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# Structural challenges, farm adjustment and profitability

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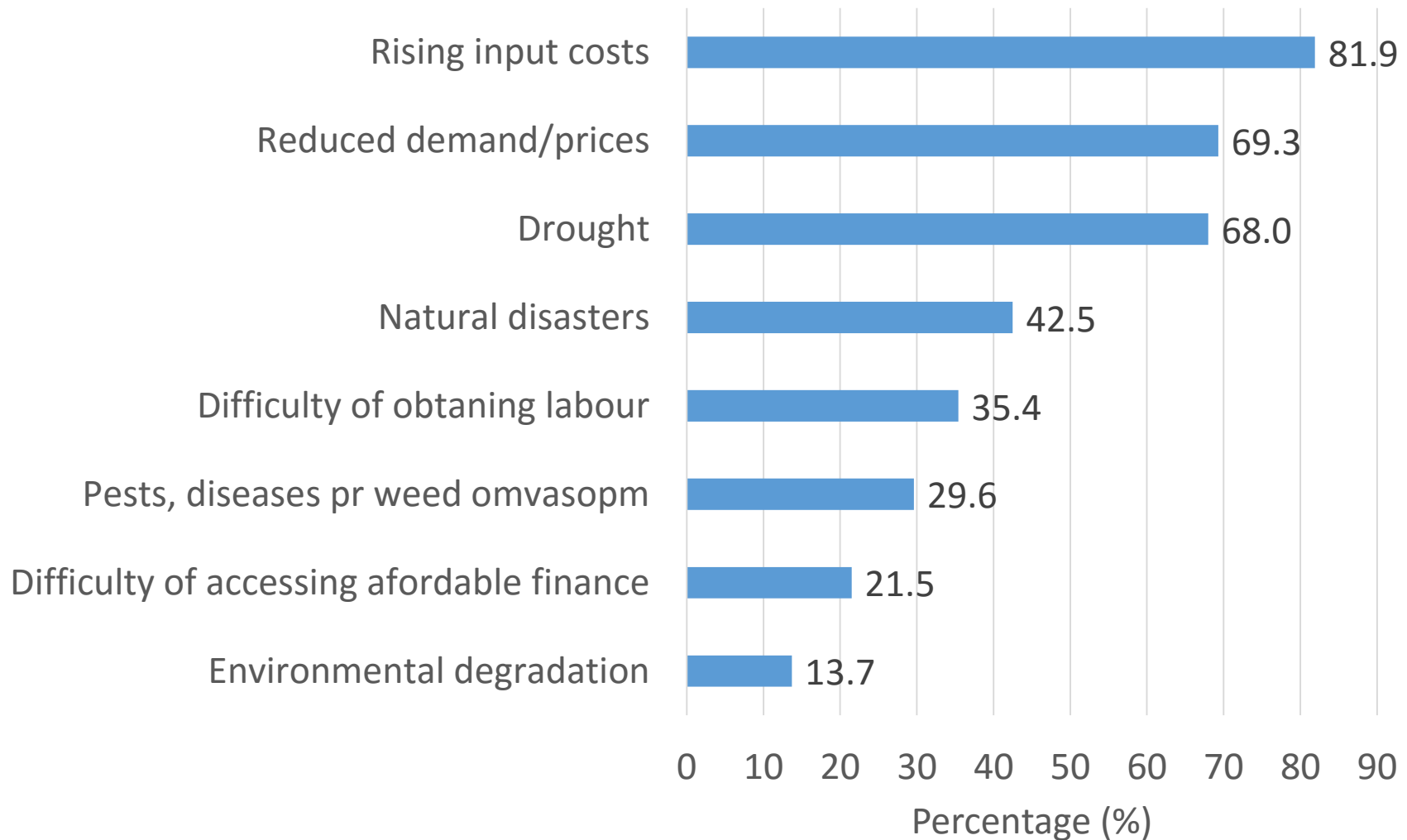
Paper presented at the 60<sup>th</sup> AARES Conference,  
Canberra, 2-5 Feb, 2016

