Ex post analysis – preliminary results

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Case study analysis – aims in DYNAMIX

- Aim of the case studies was to identify potential success stories that can be adapted in Europe as well as failures to show what problems can diminish the effectiveness of policies.
- We present preliminary results of quantitative analysis of two case studies:
  - Aggregates use in UK
  - Fertilizers in Denmark
case study analysis - characteristics

- Both case studies are based on physical flows – so efficiency improvement is visible and can be expressed in physical flows
- Analysis based on generalized Cobb-Douglas production function:
  \[ Y_t = A_t \prod_i F_{it}^{\alpha_i} \]
- Constant technological progress: \( A_t = A_0 e^{\beta t} \)
- Ex-post analysis shows the use of different resources in alternative case of “no policy” or “no structural change”
UK aggregates

• **Problem:**
  – Externalities caused by extraction of aggregates such as noise, dust, traffic, visual impacts, and blasting, ground water, surface water and loss of amenity were very high and could be easily reduced via recycling

• **Three policies:**
  – Introduction of the Landfill Tax (in 1996)
  – Introduction of the Aggregates Levy (in 2002)
  – Increase in the Landfill Tax and the Aggregates Levy (in 2008 and 2009)
aggregates in the UK - results

Volume of construction output assuming actual extraction of aggregates

Use of aggregates use in different scenarios assuming actual output

DYNAMIX is a project funded under the European Union Seventh Framework Programme

Decoupling growth from resource use and its environmental impacts
fertilizers in Denmark – problem and policies

• Problem:
  – Poor quality of water in Denmark caused mainly by pollution from agriculture. Along with technological progress, use of inorganic fertilizer increased. As some of them were used inappropriately, they leached into water bodies causing pollution, extensive fish deaths and loss of biodiversity;

• Policies:
  – Policies were gradually introduced starting from 1985;
  – Policy mix included ban of direct discharge of fertilizer, regulations regarding rules of fertilizer use, introduction of fertilizer account.
fertilizers in Denmark – results

Denmark

Nitrogenous fertilizers use per unit of output

Sweden

Nitrogenous fertilizers use per unit of output


actual  no struct. change  no struct. change and TP


actual  no struct. change  no struct. change and TP
fertilizers in Denmark – results

Denmark vs Sweden

Potash fertilizers per unit of output


- actual
- no struct. change
- no struct. change and TP

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fertilizers in Denmark – results

Denmark

Labour supply per unit of output


1.2
1.0
0.8
0.6
0.4
0.2
0.0

actual  no struct. change  no struct. change and TP

Sweden

Labour supply per unit of output


1.2
1.0
0.8
0.6
0.4
0.2
0.0

actual  no struct. change  no struct. change and TP
fertilizers in Denmark – results

**Denmark**

**Machinery capital stock per unit of output**

- Actual
- No struct. change
- No struct. change and TP

**Sweden**

**Machinery capital stock per unit of output**

- Actual
- No struct. change
- No struct. change and TP
fertilizers in Denmark – results

**Denmark**

**Sweden**

**Land development capital stock per unit of output**

- **Actual**
- **No structural change**
- **No structural change and TP**


Values: 0.2 0.4 0.6 0.8 1.0 1.2 1.4
quantitative assessment – conclusions

• Policies increasing cost of aggregates proved to be successful in increasing productivity of this resource in construction sector

• In Denmark, we observed significant impact of structural change on fertilizer use. Moreover, broad technological progress increased productivity of all production factors.

• In contrast, in Sweden, fertilizers (especially potash) were substituted by land development
Thank you.

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