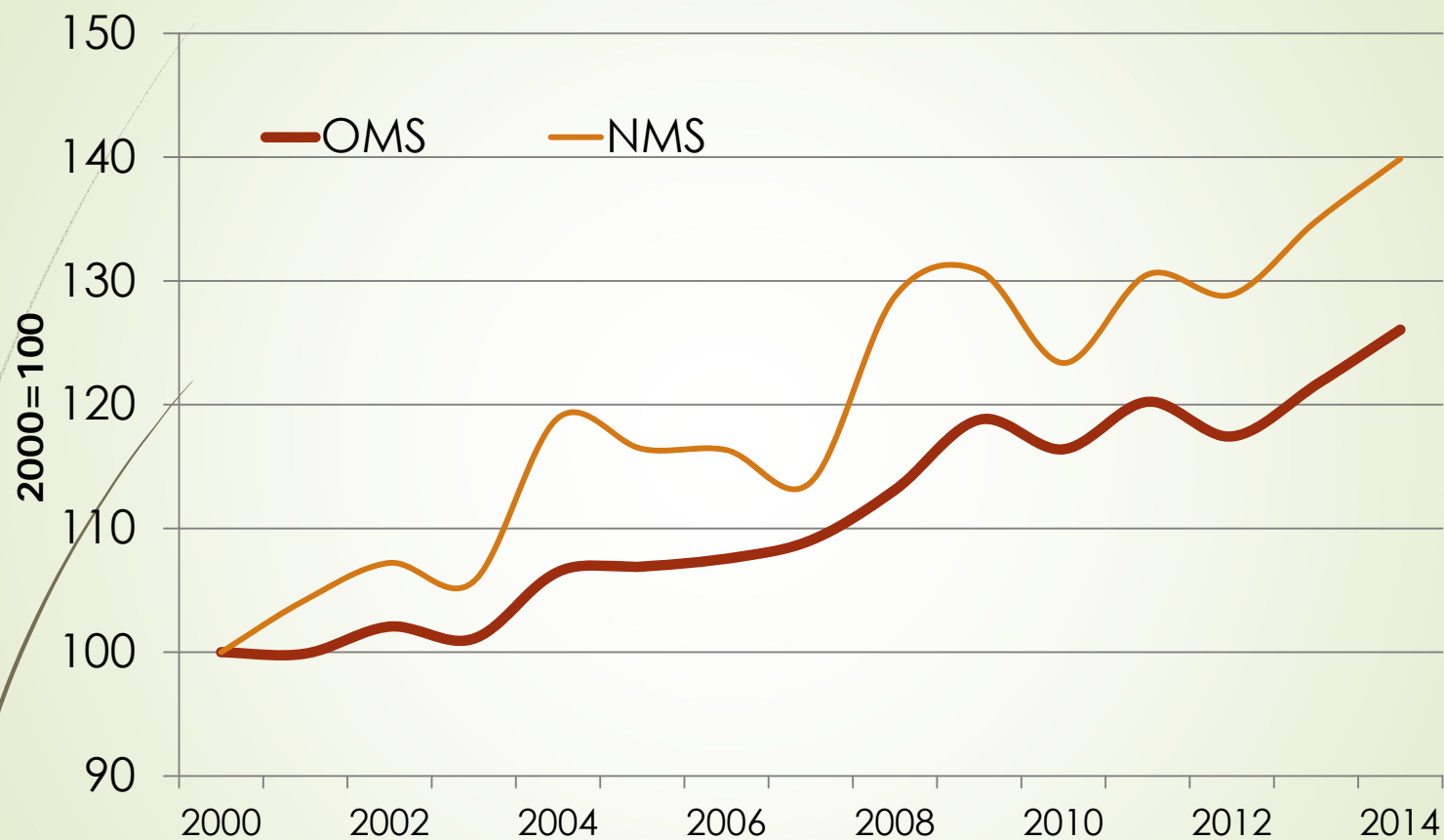
- TFP growth rate was higher in NMS (new member states) than OMS (old member states) – (a catch up of NMS was observed.)
- There exist inverse relations between CAP subsidies and production performance (Gemma and Hamulczuk, 2016).

(Materials from Gemma and Hamulczuk (2016) are used in this presentation for the purpose of explaining the background and current understanding in the literature. This study is an extension of Gemma and Hamulczuk (2016).)

