

2010 CAES Risk Management Workshop

Behavioural Dimensions of Decision Making in Grain Marketing

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Motivation

- Standard economic theory says that people make rational, consistent, and self-interested decisions
 - people know what they want, and what they want is good for them
 - people know the best way to get what they want
 - more is better
 - choices are consistent over time
- Empirical observation has shown that generally we are not so rational and consistent in our decisions

Motivation

- Insights from psychology suggest that economics should:
 - consider motivations that are ignored by standard theory (such as status, fairness, greed, fear)
 - allow for the possibility of mistakes
- Behavioural economics assumes bounded rationality
 - people have limited time and capacity to weigh all benefits and costs of their decisions
 - decisions are not fully rational
 - people tend to make predictable and avoidable mistakes

Motivation

- ❑ Individuals are subject to biases and heuristics when making decisions
 - people use rules of thumb, educated guesses, or even common sense when making decisions that involve complex variables or incomplete information
- ❑ Several studies have investigated the decision-making process in different activities and industries
- ❑ However relatively little attention has been devoted to agricultural marketing

Objectives

- To gather better understanding of how producers make marketing decisions by addressing the following questions
 - Do producers choose same marketing strategy every year?
 - Could producers have made more profit with different strategies?
 - Do results in previous year lead producers to choose “safer” or “riskier” strategies in the following year?
 - What types of behaviour could explain producers’ choices?



Wheat Marketing in Canada

- ❑ All wheat farmers must market their crop through the Canadian Wheat Board (CWB)
- ❑ CWB offers different marketing programs
- ❑ Pool pricing is the default program
 - all wheat sales all pooled together and farmers received the same price
 - farmers receive initial payment when grain is delivered and additional payments as sales are completed throughout the crop year
 - during the crop year CWB provides a projected price, the Pool Return Outlook (PRO)



Wheat Marketing in Canada

- ❑ In the last 10 years CWB developed Producer Payment Option (PPO) contracts
- ❑ PPO contracts allow farmers to price their own grain and provide more flexibility to manage their cash flow
 - farmers can lock in their price or basis using futures contracts
 - payment schedule is different than in the pool accounts
- ❑ PPO contracts and pool accounts can be used simultaneously



Farmers' Behaviour

- ❑ There is evidence that farmers are also subject to biases and heuristics in their decisions
- ❑ Previous studies found that producers are generally averse to losses, treat probability in a non-linear manner, and tend to underestimate price risk
- ❑ Some studies found that both risk perception and risk attitude are important in determining producers' behaviour

Loss Aversion and Framing

- ❑ People exhibit a stronger impulse to avoid losses than to acquire gains
- ❑ Different decisions are made if the same choice is framed as a loss rather than as a gain
- ❑ Empirical studies often find that the most common risk attitudes are:
 - risk aversion for gains
 - risk seeking for losses



Status Quo Bias

- ❑ When faced with more than one option, people tend to choose the one that ratifies or extends the existing condition (status quo)
- ❑ People are generally predisposed to avoid change
- ❑ Including more options may delay choice, increasing the fraction of individuals who adopt default alternative

Probability Weighting

- Notion that people do not treat probabilities as they are stated
- People tend to overweigh or underweight probabilities when making decisions
- Over/underweighting of probabilities can be related to:
 - preference for certain gambles
 - overconfidence
 - optimism/pessimism



Overconfidence

- Previous studies in financial markets suggest that overconfident investors tend to trade more often than other investors
 - but they would also tend to make less money (to a large extent because of more transaction fees)
- In a marketing context, overconfident farmers sell in different times of the crop year trying to take advantage of their superior price forecasting skills

Sequential Decisions

- ❑ Do prior outcomes change our attitude towards risk?
- ❑ Do we take more (or less) risk after a gain or a loss?
- ❑ In general empirical evidence is mixed
- ❑ Framing of prior gains and losses can have an impact too



Research Method

- Test if farmers have better information or analytical skills to outperform the “pool”

$$perf_{i,t} = \alpha + \beta \%PPO_{i,t} + \gamma Active_{i,t} + \varepsilon_{i,t}$$

where

$$perf_{i,t-1} = \text{price received}_{i,t-1} - \text{pool price}_{t-1}$$

$\%PPO$ = percentage of crop delivered against PPO contracts, indicating how much farmers tried to market by themselves

