Alternative Food Networks in Piedmont: Determinants of On-farm and Off-farm Direct Sales by Farmers

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Motivations and research questions

- In recent years, several experiences of Alternative Food Networks
  - short market chains
  - direct sales
  - community-supported agriculture
- “alternative” relative to “conventional” food chains
- many different AFNs, but a common point is more direct links between producers and consumers, possibly on a local basis
Motivations and research questions

- much research on consumers’ choice to “buy local”
- much less on farmers’ choice to sell directly
- of course, no short chain is possible without adequate supply
Motivations and research questions

Research questions:

- which are the factors that favour farmers’ choice to sell their products directly to consumers rather than using conventional marketing chains?
- which are the differences between farmers’ choice to sell at the farm (on-farm sales) and to sell in urban areas (off-farm sales)?
Data and method

First, we examine:

- the patterns of territorial distribution of the farms selling directly
- the share of farms selling directly by type of farming

Second, we estimate probit models of the determinants of the choice to sell directly on-farm and off-farm

- data are mainly drawn from the 2010 Census of Agriculture (66,459 family farms in Piedmont)
- information on whether farms sell directly to consumers (on-farm and off-farm)
Territorial distribution of direct sales

Analysed with:

- # of farms in each municipality practicing direct sales
  - On-farm
  - Off-farm

- Ratios of the number of farms practicing direct sales to the total number of farms by municipality in Piedmont
  - On-farm
  - Off-farm
Off-farm sales
Total number
Off-farm sales: Total number

Surroundings of Torino
Off-farm sales:
Total number

Surroundings of Torino

Langhe wine area

Vendita diretta fuori azienda
COM_PIEM_2011
- 0
- < 10
- 11-20
- 21-50
- > 50
On-farm sales
Total number

No very clear pattern
Off-farm sales
% over total #
by municipality
Off-farm sales
% over total # by municipality

Surroundings of Torino

Langhe wine area

Also widespread in mountain areas
On-farm sales
% over total #
by municipality

Diffused over the whole Region
Relevant in mountain areas
Results

In short:

- Territorial distribution gives some weak hint, but no clear-cut pattern

- A second possible analysis concerns the type of product that farmers produce
Results

Preliminary analysis by TYPE OF FARMING

- On-farm direct sales are higher for unspecialised farms and vineyards
- Off-farm direct sales are higher for horticulture and mixed farming and vineyards again
- Fieldcrops and cattle have the lowest percentages
- Technical (need for processing) and supply reasons
## Results

<table>
<thead>
<tr>
<th>Type of farming</th>
<th>Direct market (%)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>on-farm</td>
</tr>
<tr>
<td>Fieldcrops (specialist cereals - rice inclusive - and general field cropping)</td>
<td>5.0</td>
</tr>
<tr>
<td>Specialist horticulture</td>
<td>13.2</td>
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<td>Specialist vineyards</td>
<td>24.3</td>
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<td>13.5</td>
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<td>Specialist cattle (rearing and fattening and dairying, rearing and fattening combined)</td>
<td>7.5</td>
</tr>
<tr>
<td>Specialist sheep, goats and other grazing livestock</td>
<td>14.1</td>
</tr>
<tr>
<td>Specialist granivores (pigs, poultry and various combined)</td>
<td>8.3</td>
</tr>
<tr>
<td>Other types (mixed cropping, mixed livestock, field crops and grazing livestock combined, various crops and livestock combined)</td>
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Statistical analysis

- probit models estimated separately for on-farm and off-farm direct sales
- dependent variable: a dummy variable equal to 1 for the farms with a positive share of direct sales for one or more products (0 otherwise)
- Explanatory variables concerning farmers’ human capital, farm location and size, the type of farming
- Estimation over all family farms in Piedmont (58,304 farms)
## Results of the probit models of the determinants of direct sales