**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)



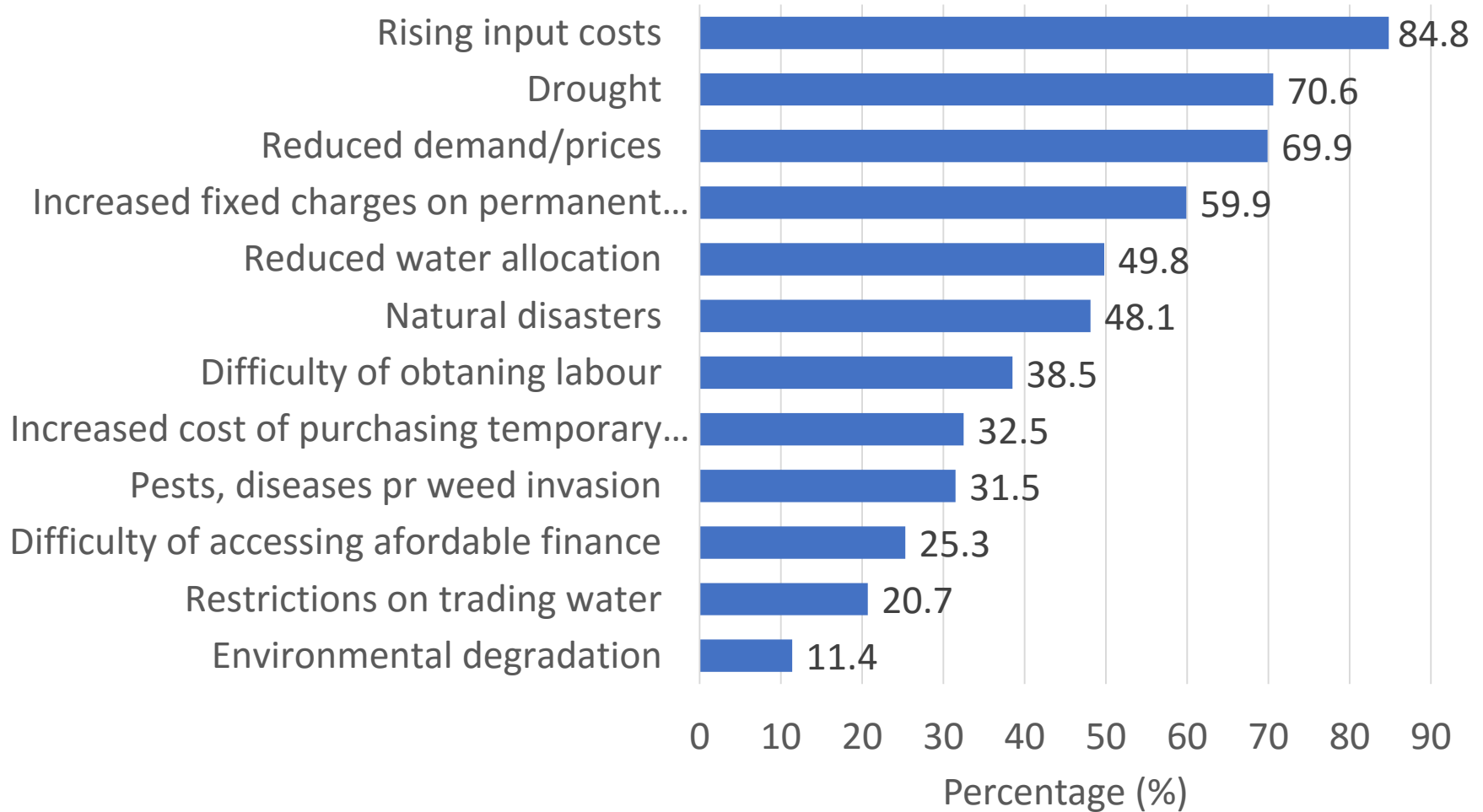
# Challenges faced by dryland farmers in 2008-13



Source: Regional Wellbeing Survey 2013 (N=1278)