# Changes in TFP for selected countries (from Gemma and Hamulczuk (2016) )



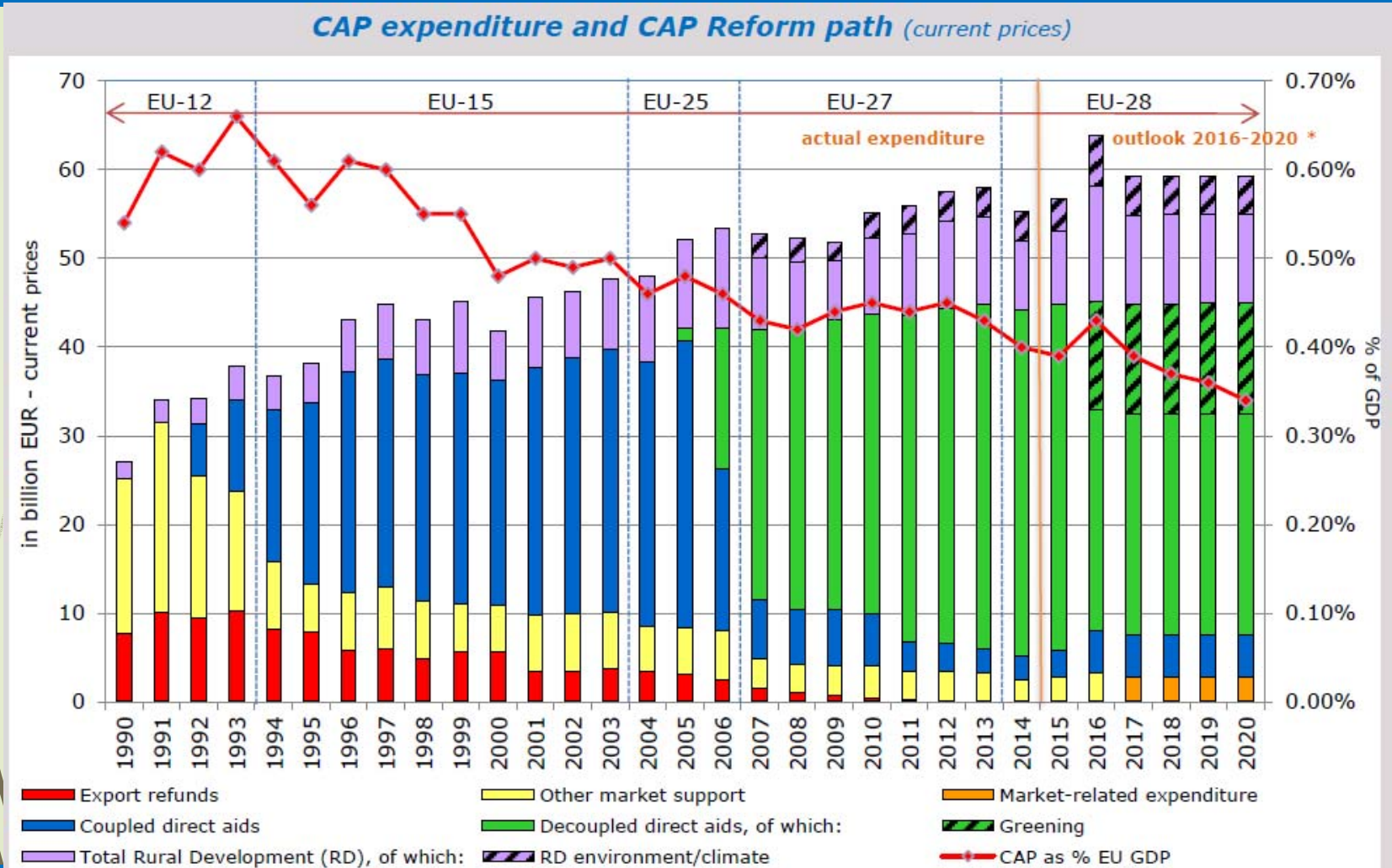
# Changes in TFP for selected countries (from Gemma and Hamulczuk (2016) )



# Observations

- ▶ In terms of allocation of financial resources a shift from the coupled direct aids to decoupled direct aids has been observed.
- ▶ The share of rural development has been increased.
- ▶ There still exists coupled direct aids though the share is significantly smaller than before 2007.

# Budget Allocation under CAP (from Gemma and Hamulczuk (2016))



**Sources:** CAP expenditure for past years: European Commission, DG Agriculture and Rural Development (Financial Report). GDP: Eurostat and Global Insight.



# Policy impacts of farm supports on agricultural productivity –

## Literature review

- ➔ Most 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 shows mixed effects of subsidies on agricultural productivity. (Mostly negative).
- ➔ Latruffe, Guyomard, Le Mouëll (2009) – This study proved significant and negative relations between managerial efficiency and CAP direct payments.

# Policy impacts of farm supports on agricultural 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 of farm supports on productivity –

## Literature review

- Kazukauskas, Newman & Sauer (2011), Rizov, Pokrivcak & Ciaian (2013) - The authors suggested 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 & Sauer, 2011)).