### On-farm

<table>
<thead>
<tr>
<th>Coeff.</th>
<th>Std.Err.</th>
<th>Marginal effect</th>
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<th>Std.Err.</th>
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<tbody>
<tr>
<td>Constant</td>
<td>-1.121***</td>
<td>0.055</td>
<td>-1.293***</td>
<td>0.063</td>
<td></td>
</tr>
<tr>
<td>Operator's age (years)</td>
<td>-0.004***</td>
<td>0.001</td>
<td>-0.007***</td>
<td>0.001</td>
<td>-0.0010</td>
</tr>
<tr>
<td>Operator's gender (1=M)</td>
<td>0.049***</td>
<td>0.016</td>
<td>0.0079</td>
<td>0.041**</td>
<td>0.018</td>
</tr>
<tr>
<td>Operator's schooling (years)</td>
<td>0.018***</td>
<td>0.002</td>
<td>0.0017</td>
<td>0.009***</td>
<td>0.003</td>
</tr>
<tr>
<td>Op.’s agricultural school (0,1)</td>
<td>0.207***</td>
<td>0.031</td>
<td>0.0487</td>
<td>0.081**</td>
<td>0.034</td>
</tr>
<tr>
<td>Op.’s professional training (0,1)</td>
<td>0.224***</td>
<td>0.025</td>
<td>0.0512</td>
<td>0.214***</td>
<td>0.028</td>
</tr>
<tr>
<td>Hills (0,1)</td>
<td>0.445***</td>
<td>0.021</td>
<td>0.0705</td>
<td>0.433***</td>
<td>0.024</td>
</tr>
<tr>
<td>Mountains (0,1)</td>
<td>0.631***</td>
<td>0.028</td>
<td>0.1221</td>
<td>0.301***</td>
<td>0.034</td>
</tr>
<tr>
<td>Standard Output (0,000 €)</td>
<td>0.001*</td>
<td>0.000</td>
<td>0.0002</td>
<td>0.000***</td>
<td>0.000</td>
</tr>
<tr>
<td>Agro-tourism (0,1)</td>
<td>0.883***</td>
<td>0.042</td>
<td>0.2519</td>
<td>0.301***</td>
<td>0.049</td>
</tr>
<tr>
<td>Recreational activities (0,1)</td>
<td>0.453***</td>
<td>0.110</td>
<td>0.1067</td>
<td>0.226*</td>
<td>0.127</td>
</tr>
<tr>
<td>Organic farming (0,1)</td>
<td>0.248***</td>
<td>0.033</td>
<td>0.0690</td>
<td>0.344***</td>
<td>0.038</td>
</tr>
<tr>
<td>PDG-PGI (0,1)</td>
<td>-0.154***</td>
<td>0.037</td>
<td>-0.0168</td>
<td>-0.283***</td>
<td>0.047</td>
</tr>
<tr>
<td>Fieldcrops (0,1)</td>
<td>-0.786***</td>
<td>0.024</td>
<td>-0.1099</td>
<td>-0.644***</td>
<td>0.027</td>
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<tr>
<td>Horticulture (0,1)</td>
<td>-0.441***</td>
<td>0.044</td>
<td>-0.0515</td>
<td>-0.013</td>
<td>0.043</td>
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<tr>
<td>Vineyards (0,1)</td>
<td>-0.052***</td>
<td>0.022</td>
<td>-0.0054</td>
<td>-0.098***</td>
<td>0.025</td>
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<tr>
<td>Other permanent crops (0,1)</td>
<td>-0.338***</td>
<td>0.024</td>
<td>-0.0470</td>
<td>-0.298***</td>
<td>0.027</td>
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<tr>
<td>Dairying (0,1)</td>
<td>-0.357***</td>
<td>0.040</td>
<td>-0.0491</td>
<td>-0.435***</td>
<td>0.049</td>
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<tr>
<td>Beef (0,1)</td>
<td>-0.714***</td>
<td>0.032</td>
<td>-0.0817</td>
<td>-0.846***</td>
<td>0.041</td>
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<tr>
<td>Sheep and goats (0,1)</td>
<td>-0.558***</td>
<td>0.040</td>
<td>-0.0841</td>
<td>-0.637***</td>
<td>0.052</td>
</tr>
<tr>
<td>Granivores (0,1)</td>
<td>-0.576***</td>
<td>0.071</td>
<td>-0.0696</td>
<td>-0.624***</td>
<td>0.086</td>
</tr>
<tr>
<td># commercial poles within 1/2 hr. driving distance</td>
<td>0.008*</td>
<td>0.004</td>
<td>0.0018</td>
<td>0.050***</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Log-likelihood: -20957.2
Chi-squared (d.f.): 5403.479 (21)