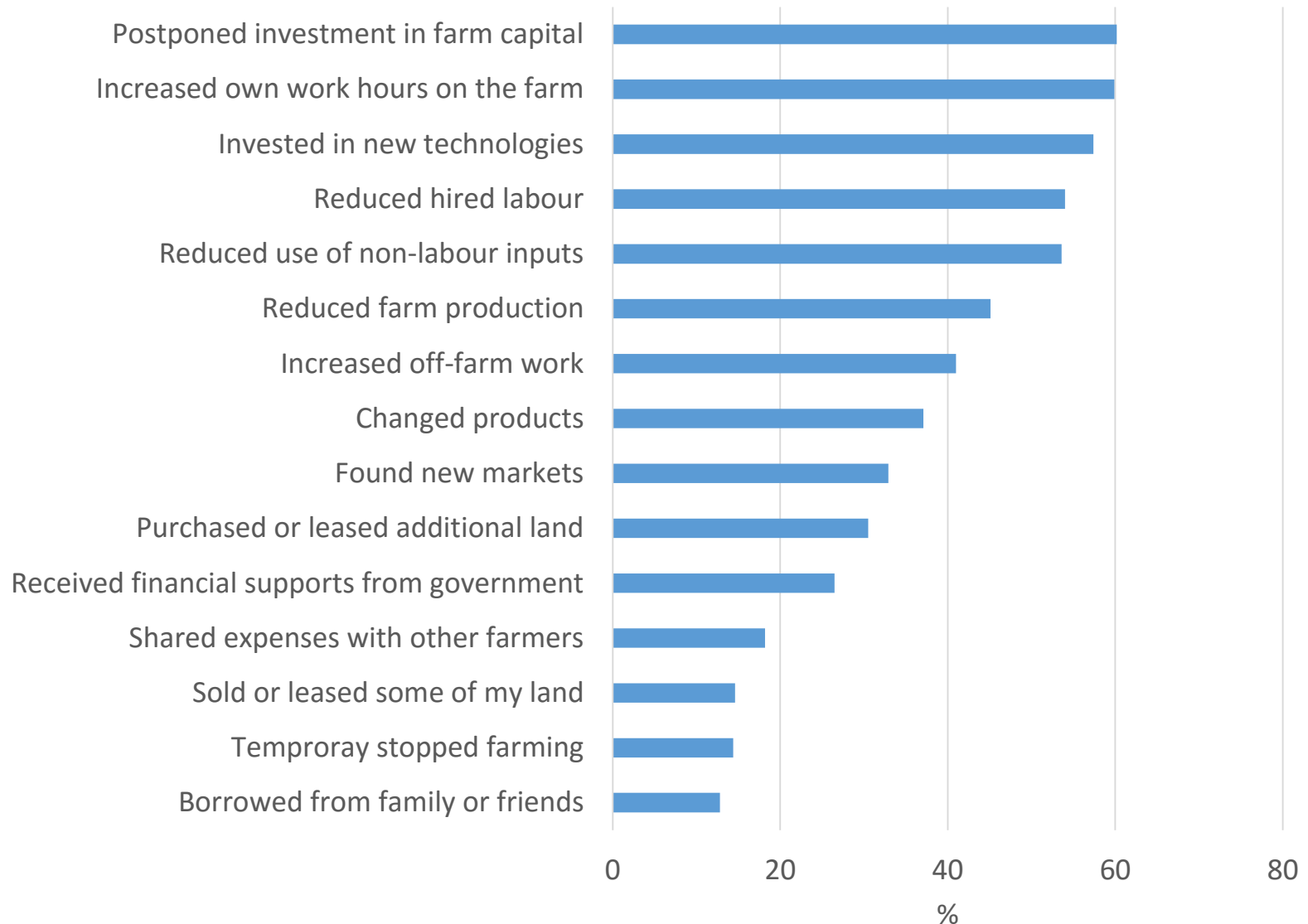
# Challenges faced by irrigators in 2008-13



Source: Regional Wellbeing Survey 2013 (N=755)

