Micro simulation model estimating Czech farm income from Farm Accountancy Data Network database

22nd Pacioli workshop
29th September 2014
What do we estimate...

Farm income of Czech agriculture and its components:
- Farm net income
- Farm net value added
- Costs
- Production
- Subsidies

Farm level estimates → weighting & aggregation → national level estimates

...based on FADN CZ database

1417 questionnaires for DG.AGRI represent ≈14 800 Czech farms
When do we estimate

I. stage
- estimation 10 months before FADN final results are ready
- December of current accounting year
- input information is known

II. stage
- estimation 13 months before FADN final results are ready
- September of current accounting year
- input information partly known, partly estimated

III. stage
- forecast 22 months before FADN final results are ready
- December of preceding year
- scenarios of following year results, no information known

the sooner the better
**Process of estimation (stage I and II)**

**Data**
- farm sample selection
- selection of independent variables in FADN CZ farm return
- external input data search

**Index compilation**
- index calculation, identification of price/rate per unit
- integration of indices/prices/rates into simulation model
- assumptions

**Projection**
- running of the projection on individual farms
- calculation of output results
- application of weights
- aggregation by class

**Results analysis**
- production (crop, livestock), costs, subsidies, income
- annual trend
- changes in values
- comparison with macroeconomic results
Selection of independent variables

Annual change rate is applied to all key items affecting economic results

**Production:** main crops
livestock categories
products (milk, eggs)

**Costs:**
direct livestock and crop costs, energy, services,
costs of machinery and buildings, wages, rent paid.

**Subsidies:**
according to information available at time of calculation
Information source

- Czech Statistical Office
- Ministry of Agriculture
- Institute of Agricultural Economics and Information
- State Agricultural Intervention Fund
- Agricultural unions etc.

- Average monthly prices of agricultural producers
- Input agricultural price indices
- Commodity statistics
- Livestock inventory
- Information on estimated yield and harvest of selected crops
- Information on estimate of yield and production of agricultural crops
- Economic Accounts for Agriculture (macro economical data)
- Information on subsidy (totals, rates)
Results of stage I – weighted results comparison, 2011 and 2012

- Farm net income
  - 2011: +4.8%  
  - 2012: +2.9%

- Farm net value added
  - 2011: -6.1%  
  - 2012: -12%

- Gross farm income
  - 2011: +0.4%  
  - 2012: -0.8%

- Total output
  - 2011: +0.06%  
  - 2012: +4.8%

- Total costs
  - 2011: -4.1%  
  - 2012: +6.96%

- Subsidies (ex. on investments)
  - 2011: -5.7%  
  - 2012: +5%
Testing of stage I – farm distribution comparison FADN 2012

- **Total output**
  - Final
  - Estimated

- **Total input**
  - Final
  - Estimated

- **Farm net value added**
  - Final
  - Estimated

- **Net farm income**
  - Final
  - Estimated
Testing of stage I – farm distribution comparison FADN 2011

NFI by type of farming

Specialists' field crops

Specialists' dairying

Grazing livestock

Mixed farms
Stage II – input information estimation

Estimation of:
- Crop prices
- Livestock prices
- Products prices
- Costs
- Yields

FADN CZ estimates:
- Crop prices and costs
- Forecast function of linear regression
- 2001-2012 (2013) panel data

Public estimates:
- Czech Statistical Office
- Ministry of Agriculture

IAEI estimates:
- prediction of Economic Accounts of Agriculture in CZE (model EAA)
- Commodity department estimates
Testing of step II – weighted 2012 results comparison

-1,07%  
+0,33%  
+2,17%  
+0,05%  
+1,70%  
-1,45%  
-1,87%  
+5,80%  
-1,07% estimation (September 2012)  
+0,05%  
+2,17%  
+1,70%  
+1,70%  
-1,45%  
-1,87%  
+5,80%  
-1,07% final FADN results
## Testing of step II – weighted 2012 results comparison

<table>
<thead>
<tr>
<th>Millions of CZK</th>
<th>2012</th>
<th>2012e</th>
<th>Final vs. Estimated %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE131 Total output</td>
<td>125 859</td>
<td>124 509</td>
<td>-1,07%</td>
</tr>
<tr>
<td>SE135 Total crop output</td>
<td>69 832</td>
<td>70 059</td>
<td>0,33%</td>
</tr>
<tr>
<td>SE140 Cereals</td>
<td>33 308</td>
<td>33 551</td>
<td>0,73%</td>
</tr>
<tr>
<td>SE160 Oil seed crops</td>
<td>13 664</td>
<td>14 331</td>
<td>4,88%</td>
</tr>
<tr>
<td>SE170 Vegetables</td>
<td>3 887</td>
<td>3 811</td>
<td>-1,95%</td>
</tr>
<tr>
<td>SE175 Fruit</td>
<td>1 152</td>
<td>1 165</td>
<td>1,07%</td>
</tr>
<tr>
<td>SE195 Forage crops</td>
<td>7 138</td>
<td>7 347</td>
<td>2,92%</td>
</tr>
<tr>
<td>SE206 Total livestock output</td>
<td>44 501</td>
<td>45 466</td>
<td>2,17%</td>
</tr>
<tr>
<td>SE216 Cow’s milk and products</td>
<td>21 480</td>
<td>22 081</td>
<td>2,80%</td>
</tr>
<tr>
<td>SE220 Beef and veal</td>
<td>8 355</td>
<td>7 572</td>
<td>-9,37%</td>
</tr>
<tr>
<td>SE225 Pigmeat</td>
<td>7 539</td>
<td>7 127</td>
<td>-5,47%</td>
</tr>
<tr>
<td>SE235 Poultrymeat</td>
<td>4 578</td>
<td>4 071</td>
<td>-11,09%</td>
</tr>
<tr>
<td>SE270 Total inputs</td>
<td>139 351</td>
<td>139 417</td>
<td>0,05%</td>
</tr>
<tr>
<td>SE275 Total intermediate consumption</td>
<td>93 622</td>
<td>95 214</td>
<td>1,70%</td>
</tr>
<tr>
<td>SE281 Total specific costs</td>
<td>52 936</td>
<td>52 169</td>
<td>-1,45%</td>
</tr>
<tr>
<td>SE285 Seeds and plants</td>
<td>6 397</td>
<td>5 913</td>
<td>-7,58%</td>
</tr>
<tr>
<td>SE295 Fertilisers</td>
<td>8 659</td>
<td>9 179</td>
<td>6,01%</td>
</tr>
<tr>
<td>SE300 Crop protection</td>
<td>7 305</td>
<td>7 333</td>
<td>0,37%</td>
</tr>
<tr>
<td>Total feed</td>
<td>24 237</td>
<td>25 108</td>
<td>3,60%</td>
</tr>
<tr>
<td>SE336 Total farming overheads</td>
<td>40 685</td>
<td>43 045</td>
<td>5,80%</td>
</tr>
<tr>
<td>SE365 Total external factors</td>
<td>31 907</td>
<td>31 311</td>
<td>-1,87%</td>
</tr>
</tbody>
</table>
Limitations

Extreme weather and its unexpected impacts on production
(drought, flood, spring frost, hail, heavy rain)

Change of political decisions

Prices of production available from the Czech Statistical Office not weighted by volume of production

Volatility of prices

Information on subsidies not comprehensive in the course of year (difficult to estimate real payments)

Model does not include forecast of structural change and assets
THANK YOU FOR YOUR ATTENTION