# Policy impacts of farm support policies on productivity: an overview

- 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. However, not many discuss the impact of TFP on farm income and the gains of consumers.
  - Gemma and Hamulczuk (2016) used most recent data from the NMC and OMC of the EU to examine the relationship between budgets allocated for farm support policies and agricultural TFP.
  - This current study assesses the impacts of different types of subsidies on agricultural TFP in the NMC and OMC of the EU. Besides TFP, technical efficiency effects and technical change effect are included as agricultural production performance measures.

# Scope of this study

- Taking the period between 2008 and 2014, the relations between total factor productivity (TFP) and the expenditures on individual EU budget categories were examined. 2008 was set as the base year for this exercise to reflect the EU enlargement in 2004 and 2007.

# Structure of this study

- First, Using the Malmquist TFP model and agricultural production data from individual member countries, production performance measures of Malmquist TFP, technical efficiency (TE) effect and technical change (TC) effects were estimated. The Malmquist TFP approach is often used for the ease in the decomposition of contributing factors in calculation. The relationship of  $\text{Malmquist TFP} = \text{TE} * \text{TC}$  exists. Second, the association between these three production performance measures and the amounts of EU budgets on different subsidy policies were analyzed to derive policy implications. A TFP growth is important in sustainable development of any sector of the economy. The impacts of the subsidies with different objectives on TFP are of our interests when we consider the future of the common agricultural policy (CAP) beyond 2020.

# Results

- For the new member countries, most categories in expenditures were not related to the changes in TFP. Only exception is the subsidy on crops. The result of a fixed effect model showed an almost statistically significant result. The higher the amounts of subsidies for crop production, the TFP growth rates became higher in new member countries. All other types of subsidies including the ones for rural development and direct payment did not have any relationship with TFP growth rates in new member countries. Subsidies on crop production were still useful for TFP growth.

# Results

- The equation for the fixed effects model becomes:

$$Y_{it} = \beta_1 X_{it} + a_i + u_{it}$$

- where

- –  $a_i$  ( $i=1 \dots 27$ ) is the unknown intercept for each entity (  $n$  entity-specific intercepts)
- –  $Y_{it}$  is the dependent variable (DV) where  $i$  = entity and  $t$  = time.
- –  $X_{it}$  represents one independent variable (IV), –  $\beta_1$  is the coefficient for that IV, –  $u_{it}$  is the error term

- The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics... [like culture, religion, gender, history, etc.] Country specific reasons are excluded in the fixed effect model.

- The random effects model:

$$Y_{it} = \beta X_{it} + a + u_{it} + \epsilon_{it}$$



## Results (Continued)

- Clearer relations between subsidies and TFP growth rates exist for old member countries. An inverse relation was statistically confirmed between the total amounts of subsidies and TFP growth rates in a random effect model. A similar relation was found between the subsidies on rural development and TFP growth rates using a random effect model. The countries with higher total amounts of subsidies and higher amounts of subsidies on rural development had lower TFP growths than others. Assuming TFP growth is necessary for sustainable agricultural development, the increase in total amount of subsidies does harm than any good in old member countries.

# Results (Continued)

- ▶ The same models were applied to examine the relationship between a production performance measure of technical efficiency (TE) and the amounts of EU budgets on different subsidy policies. The EU budgets on decoupled payment has been found to be almost positively related to TE for new member countries. Other EU spending items were not related to TE effects.
- ▶ The same models were used to examine the relationship between a production performance measure of technical change (TC) and the amounts of EU budgets on different subsidy policies. The subsidies on crop production and animal production were positively affecting TC in new member countries in the fixed effect model. On the other hand, the subsidies through decoupled payments were negatively affecting TC in new member countries in the fixed effect model.
- ▶ For new member countries, the changes in the amount of subsidies for crop production had a positive relation to TC effects in the random effect model. For old member countries, the changes in the total amounts of subsidies had a negative relation to TC in the fixed effect model.

# Conclusions

- ➔ The policies in 2008-2014 had impacts on production performance of new member countries as well as old member countries of EU15. For new member countries, the subsidies on agricultural production helped improving the production performance of agriculture. Decoupled payments were not useful for taking advantage of available technology, plus did harm for technical change for new member countries.
- ➔ Old member countries did not benefit from any subsidies in terms of improving production performance. We found that the larger the total amount of subsidies the lower the production performance measured in TFP, especially in relation to rural development efforts.

# Policy implications

- Policy implications include a suggestion of reexamination of long-term welfare impacts of past and present CAP subsidies in order to set the priority list straight. Multi-functionality of agriculture and the importance of rural development need to stay important for sustainable agricultural and rural development, but a balance (in the form of a priority list) among different policy objectives and options needs to be discussed for sustainable agricultural and rural development.