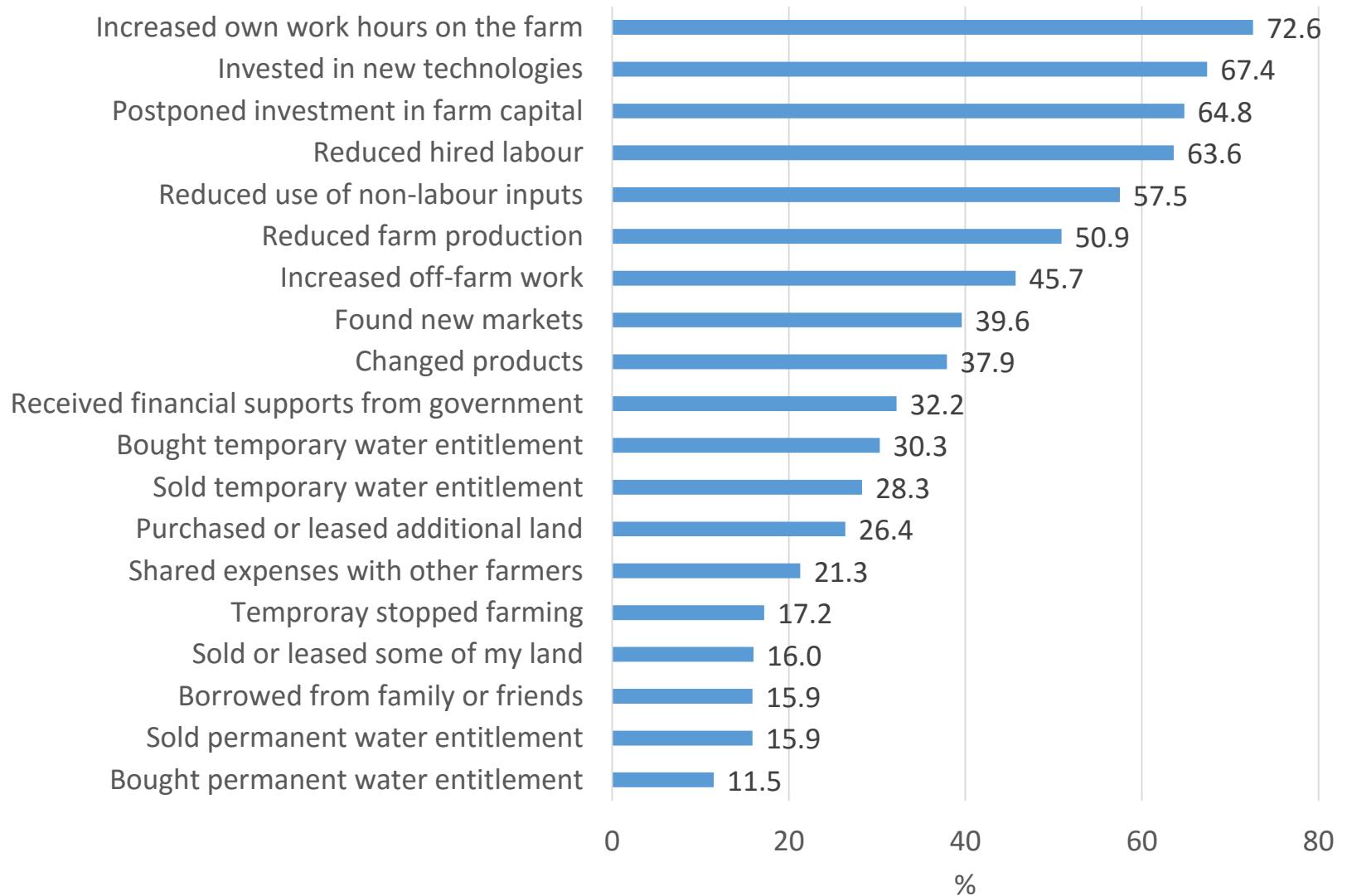


# Adjustment strategies by dryland farmers, 2008-13



Source: Regional Wellbeing Survey 2013 (N=1278)

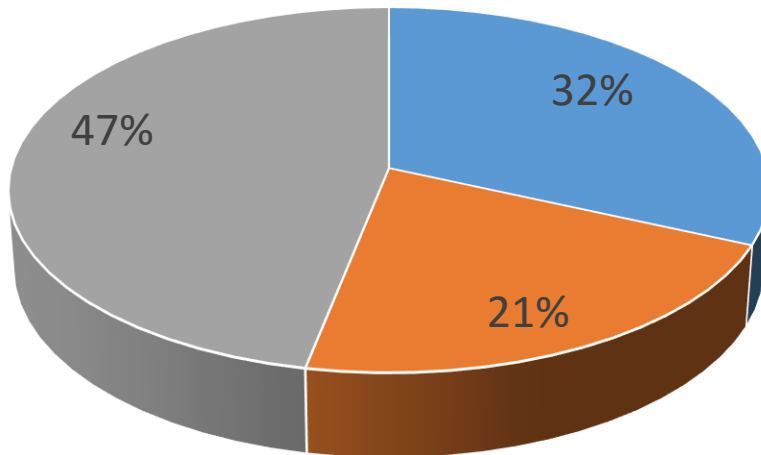
# Adjustment strategies by irrigators, 2008-13



