The Economic Impact of Formal Agricultural Education

Prof. Cathal O’Donoghue & Dr. Kevin Heanue
Teagasc Rural Economy and Development Programme
Background and Context

- **Objective of study**
  - To understand the return on an investment in Agricultural Education to
    - Farmer
    - State

- Not however that simple to do

- Provide context in relation to challenges of doing this
- Provide estimates of returns
Teagasc National Farm Survey

- Utilise Teagasc National Farm Survey
  - Nationally Representative dataset of about 1000 farms collected annually since 1973
  - Irish Component of EU Farm Accountancy Data Network
  - Detailed farm activity, costs and income data
  - Collected Education Data since 2004 (however panel nature allows us to incorporate data back to 2001 in analysis)

- Income Definitions
  - Family Farm Income = Gross Output + Subsidies – Direct Costs – Overhead Costs
  - Market Gross Margin = Gross Output – Direct Costs
Family Farm Income
(Ratio by Agri-Educational Level relative to no Agricultural Education)

Average Family Farm income is between 2.55 and 2.75 for those with Agri-Education times that without Agri-Education.
However because the return to education is higher for a larger farm, farmers with larger farms have higher participation rate.
Family Farm Income per hectare
(Ratio by Agri-Educational Level relative to no Agricultural Education)

On a per hectare basis, the premium is about 50%.
Market Gross Margin per hectare
(Ratio by Agri-Educational Level relative to no Agricultural Education)

For Market Gross Margin per hectare, the premium is more than double, reflecting higher subsidy share for those without Agri-Education.
Comparing Market GM per ha for those with Agricultural education relative to those without, there is a difference of over €500 per ha.

However, the story is more complicated.
Dairy and to a lesser extent Tillage farmers have a much higher income than beef or sheep farmers.

They also have a higher participation rate in agri-education.

If it were easily possible to move between sectors to dairy then, the aggregate statistics would reflect actual return.
At a individual sector level, the premium per hectare varies from as low as €50 per ha for sheep farmers with Agri-Ed to over €200 per ha for cattle farmers with Agricultural College for Cattle Rearing. Return similar for Dairy and Cattle Other. Higher for Agricultural College for Cattle Rearing. Lower for Sheep and Tillage.
Ignoring any movement between system, the more appropriate premium is about €160, with Ag College having a slightly higher average premium.

It may be that naturally “better” farmers are more likely to pursue education, however we have utilising advanced statistical methods, we find that this effect is not important.

Thus there is a relatively premium of 35-45% of Market GM per ha on average.
Demand for Agricultural Education

Factors Influencing Participation in Agricultural Education

- Larger Farms and higher income farms more likely to participate
- Older farmers less likely to have participated in formal agricultural education.
- The greater the distance a farmer is from an agricultural college the less likely the farmer would have attended.
- However farmers at a greater distance from an agricultural college were more likely to have participated in a Teagasc ‘local’ Green Cert option.
- The introduction of the Stamp Duty Exemption in 1994 for ‘young trained farmers’ had a positive influence on formal education participation levels.
- Being a Teagasc client and participating in the REPS scheme was positively and significantly related to completion of a Teagasc Green Cert.
Economic Impact of Agricultural Education

Internal Rate of Return

- Internal Rate of Return
  - Interest Rates where Up-front Costs and Discounted Returns are equal

- Private rate of return
  - i.e. the benefits to the individual farmer \( \rightarrow \) Market Gross Margin

- Society or ‘social’ rate of return
  - Broader society impact of any improved farm productivity. \( \rightarrow \) Output
Pathways for Agricultural Education to Achieve Economic Impact

Farm Level
- Higher Yields (gross output per Livestock Unit) – Dairy, Cattle
- Higher Intensity (LU per ha) at farm level – Dairy, Cattle, Sheep
  - Implied higher output per land

- Market Premium (No movement between systems; Ignore subsidies due to decoupling)
  - Private → Gross Margin (Output – Direct Costs) – c. €160
  - Public → Gross Output – c. €410

- Costs
  - Fees
  - Salary and non-pay costs
  - Foregone Earnings
Pathways for Agricultural Education to Achieve Economic Impact

Industry Level
- Animal based industries (Dairy and meat) dependent upon Farm based output
  - Industry Output 4.16 times Farm Output
  - Also incorporate multiplier on other sectors
# Economic Impact of Agricultural Education

## Internal Rate of Return

<table>
<thead>
<tr>
<th>Costs</th>
<th>IRR (Benefit:Cost)</th>
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<tbody>
<tr>
<td><strong>At Farm Level</strong></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>0.104 (3.3)</td>
</tr>
<tr>
<td>Social</td>
<td>0.148 (6.1)</td>
</tr>
<tr>
<td><strong>With Supply Chain Impact</strong></td>
<td>0.263 (27.8)</td>
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</tbody>
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Private rate of return substantially higher than that for tertiary education rate of 5.8%.

Higher rate of return than that calculated for Tertiary education of 5.7%

Very high rates of social return when wider supply chain impact of improved agricultural productivity factored in.

NB Using a slightly revised methodology, the returns are slightly higher. However we have tried to incorporate the most conservative assumptions in our reported numbers.
Take home messages

- Agricultural education is of significant value in the type of rapidly changing technological and economic environment now facing Irish farmers

- Very high demand for formal agricultural education

- Supply challenges, particularly for modern skills training with high pupil teacher ratios

- Economic returns, significant private and social returns to formal agricultural education
  - From a human capital perspective (IRR)
  - From a farm level production perspective (income, yields and intensity)
Thank You