Prospects of Insurance after Dairy Quota Abolition

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  – Dairy Quota abolition
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Dairy Quota abolition – What do we know?

- Structural change
  - Expected increase of herd size

- Significant price drop after quota abolition
  - Inelastic demand function and production increase

- Suggested increase of milk price volatility
  - Planning insecurity
  - Additional costs of risk for risk averse dairy farmers

Magnitude of milk price volatility and what is the willingness to pay of risk averse dairy farmer to prevent milk price volatility
Price Risk Management on dairy farm level

- Production diversification on farm level
- Livestock Gross Margin (LGM) insurance like in the U.S.
  - Highly subsidized instrument to guarantee a specific Gross Margin
- Hedging dairy products on commodity exchanges
  - Size of the farm
  - Costs of education
  - Transaction costs
  - No application because the milk price volatility was too low
  - Basis risk

How to use the willingness to pay to insure stable milk prices and planning security
Data and modelling the milk price series

• Approximating the milk price volatility after dairy quota abolition with a farm gate milk price series from New Zealand
  - Monthly basis from 2009 until 2014
  - Non-stationary price series

• Using the Geometric Brownian Motion (GBM) to model the milk price for additional 24 months

\[ dp_{t,m} = \alpha_m \cdot p_{t,m} \cdot dt + \sigma_m \cdot p_{t,m} \cdot dz \]

• Stochastic simulation of the milk price
Calculation of the willingness to pay to prevent milk price volatility

• Calculation of the certiancy equivalent (CE) for risk averse dairy farmers
  – CE is a certain payment that has the same utility as an uncertain payment

• Power Risk Utility function

\[ U(GR_{t,m}) = \frac{GR_{t,m}^{1-\theta}}{1-\theta} \]

• the values 0.1464, 0.4115, 0.6762 and 0.906 are used for \( \theta \) because they represent reasonable Holt and Laury lottery (HLL) values from 5 to 8

• Calculating the utility of the GR

\[ E(U(GR_{t,m})) = (\sum_{j=1}^{J} U(GR_{t,m,j}) \cdot \frac{1}{j}) \]
Calculation of the willingness to pay to prevent milk price volatility

• Using the inverse of the utility function to calculate the CE

\[ GR_{t,m}(U) = [U_{t,m} \cdot (1 - \theta)]^{\frac{1}{1-\theta}} = [E(U(GR_{t,m})) \cdot (1 - \theta)]^{\frac{1}{1-\theta}} = CE_{t,m} \]

• Risk Premium is the difference between expected Gross Revenue and CE

\[ RP_{0,m} = E(GR)_{0,m} - CE_{0,m} \]
WTP before dairy quota abolition

RP in ct. per cow and day

- HLL value 8
- HLL value 7
- HLL value 6
- HLL value 5
- transaction costs

months

0  4  8  12  16  20  24
WTP after dairy quota abolition

RP in ct. per cow and day

- HLL value 8
- HLL value 7
- HLL value 6
- HLL value 5
- transaction costs

months

0  4  8  12  16  20  24

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How to use the additional WTP?

Farm 1

Farm 2

Farm 3

Insurance \ Cooperative

Commodity Exchange
Conclusion

- Milk price volatility and planning unsecurity of dairy farmers are increasing.
- Willingness to pay to prevent milk price volatility are going beyond transaction costs of hedging dairy for risk averse dairy farmers.
- Structural reasons are inhibiting the opportunity to hedge for most of the dairy farmers.
- Establishing insurance that concentrate the WTP of dairy farmers and hedge dairy products for them on commodity exchanges.