### Off-farm

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<td>Operator's gender (1=M)</td>
<td>0.041**</td>
<td>0.018</td>
<td>0.041**</td>
<td>0.018</td>
<td>0.0045</td>
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<tr>
<td>Operator's schooling (years)</td>
<td>0.009***</td>
<td>0.003</td>
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<td>0.003</td>
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</tr>
<tr>
<td>Op.’s agricultural school (0,1)</td>
<td>0.081**</td>
<td>0.034</td>
<td>0.081**</td>
<td>0.034</td>
<td>0.0138</td>
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<tr>
<td>Op.’s professional training (0,1)</td>
<td>0.214***</td>
<td>0.028</td>
<td>0.214***</td>
<td>0.028</td>
<td>0.0316</td>
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<tr>
<td>Hills (0,1)</td>
<td>0.433***</td>
<td>0.024</td>
<td>0.433***</td>
<td>0.024</td>
<td>0.0444</td>
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<tr>
<td>Mountains (0,1)</td>
<td>0.301***</td>
<td>0.034</td>
<td>0.301***</td>
<td>0.034</td>
<td>0.0331</td>
</tr>
<tr>
<td>Standard Output (0,000 €)</td>
<td>0.000***</td>
<td>0.000</td>
<td>0.000***</td>
<td>0.000</td>
<td>0.0002</td>
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<tr>
<td>Agro-tourism (0,1)</td>
<td>0.344***</td>
<td>0.038</td>
<td>0.344***</td>
<td>0.038</td>
<td>0.0595</td>
</tr>
<tr>
<td>Recreational activities (0,1)</td>
<td>0.226*</td>
<td>0.127</td>
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<td>Fieldcrops (0,1)</td>
<td>-0.644***</td>
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Log-likelihood: -14962.02
Chi-squared (d.f.): 2853.966 (21)
Main determinants of the choice to sell on-farm:

- having attended an agricultural school/university or a professional training course in the last two years → increases the probability by 5%
- mountain farms → +12.2%
- hill farms → +7%
- diversification activities undertaken by the farm: agro-tourism → +25%; recreational activities → +11%
- organic farming → +7%
Results

- **Variables with weak or negative effects on the choice to sell on-farm:**

  - the economic size: a rise in Standard Output *increases* the probability, but only by 0.02% for a 10,000 euro increase
  - specialised types of farms (TFs): taking the mixed TFs as reference, the difference ranges between -11% for cereals to -0.5% for viticulture. Even for vegetables and flowers the probability is -5%
  - the number of “pole” municipalities that can be reached in a half hour drive → +0.2%
  - The effect of gender is negligible (males 0.1% more likely)
Results

- **Main determinants of the choice to sell off-farm:**
  - personal characteristics bear the same signs as for on-farm direct sales, often with weaker effects
  - the same apply to mountain and hill farms, though in a lower measure relative to on-farm direct sales (+3%, +4%)
  - agro-tourism and recreational activities were not expected to influence off-farm sales, but they are nevertheless significant and positive (+5%, +3%)
  - organic farming → +6%
Results

- Variables with weak or negative effects on the choice to sell off-farm:
  - specialised TFs have a negative and significant effect relative to mixed TF
  - nevertheless, vegetables and flowers TF is not significantly different from mixed TF → +0.4%
  - the number of “pole” municipalities that can be reached in a half hour drive → +0.6% (transportation costs, though relevant, are not crucial in this field)
Ongoing developments

- So far, the assumption was that TFs shift the likelihood, but do not affect the way the other variables impact on the likelihood.

- We are testing the assumption that the effect of the variables is different according to the TF.

- Actually, LR tests strongly reject the $H_0$ that the parameters estimated on farms belonging to a specific TF are equal to the parameters estimated on the overall sample.
Ongoing developments

- In other words: the way in which e.g. education influence the probability of direct sales is different (in some cases, signs are opposite) for farmers in different TFs

- E.g.:
  - Organic farming increases the probability of off-farm direct sales by 11% for mixed TF, by 16% in viticulture, and by 21% in horticulture
  - Gender has no significant effect for mixed farming, but males are more likely to make off-farm direct sales in viticulture, but less likely in horticulture
Ongoing developments

- We are also trying to find better variables for location.

- For off-farm sales, distance to markets is arguably relevant, regardless of the dimension of urban population.

- For on-farm sales, the relevant point is the potential number of consumers going to the farm, and hence:
  - Closeness to big urban centres
  - Touristic areas
Conclusions

- Need to distinguish between on-farm and off-farm direct sales
- Some determinants seem in common: personal characteristics, complementarity with agro-tourism...
- But Location is important, but interaction with type of direct sales and types of farming still unclear
- Probably the effect of location is different between the two types of direct sales
- Research is ongoing...
Thank you for your attention