$Active$ = measure of marketing activeness



Research Method

- Measure of marketing activeness
 - create series of the amount of wheat marketed in each week of the crop year
 - calculate standard deviation of this series
 - the higher the standard deviation the more active the farmer is (each year the farmer sells in different weeks)
- Negative relationship between activeness and performance would suggest that farmers are overconfident



Research Method

- Test if previous year's marketing strategy affects current year's strategy
- Test if previous year's return affect current year's strategy

$$\% pool_{i,t} = \alpha + \beta \% pool_{i,t-1} + \gamma p_{i,t-1}^R + \varepsilon_{i,t}$$

where

$$p_{i,t-1}^R = \text{price received}_{i,t-1} - \text{pool price}_{i,t-1}$$



Data

- ❑ Farmers who grew Canada Western Red Spring (CWRS) wheat between 2003-04 and 2008-09
 - sample size: 67,798 farmers
- ❑ Marketing strategy adopted by each farmer during each year
 - how many tonnes delivered to each marketing program
- ❑ Dates when farmers signed up PPO contracts
- ❑ Final price received by each farmer
- ❑ Seeded acres
- ❑ Province and municipality

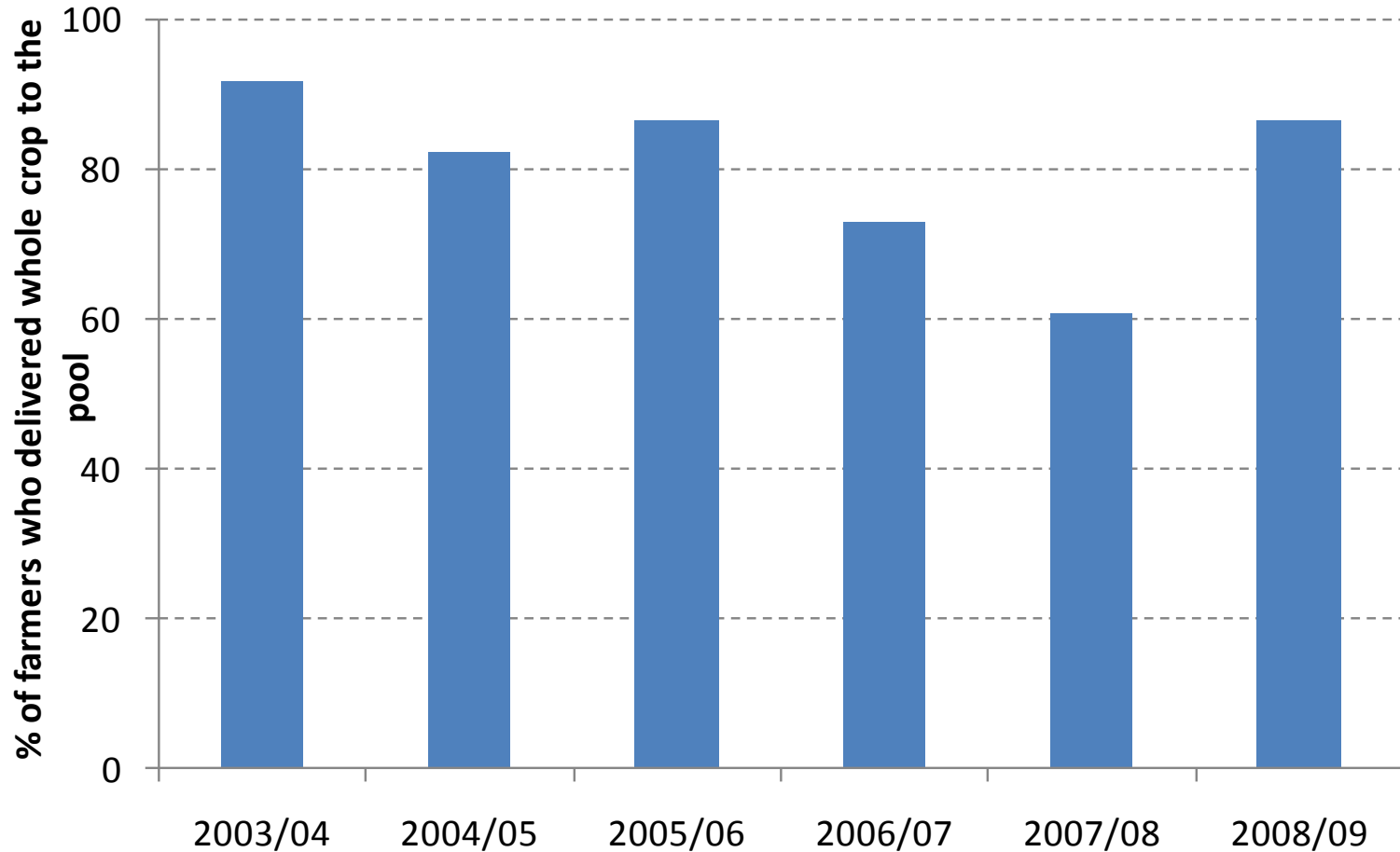


Preliminary Analysis

- ❑ Farmers who grew CWRS wheat continuously between 2003-04 and 2008-09
 - sample size: 11,901 farmers
- ❑ Almost all farmers who use PPO contracts also deliver part of their crop to the pool
 - pool pricing is still more largely used than PPO contracts
- ❑ Use of pool pricing had been decreasing between 2003-04 and 2007-08, but increased in 2008-09
 - PPO contracts have been used more often
- ❑ There is large heterogeneity in marketing strategies

