

An Analysis of Milk Quota Abolition Impact on Scottish Farmers' Behaviour

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Introduction & aims



- Scottish dairy farming industry - strong decline in numbers & increase in farm size due to, amongst other reasons, the introduction of the milk quota in the EU in 1984
- Current developments in EU dairy policies, e.g., quota abolition forecasted for year 2015 might trigger further changes in the sector
- Aims of paper - analyse impact of *a priori* identified factors on farmers' behaviour as regards changing farm size in context of policy changes (*i.e.*, abolition of milk quota)

- Telephone survey March 2009 – interviews with 533 Scottish dairy farmers
- Questionnaire
 - socio-demographic & economic info
 - frequency of access to information sources
 - attitudes, perceptions and knowledge of dairy policies and markets
 - attitudes, perceptions and knowledge of environmental/ climate change issues
 - economic & environmental risk perceptions
 - intentional investment behaviour
 - attitudes towards animal welfare policies
 - attitudes towards milk quota abolition
 - perceptions of milk quota abolition impact on business
 - intentions to increase farm size in the short/medium/long term

- Structural equation modelling with observed and latent variables (SEM)

Jöreskog and Sörbom, 2007

structural equation model: $\eta = B\eta + \Gamma\xi + \zeta$

measurement model for y: $y = \Lambda_y\eta + \varepsilon$

measurement model for x: $x = \Lambda_x\xi + \delta$

Where: η is an $m \times 1$ random vector of endogenous latent variables;

ξ is an $n \times 1$ random vector of exogenous latent variables;

B is an $m \times m$ matrix of coefficients of the η variables in the structural model;

Γ is an $m \times n$ matrix of coefficients of the ξ variables in the structural model;

ζ is an $m \times 1$ vector of equation errors (random disturbances) in the structural model;

y is a $p \times 1$ vector of endogenous variables;

x is a $q \times 1$ vector of predictors or exogenous variables;

Λ_y is a $p \times m$ matrix of coefficients of the regression of y on η ;

Λ_x is a $q \times n$ matrix of coefficients of the regression of x on ξ ;

ε is a $p \times 1$ vector of measurement errors in y ; δ is a $q \times 1$ vector of measurement errors in x

Methodology (2)

Latent variables



- ‘farm business inherited from previous generation’
- ‘intention to leave farm to children’
- ‘size of milk quota owned’
- ‘perceived influence of dairy policies and markets on farm business during the past ten years’
- ‘attitudes towards dairy policies and regulations’
- ‘perceptions of milk quota abolition impact on dairy business’
- ‘intentions to change farm size after 2015’

Methodology (3)

Indicators



| | Mean | Std. deviation |
|-----------------------------------------------------------------------------------------------------------------------------------|------|----------------|
| Did you inherit your farm from your family? (inherit) | 1.21 | .410 |
| Do you intend to leave the farm to your children? (child) | 1.25 | .433 |
| How much quota do you own? (quota) | 1.97 | .746 |
| During the past ten years had Government policies in the dairy industry had any influence on your dairy farm business? (businfl1) | 2.15 | .791 |
| During the past ten years had input prices had any influence on your dairy farm business? (businfl2) | 2.80 | .483 |
| During the past ten years had prices for liquid milk had any influence on your dairy farm business? (businfl3) | 2.82 | .471 |
| I consider Scottish dairy policy to be increasingly restrictive (attdp1) | 3.19 | 1.120 |
| Dairy legislation spoils the pleasure in my work (attdp2) | 3.55 | 1.215 |
| The increasing amount of dairy regulations interferes with my plans for the future (attdp3) | 3.45 | 1.181 |
| Changes in dairy regulations and policies are an increasing burden (attdp4) | 3.96 | 1.016 |
| Removing milk quotas will force me to reduce herd size (attqab1) | 1.80 | 1.114 |
| Removing milk quotas will make me focus on the processing side of the dairy business (attqab2) | 1.84 | 1.106 |
| The threat of removing milk quotas stops me from investing in my business (attqab3) | 2.06 | 1.230 |
| Do you intend to change the size of the farm after 2015? (behavlt) | 1.65 | .478 |

Methodology (4)

