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Content

- Introduction and objectives
- Theoretical expectations
- Econometric approach
- Results and consultations
RDP Investment support

- One of the main measures within the EU Rural Development Programme (RDP)

- Accounts for around 11 billion Euro (11.5% of the RDP budget) in the current financial period 2007-2013.

- Primary objective: to support private investment for improving farm productivity, competitiveness, innovation, adaption of new technologies, etc.

- The support is not automatically granted to all farms but is subject to a project approval.
Investment support in the study region

- We analyse investment support in Schleswig-Holstein (Germany) for the period 2000-2006.

- The largest part of the programme budget (approximately 80%) was allocated to the milk and beef sectors. The rest went to pork, agro-tourism and horticulture sectors.

- Eligibility criteria requiring investment volume higher than 175,000 EUR, personal income up to 90,000 EUR per person or 120,000 EUR per couple, excluded the smallest and the largest agricultural farms from this programme.

- Key policy question: Does the investment support stimulates private investment? What are the second order induced effects (on productivity, employment, environment, etc.)?
Objectives

- To estimate the extent to which the RDP investment support has a complementary or a substitutionary effect on farm investments.

- To quantify the potential **deadweight effect** by estimating the extent to which the beneficiaries would have undertaken comparable investments also without the investment support.

- Application on data from Schleswig-Holstein in Germany

- There is growing but still limited literature on the impact of RDP investment support on farm performance (e.g. Kirchweger and Kantelhardt 2012; Ortner 2012; Ratinger et al 2012; Salvioni and Sciulli 2011).
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Theoretical hypothesis

- The support may or may not increase in investment.

- Investment support can have either complementary effect (firms increase investments) or substitutionary effect (small or no change in firm investment).

- Substitutionary effect (or dead weight effect) can be induced by
  - intra-firm investment adjustments and/or
  - inter-firm investment adjustments
Theoretical hypothesis

**Intra-firm substitution of investment:** it captures the replacement of private investments by the support within the firm.

- **The role of market imperfections:**
  - Investment support increases firm investment only in imperfectly competitive markets (Brandsma et al. 2013).
    - E.g., if firms are credit constrained, the support relaxes firms' financial constraint leading to higher investment.
  - Under perfect competition no impact of support on investments.
    - The support fully substitutes private investment because firms can exploit all investment opportunities also without the support (support represents an income transfer).

- **Inter-temporal relocation of investment:** firms may bring forward investments originally planned for the post intervention period as the subsidy gives incentives to invest during the program period (Abel 1982; Bergström 2000; Bronzini and de Blasio 2006).
Inter-firm substitution of investment:
- Inter-firm substitution results from relocation of investment among firms, i.e. it may cause a crowding-out of investment of non-subsidised firms (Bronzini and de Blasio 2006; Harris and Trainor 2005; Lee 1996).

• Non-supported firms may be crowded-out because
  - factor price may increase (e.g. land rents, loan interest rate);
  - regional producer prices may decrease;
  - the support may improve credit-worthiness of supported firms relative to non-supported ones.
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Econometric approach

- We are interested to estimate the firm investment level relative to the hypothetical no-support situation - the average treatment on the treated (ATT):

\[ ATT = E(Y_1 - Y_0 \mid D = 1) = E(Y_1 \mid D = 1) - E(Y_0 \mid D = 1) \]

- Problems:
  - Counterfactual not available (expected impact in case of non-participation)
  - Selection bias: investment support is project based and subject eligibility/selection criteria
We employ Propensity Score Matching (PSM) and Difference-in-Differences (DID) estimator

- PSM-DID measures the impact of the support by using differences between comparable group of participants \((D=1)\) and non-participants \((D=0)\) before and after the support.
- Addresses selection bias and eliminates differences in initial conditions (observable heterogeneity)
Crucial assumption of PSM: the absence of inter-firm adjustments in investments.

PSM estimates are valid under the assumption of no indirect effects on non-supported farms.

**To overcome this problem, we employ a two-stage approach:**

1. **Step 1:** We identify the impact of support on non-beneficiaries: by estimating the impact of inter-firm substitution effects of the support:
   - by comparing the performance of non-supported farms in regions with high support relative to regions with low support.