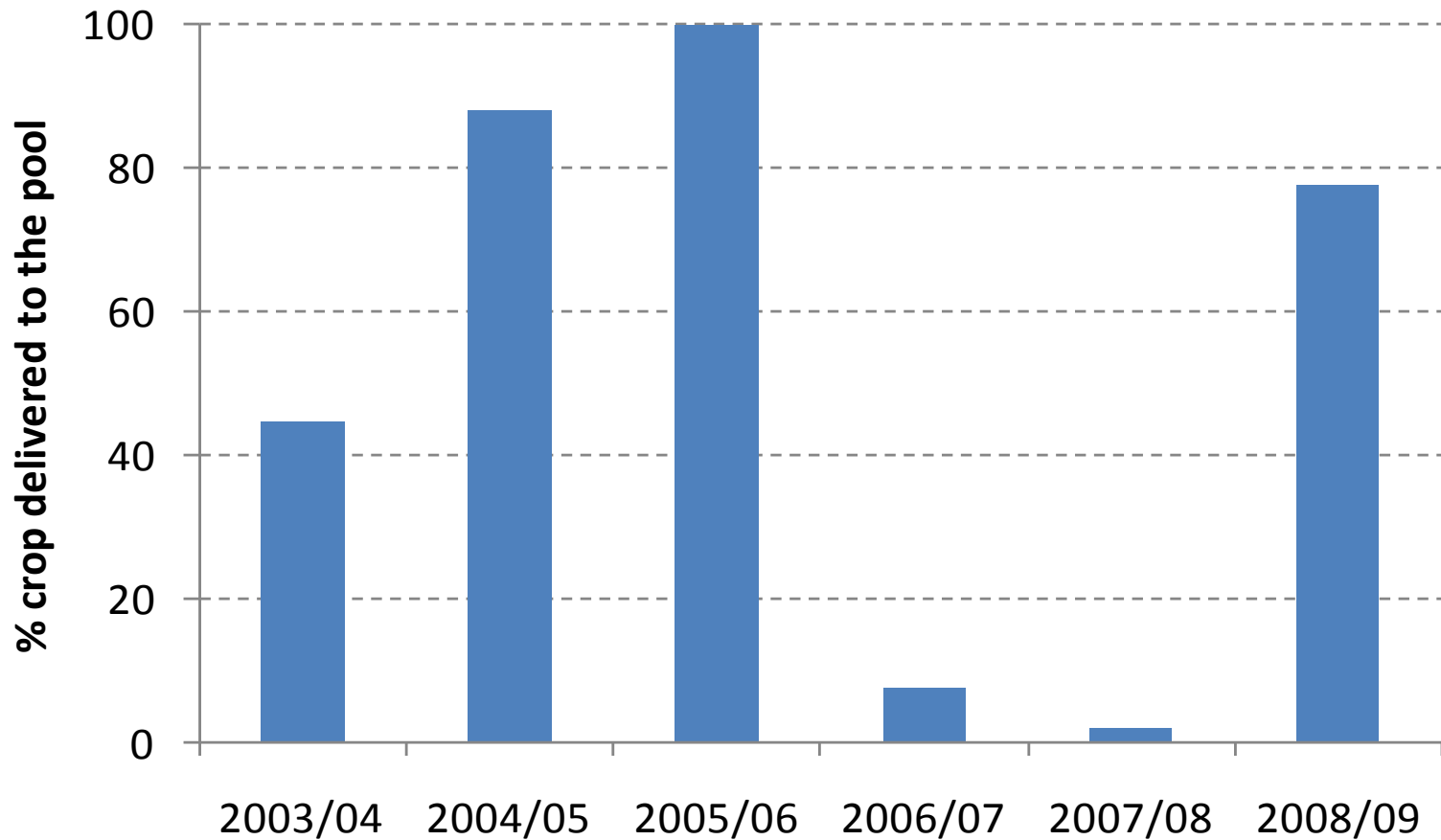
Preliminary Analysis

All Farmers (n=11,901)

