Structural challenges, farm adjustment and profitability

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Study Aim: To set up the links between structural challenges, farm adjustment and farm profitability

• Data: 2015 Regional Wellbeing Survey in Australia (Dryland farmers = 1278, Irrigators = 755)
Challenges faced by dryland farmers in 2008-13

- Rising input costs: 81.9%
- Reduced demand/prices: 69.3%
- Drought: 68.0%
- Natural disasters: 42.5%
- Difficulty of obtaining labour: 35.4%
- Pests, diseases pr weed omvasopm: 29.6%
- Difficulty of accessing affordable finance: 21.5%
- Environmental degradation: 13.7%

Source: Regional Wellbeing Survey 2013 (N=1278)
Challenges faced by irrigators in 2008-13

- Rising input costs: 84.8%
- Drought: 70.6%
- Reduced demand/prices: 69.9%
- Increased fixed charges on permanent...: 59.9%
- Reduced water allocation: 49.8%
- Natural disasters: 48.1%
- Difficulty of obtaining labour: 38.5%
- Increased cost of purchasing temporary...: 32.5%
- Pests, diseases pr weed invasion: 31.5%
- Difficulty of accessing affordable finance: 25.3%
- Restrictions on trading water: 20.7%
- Environmental degradation: 11.4%

Source: Regional Wellbeing Survey 2013 (N=755)
Adjustment strategies by dryland farmers, 2008-13

Postponed investment in farm capital
Increased own work hours on the farm
Invested in new technologies
Reduced hired labour
Reduced use of non-labour inputs
Reduced farm production
Increased off-farm work
Changed products
Found new markets
Purchased or leased additional land
Received financial supports from government
Shared expenses with other farmers
Sold or leased some of my land
Temporarily stopped farming
Borrowed from family or friends

Source: Regional Wellbeing Survey 2013 (N=1278)
Adjustment strategies by irrigators, 2008-13

- Increased own work hours on the farm: 72.6%
- Invested in new technologies: 67.4%
- Postponed investment in farm capital: 64.8%
- Reduced hired labour: 64.8%
- Reduced use of non-labour inputs: 63.6%
- Reduced farm production: 57.5%
- Increased off-farm work: 50.9%
- Found new markets: 39.6%
- Changed products: 37.9%
- Received financial supports from government: 32.2%
- Bought temporary water entitlement: 30.3%
- Sold temporary water entitlement: 28.3%
- Purchased or leased additional land: 26.3%
- Shared expenses with other farmers: 21.3%
- Temporarily stopped farming: 17.2%
- Sold or leased some of my land: 16.0%
- Borrowed from family or friends: 15.9%
- Sold permanent water entitlement: 15.9%
- Bought permanent water entitlement: 11.5%

Source: Regional Wellbeing Survey 2013 (N=755)
Farm profitability in 2013

**Dryland farmers**
- Making a profit: 47%
- Breaking even: 32%
- Making a loss: 21%

**Irrigators**
- Making a profit: 45%
- Breaking even: 36%
- Making a loss: 19%

Legend:
- blue: making a loss
- orange: breaking even
- gray: Making a profit
Research questions

Structural challenges encourage farm-level adjustment

But does adjustment help to improve profitability?
– Adjustment may reduce total production cost but also reduce total revenue.

Research questions:
– Which adjustment strategies mediate the impact of structural challenges on farm profitability?
– Which adjustment strategies suppress the impact of structural challenges on farm profitability?
Conceptual links between structural challenges, farm adjustment and profitability

Structural change challenges in 2008-2012

Farm adjustment strategies

- Reduced hired labour
- Increased own work hours
- Reduced use of non-labour
- Changed products
- Found new markets
- Reduced farm production
- Purchased or leased
- Sold or leased some of my
- Increased off-farm work
- Invested in new technologies
- Postponed investment in
- Received financial supports
- Borrowed from family or
- Shared expenses with
- Temporarily stopped
- Bought temporary water
- Bought permanent water
- Sold permanent water
- Sold temporary water

Current profitability in 2013 (Making improvements)
Method

- Structural equation modelling
  \[ Adjustment_i = \alpha_i + \beta_i \text{Challenges} + \gamma_i X + u_i \]
  \[ Profitability = \delta + \sum_{i=1}^{m} \theta_i \text{Adjustment}_i + \sigma \text{Challenges} + \varphi Z + v \]

Hypotheses:
- \( \beta_i > 0 \)
- \( \sigma < 0 \): Direct effect
- \( \theta_i > 0 \) if suppression
- \( \theta_i < 0 \) if mediation
- \( \sigma \theta_i \): Indirect effect of Adjustment \( i \)
Estimated links between structural challenges, farm adjustment and profitability, dryland farmers
Estimated link between structural challenges, farm adjustment and profitability, irrigators
## Estimated indirect and direct effects of structural challenges on farm profitability, irrigators

<table>
<thead>
<tr>
<th>Adjustment strategies</th>
<th>Coef.</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold temporary water entitlement</td>
<td>-0.07</td>
<td>0.04</td>
<td>0.05</td>
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<tr>
<td>Reduced hired labour</td>
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<td>0.08</td>
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<tr>
<td>Reduced use of non-labour inputs</td>
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<td>Increased off-farm work</td>
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<td>0.03</td>
</tr>
<tr>
<td>Borrowed from family or friends</td>
<td>-0.11</td>
<td>0.04</td>
<td>0.01</td>
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<tr>
<td>Increased own work hours on the farm</td>
<td>-0.07</td>
<td>0.06</td>
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<tr>
<td>Changed products</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.58</td>
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<tr>
<td>Found new markets</td>
<td>-0.01</td>
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<td>0.58</td>
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<tr>
<td>Reduced farm production</td>
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<tr>
<td>Postponed investment in farm capital</td>
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<td>0.02</td>
<td>0.34</td>
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<tr>
<td>Sold or leased some of my land</td>
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<td>0.03</td>
<td>0.23</td>
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<tr>
<td>Invested in new technologies</td>
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<td>0.01</td>
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<tr>
<td>Bought temporary water entitlement</td>
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<td>0.06</td>
<td>0.46</td>
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<td>Temporarily stopped farming</td>
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<td>0.70</td>
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<td>Shared expenses with other farmers</td>
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<td>Purchased or leased additional land</td>
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<td>0.46</td>
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<tr>
<td>Received financial supports from government</td>
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<tr>
<td><strong>Total indirect effects</strong></td>
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<td><strong>0.12</strong></td>
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<tr>
<td><strong>Total effects</strong></td>
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<td>0.91</td>
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<td>-0.20</td>
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<td><strong>Total effects</strong></td>
<td>-0.26</td>
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Conclusions

- Structural challenges are associated with lower profitability for both dryland and irrigated farmers.
- Many farm adjustments are found to mediate the negative impacts of structural challenges on profitability (e.g., reduced hired labour, borrowed from family and friends).
- Investing in new technologies – proactive adjustment is found to suppress the impact of structural challenges on profitability.