Irish agriculture: public goods and productivity conundrums

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Next steps for farming productivity – agri-tech, investment and knowledge transfer

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Teagasc in brief

- Teagasc – pronounced “Chawg-ask” means “instruction”
- Teagasc – The Irish Agriculture and Food Development Authority – research, advisory and education
- Annual expenditure €180 m. and 1200 total staff – 70% State grant
- 233 researchers + 240 Ph.D. students; 64 subject-matter specialists; 78 teachers; 285 advisory; 7 research centres; 51 advisory offices and 7 colleges
**FOOD & DRINK EXPORTS**

The sector recorded the 7th consecutive year of growth in exports during 2016.

- **€11.15 billion**
  - the value of Irish food & drink exports, an increase of 2%

- **37%**
  - of Irish food & drink exports are destined for the UK, valued at €4.13 billion

- **41%**
  - Growth of
  - or €3.27 billion since 2010

- **32%**
  - Other EU markets account for €3.53 bn or

- **31%**
  - International markets account for €3.49 bn, or

Irish food & drink is sold in **180 markets worldwide**.
Teagasc research: from farm to gut
Profit from productivity

- Profit = productivity x relative output and input prices
- In medium to long run ... change in relative prices ~ constant
- Technology adoption/innovation >> productivity >> Improved profit
- Hopefully we can all agree on the veracity of this proposition
Role for public research knowledge transfer in addressing market failures

- Two examples: data infrastructure and technology integration failures
- Data infrastructure failure can frustrate development of ‘best’ technology
- Integration failure can frustrate adoption of ‘best’ technology
New technology is typically embodied in purchased market inputs (e.g. fertilisers, machinery, software, etc.)

Purchases of these inputs has greatly improved on-farm profits and will continue to do so ...

‘Simple’ use decision rule vs ‘complex’ underlying technology

High potential levels of adoption
AI sire selection for dairy cows driven by Economic Breeding Index (EBI)

- EBI denominated in € and reflects dairy profitability (= monetary value of genetic gain)
- Single market accepted EBI for dairy sector
- Very high rate of adoption
- Key factors in developing the EBI ...  
  (1) farmer ownership of the underlying genetics data  
  (2) ‘independent’ research team to produce credible EBI
Trend of EBI in Irish dairying

Profit per lactation (€)

Year of birth

EBI

Fertility

Milk

DNA selection 2009

Benefit to cost ratio 18 to 1

€5/year

€12/year

€25/year

€12/year
Integration market failure

- Some technologies may not/cannot be embodied in individual inputs ...

- ‘complex’ decision rules vs (potentially) ‘simple’ underlying technology

- Result: adoption may be lower (sometimes substantially) than otherwise with lower profits and perhaps poorer environmental outcomes

- Examples: 1) optimal grassland management
  2) pasture-based precision agriculture?
Conclusion

• Market failures matter!