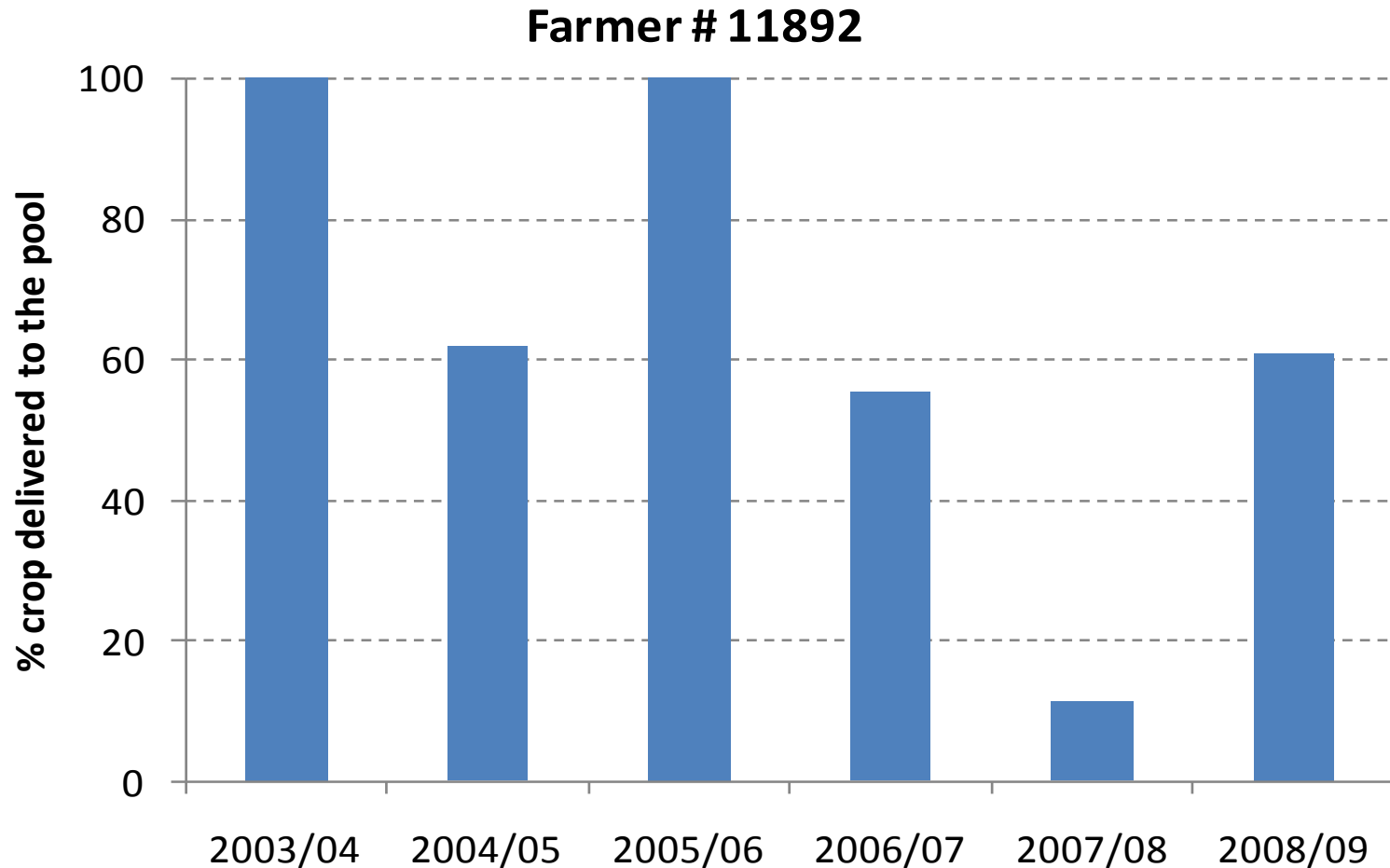


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