2. **Step 2:** We re-estimate program effect dropping non-beneficiary farms affected by the support.
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Data

- Bookkeeping data for the Schleswig-Holstein region in Germany
- Balanced panel covering 7 years (2001-2007).
- The choice of the period 2001-2007 was determined by the availability of data and to cover the start period and the period after the end of the programme.
- Given that the main focus of the support in the study region is milk/beef sectors we consider only these farms in our sample.
- Total farms is 1333: 101 supported farms and 1232 non-supported.
Results

Step 1: Inter-firm effects of the support:

- Impact of non-beneficiaries.

- We compared the performance of non-beneficiaries farms in sub-regions with high support level relative to non-beneficiaries in regions with low support level.

- We measure the economic performance in terms of (i) profit per farm, (ii) economic corrected profit, (iii) milk production, (iv) profit per person fully employed, (v) profit per family labour, (vi) profit per fully employed.
Step 1: Inter-firm effects of the support:

- Non-beneficiaries farms in sub-regions with high support level were found to have lower performance for all indicators.

- These results provide empirical evidence of inter-firm crowding-out effects of investment support.

- We need to control for affected firms in the counterfactual non-beneficiary group; otherwise the estimates may be biased.

- In step 2 all programme non-beneficiaries located in regions with high programme intensity were dropped from further analysis.
Step 2: Intra-firm effects (deadweight effect of support):

- We estimate how farm assets are affected by the investment support to quantify the deadweight effect.

- Full sample: the estimated deadweight effect on farm assets is 82%.

- When controlling for the inter-firm substitution effect, the deadweight effect is 99%.

- If we would not control for the bias, the deadweight loss would be underestimated by around 17%.
### Results

**Deadweight loss of the AFP on farm assets**

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Sub-sample with excluded programme affected beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matched participants</td>
<td>73,487</td>
<td>92%</td>
</tr>
<tr>
<td>Matched non-participants</td>
<td>60,552</td>
<td>86%</td>
</tr>
<tr>
<td>ATT (EUR)</td>
<td>12,935</td>
<td></td>
</tr>
<tr>
<td><strong>Deadweight loss (%)</strong></td>
<td><strong>82%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Robustness check:

- To check the robustness of the deadweight effects, we estimate the leverage effect.

- The support should end up either as an increase in farm assets or as or household non-farm related expenditures/assets.

- Because of high deadweight effects we should observe an increase in non-farm expenditures/assets.

- We use three indicators to measure private off-farm spending:
  - money transfer from farm to farm households for living expenses,
  - money transfers from farm to building of private non-farm assets
  - total money transfers from farm to farm household.
## Results

### Leverage effects

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Sub-sample with excluded programme affected beneficiaries</th>
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</thead>
<tbody>
<tr>
<td>EUR</td>
<td>%</td>
<td>EUR</td>
</tr>
<tr>
<td>Farm household living expenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matched beneficiaries</td>
<td>13,738</td>
<td>13,869</td>
</tr>
<tr>
<td>Matched non-beneficiaries</td>
<td>9,085</td>
<td>9,209</td>
</tr>
<tr>
<td>ATT (leverage effect)</td>
<td>4,653</td>
<td>4,659</td>
</tr>
<tr>
<td>Building of private non-farm assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matched beneficiaries</td>
<td>29,855</td>
<td>29,307</td>
</tr>
<tr>
<td>Matched non-beneficiaries</td>
<td>26,677</td>
<td>19,782</td>
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<tr>
<td>ATT (leverage effect)</td>
<td>3,178</td>
<td>9,526</td>
</tr>
<tr>
<td>Transfers from farm to farm household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matched beneficiaries</td>
<td>62,471</td>
<td>62,413</td>
</tr>
<tr>
<td>Matched non-beneficiaries</td>
<td>47,919</td>
<td>39,711</td>
</tr>
<tr>
<td>ATT (leverage effect)</td>
<td>14,550</td>
<td>22,702</td>
</tr>
</tbody>
</table>
Conclusions

- Almost 100% dead weight effect of investment support in the Schleswig-Holstein region.

- Similar investments in the examined period would have been undertaken also without the support

- Farms are able to exploit all profitable investment opportunities also without the RDP.

- This may imply that farms do not face significant market imperfections, such as credit constrain.

- The support represents an income transfer ➔ it increases private off-farm spending/assets.