Factor analysis

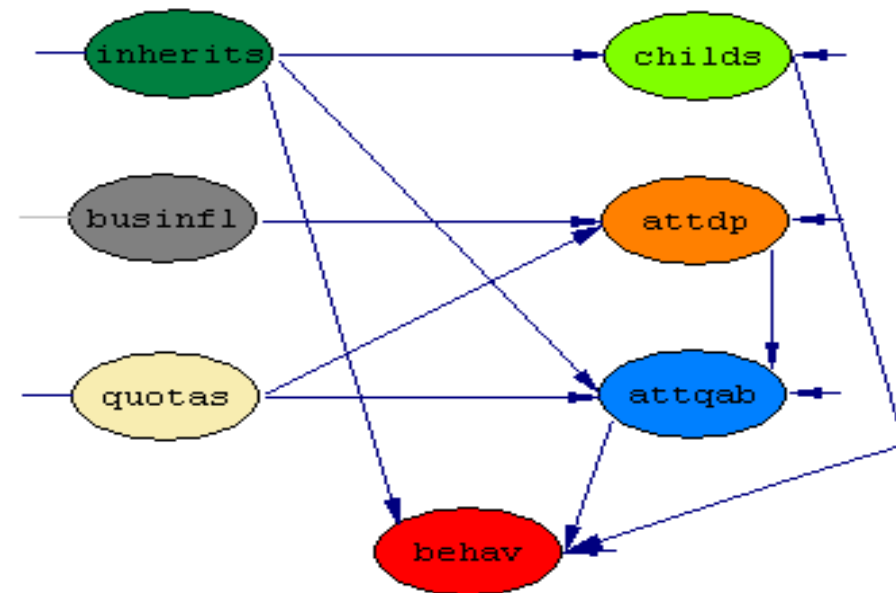


| | Component | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Did you inherit your farm from your family? (inherit) | -.046 | -.057 | -.012 | -.075 | .097 | .963 | -.030 |
| Do you intend to leave the farm to your children? (child) | -.038 | .020 | -.039 | .122 | .924 | .103 | -.065 |
| How much quota do you own? (quota) | -.048 | -.041 | .047 | -.056 | -.065 | -.029 | .978 |
| During the past ten years had Government policies in the dairy industry had any influence on your dairy farm business? (businfl1) | .096 | -.033 | .517 | -.508 | .249 | -.128 | .032 |
| During the past ten years had input prices had any influence on your dairy farm business? (businfl2) | .044 | .011 | .800 | -.020 | .038 | .018 | -.008 |
| During the past ten years had prices for liquid milk had any influence on your dairy farm business? (businfl3) | .065 | .022 | .803 | .057 | -.120 | -.004 | .055 |
| I consider Scottish dairy policy to be increasingly restrictive (attdp1) | .667 | .203 | .013 | -.091 | .139 | -.084 | .000 |
| Dairy legislation spoils the pleasure in my work (attdp2) | .831 | .051 | -.010 | -.034 | -.080 | .030 | -.013 |
| The increasing amount of dairy regulations interferes with my plans for the future (attdp3) | .844 | .103 | .074 | -.002 | -.035 | .011 | -.037 |
| Changes in dairy regulations and policies are an increasing burden (attdp4) | .818 | -.013 | .100 | .036 | -.047 | -.032 | -.005 |
| Removing milk quotas will force me to reduce herd size (attqab1) | .052 | .810 | .057 | .095 | .026 | .078 | -.076 |
| Removing milk quotas will make me focus on the processing side of the dairy business (attqab2) | .039 | .698 | -.154 | -.188 | -.078 | -.157 | -.115 |
| The threat of removing milk quotas stops me from investing in my business (attqab3) | .209 | .717 | .106 | .059 | .066 | -.018 | .142 |
| Do you intend to change the size of the farm after 2015? (behavlt) | -.025 | -.013 | .087 | .832 | .217 | -.129 | -.048 |

Results (1)

Goodness-of-fit

- normed chi-square 2.97 (within recommended interval of 1 to 3)
- root mean square error of approx. RMSEA 0.061 (below 0.10)
- standardised root mean residual SRMR 0.057 (below 0.08)
- GoF indexes above (or close to) 'magic 0.90 or 0.95'
(CFI 0.93; IFI 0.93; NNFI 0.91;
GFI 0.95; AGFI 0.92; NFI 0.90
RFI 0.87)



Results (2)