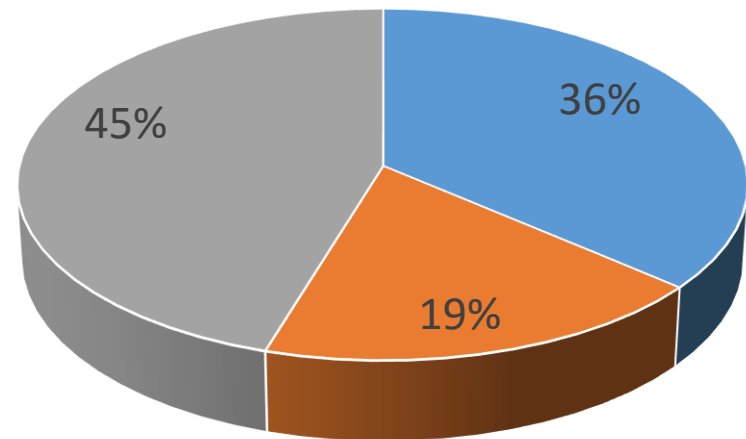
Source: Regional Wellbeing Survey 2013 (N=755)

# Farm profitability in 2013

Dryland farmers



Irrigators



■ making a loss   ■ breaking even  
■ Making a profit

Structural challenges encourage farm-level adjustment

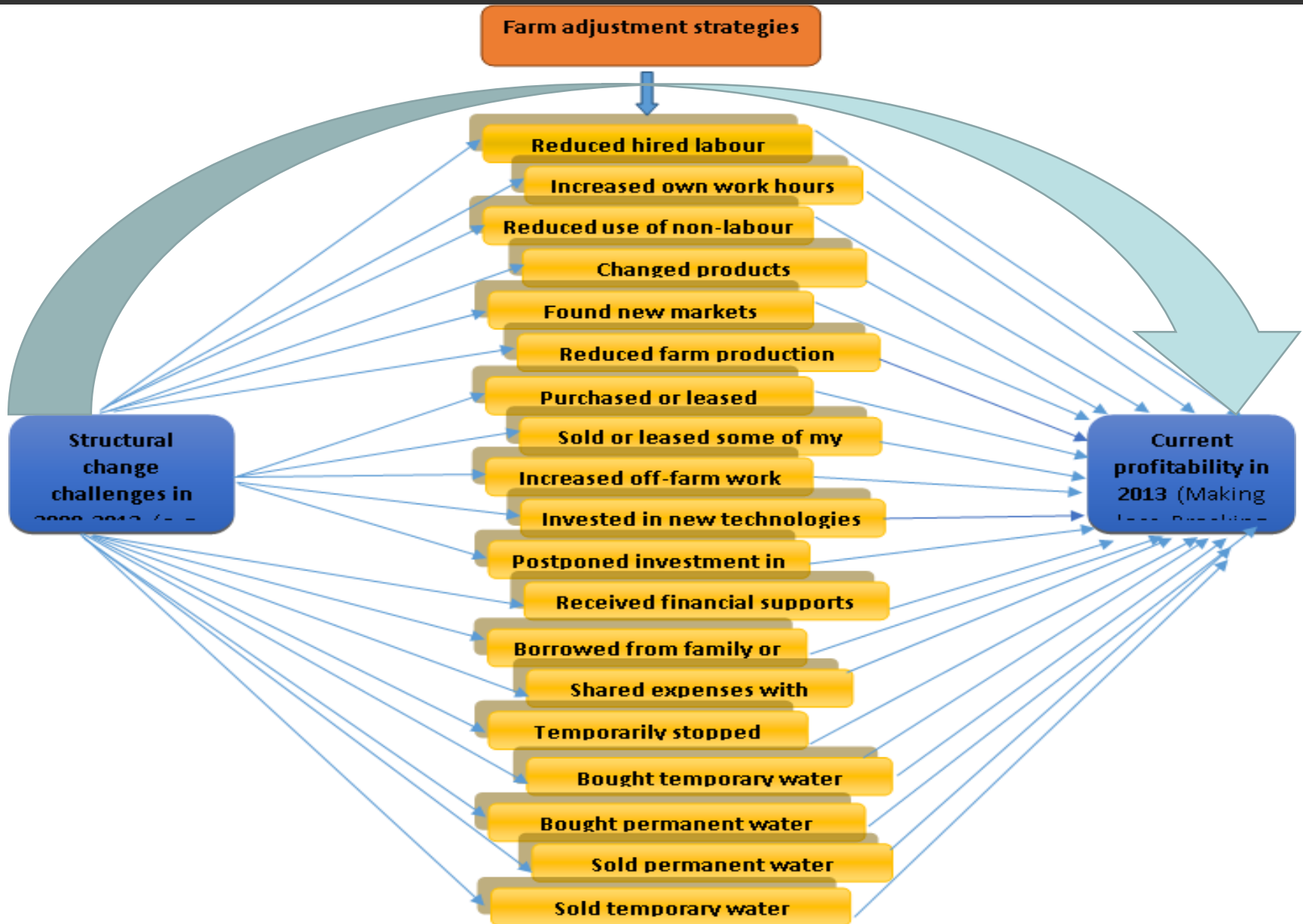
But does adjustment help to improve profitability?