Effects

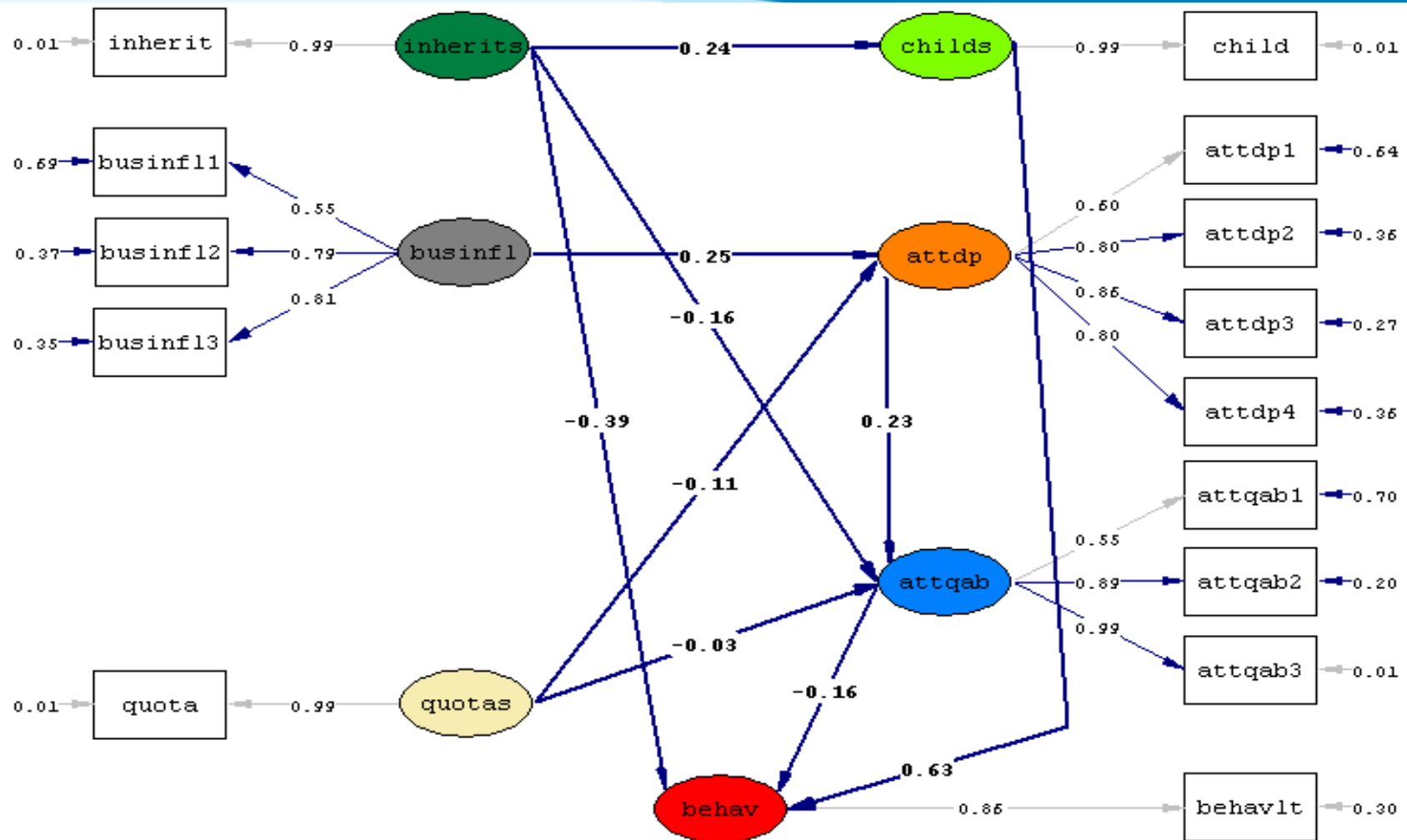


| Observed/latent variables | Direct effect | Indirect effect | Total effect |
|---------------------------|-------------------------------------------------------------|------------------|------------------|
| | intention to change the size of the farm after 2015 (behav) | | |
| inherits | -0.39 (-5.08) | 0.10 (5.13) | -0.29 (-2.72) |
| quotas | 0.0 | 0.01 (1.23) | 0.01 (1.23) |
| businfl | 0.0 | -0.01 (-2.05) | -0.01 (-2.05) |
| childs | 0.63 (8.30) | 0.0 | 0.63 (8.30) |
| attdp | 0.0 | -0.02 (-2.24) | -0.02 (-2.24) |
| attqab | -0.16 (-2.46) | 0.0 | -0.16 (-2.46) |

Standardised total, direct and indirect effects on behavioural latent variable
(t-values in parentheses)

Results (3)

Path diagram



Chi-Square=205.23, df=69, P-value=0.03251, RMSEA=0.061

Conclusions



- Results suggest that farmers who
 - (1) *intend to leave their farm to children;*
 - (2) *have not inherited their farm from previous generation;*
 - (3) *perceive a lower impact of milk quota abolition on their business;*
 - (4) *have less negative attitudes towards dairy policies and regulations; and*
 - (5) *perceived a lower influence of policies and markets on business during the past decade*are most likely to increase farm size.
- More work needed to explore the less expected results & add and assess impact of other determinants.



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S✓**ccess** through **Knowledge**