- 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 equation modelling

$$\begin{aligned} \text{Adjustment}_i &= \alpha_i + \beta_i \text{Challenges} + \gamma_i X + u_i \\ \text{Profitability} \\ &= \delta + \sum_{i=1}^m \theta_i \text{Adjustment}_i + \sigma \text{Challenges} + \varphi Z + v \end{aligned}$$

Hypotheses:

$$\beta_i > 0$$

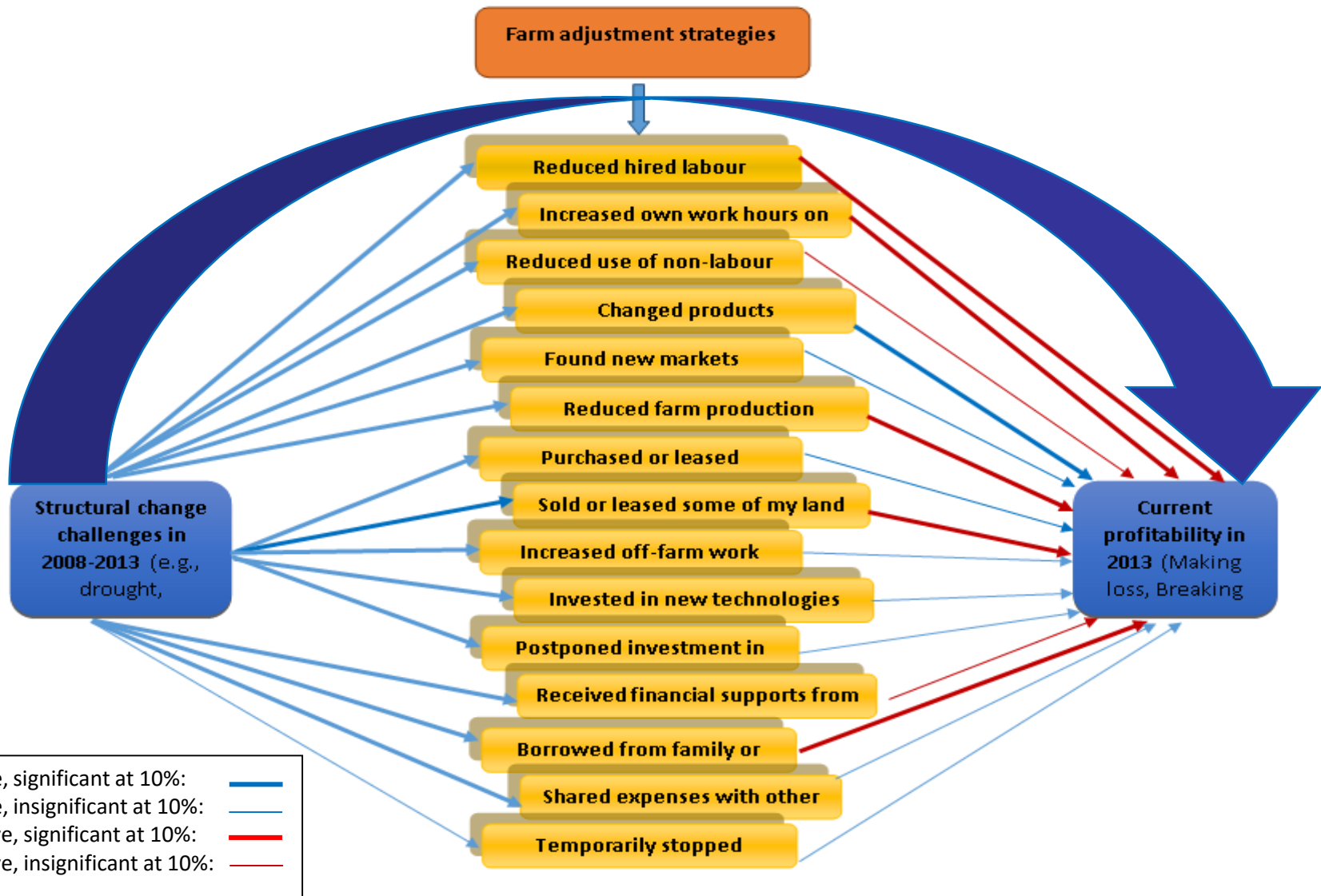
$\sigma < 0$ : Direct effect

$\theta_i > 0$  if suppression

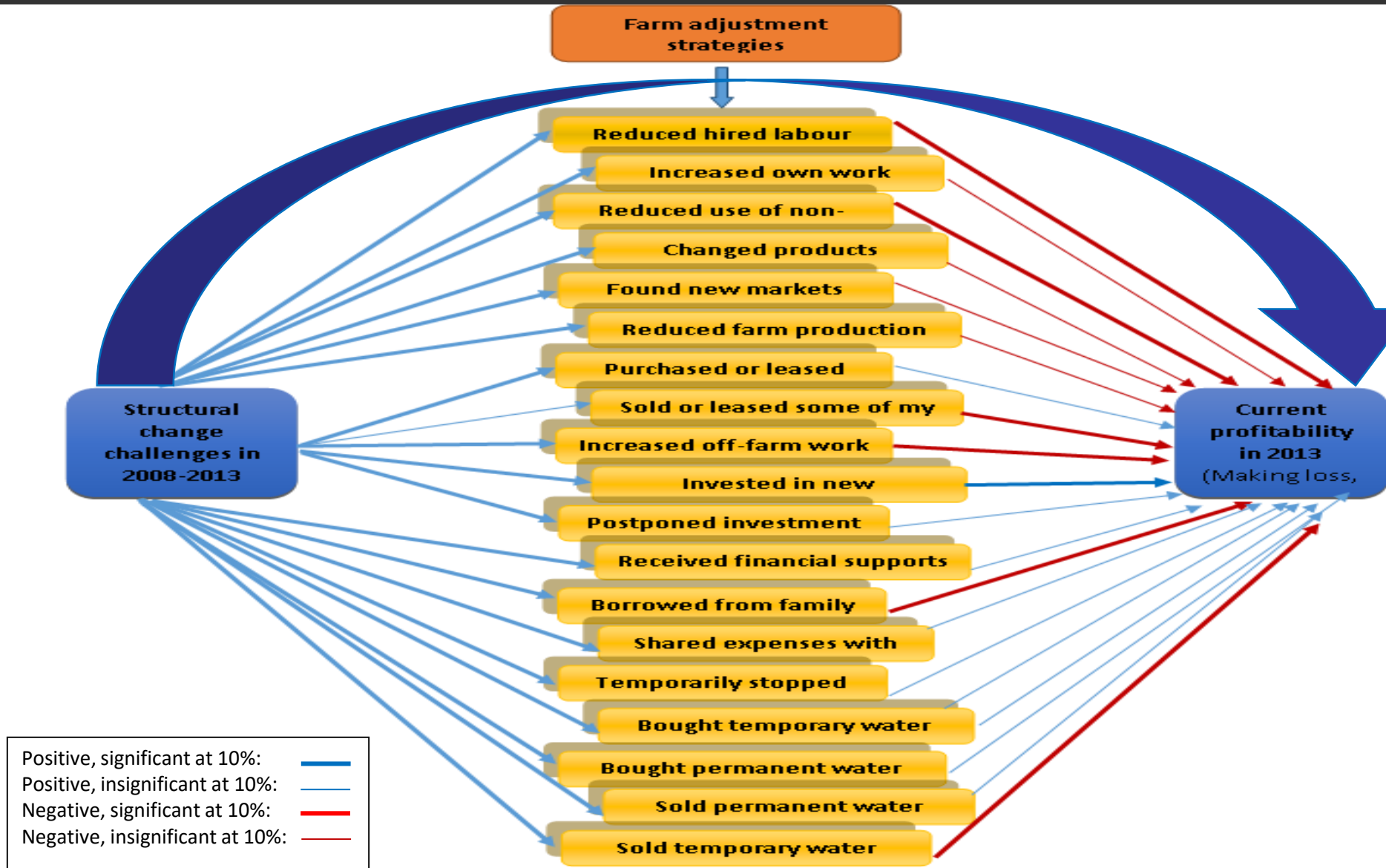
$\theta_i < 0$  if mediation

$\sigma\theta_i$ : 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

	Coef.	SE	p-value
<b><i>Adjustment strategies</i></b>			
<b>Sold temporary water entitlement</b>	<b>-0.07</b>	<b>0.04</b>	<b>0.05</b>
<b>Reduced hired labour</b>	<b>-0.10</b>	<b>0.05</b>	<b>0.08</b>
<b>Reduced use of non-labour inputs</b>	<b>-0.07</b>	<b>0.03</b>	<b>0.02</b>
<b>Increased off-farm work</b>	<b>-0.06</b>	<b>0.03</b>	<b>0.03</b>
<b>Borrowed from family or friends</b>	<b>-0.11</b>	<b>0.04</b>	<b>0.01</b>
Increased own work hours on the farm	-0.07	0.06	0.25
Changed products	-0.01	0.02	0.58
Found new markets	-0.01	0.01	0.58
Reduced farm production	-0.01	0.03	0.65
Postponed investment in farm capital	0.02	0.02	0.34
Sold or leased some of my land	-0.04	0.03	0.23
<b>Invested in new technologies</b>	<b>0.09</b>	<b>0.04</b>	<b>0.01</b>
Bought temporary water entitlement	0.04	0.06	0.46
Bought permanent water entitlement	0.02	0.06	0.76
Sold permanent water entitlement	0.05	0.05	0.27
Temporarily stopped farming	0.01	0.04	0.70
Shared expenses with other farmers	0.04	0.03	0.23
Purchased or leased additional land	0.02	0.03	0.46
Received financial supports from government	0.01	0.02	0.73
<b>Total indirect effects</b>	<b>-0.23</b>	<b>0.12</b>	<b>0.06</b>
<b>Total effects</b>	<b>-0.27</b>	<b>0.11</b>	<b>0.01</b>



# Estimated indirect and direct effects of structural challenges on farm profitability, dryland farmers

	Coef	SE	P-value
<b><i>Adjustment strategies</i></b>			
Reduced hired labour	-0.05	0.03	0.10
Increased own work hours on the farm	-0.09	0.03	0.01
Reduced farm production	-0.10	0.03	0.00
Borrowed from family or friends	-0.11	0.06	0.04
Reduced use of non-labour inputs	-0.01	0.02	0.62
Sold or leased some of my land	-0.03	0.02	0.24
Invested in new technologies	0.03	0.03	0.29
Temporarily stopped farming	0.04	0.04	0.38
Shared expenses with other farmers	0.04	0.03	0.21
Increased off-farm work	0.00	0.03	0.94
Changed products	0.06	0.04	0.11
Found new markets	0.03	0.03	0.32
Postponed investment in farm capital	0.00	0.01	0.73
Received financial supports from government	0.00	0.02	0.87
Purchased or leased additional land	0.00	0.02	0.91
<b><i>Total indirect effects</i></b>	<b>-0.20</b>	<b>0.09</b>	<b>0.03</b>
<b><i>Total effects</i></b>	<b>-0.26</b>	<b>0.09</b>	<b>0.00</b>

- 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