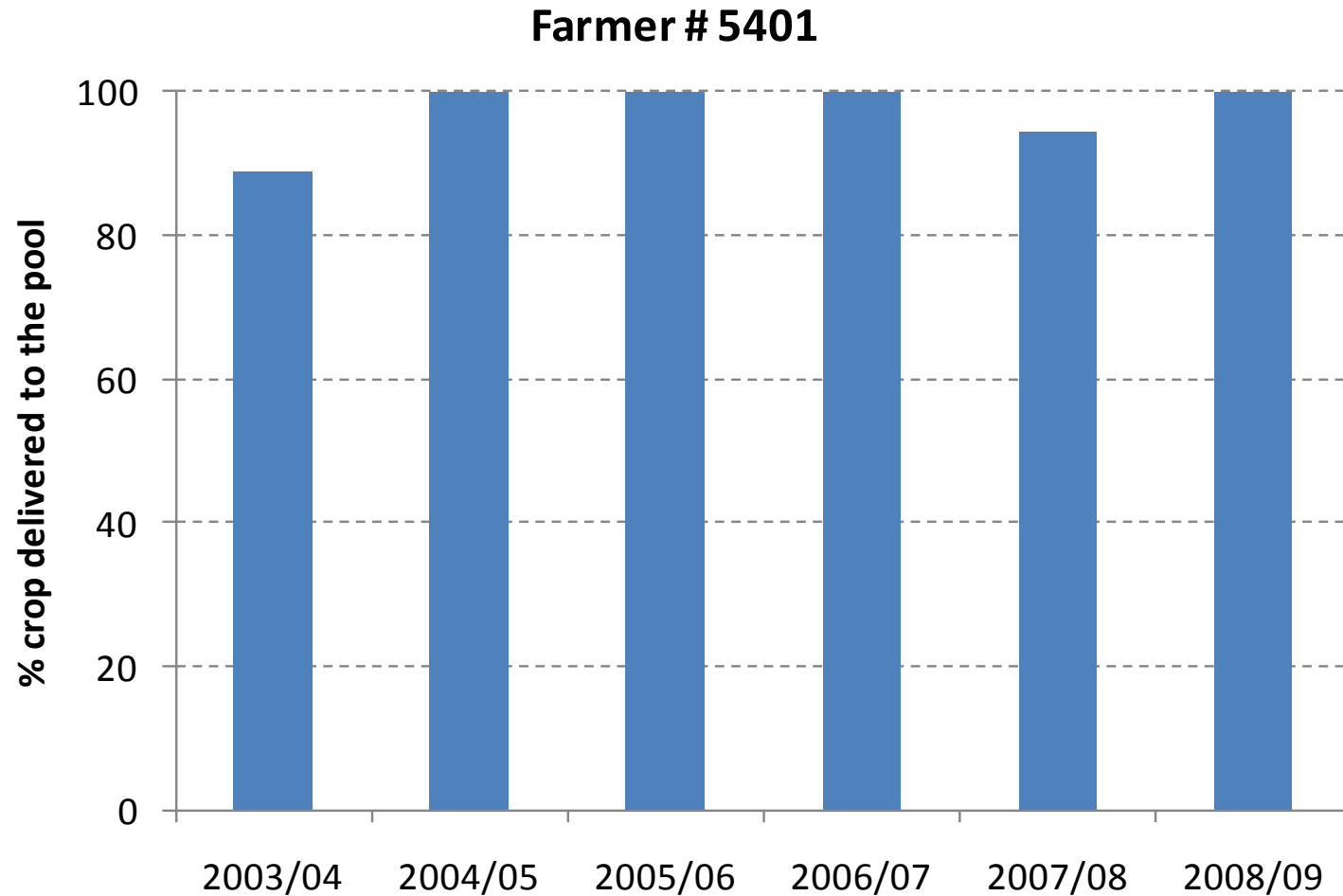
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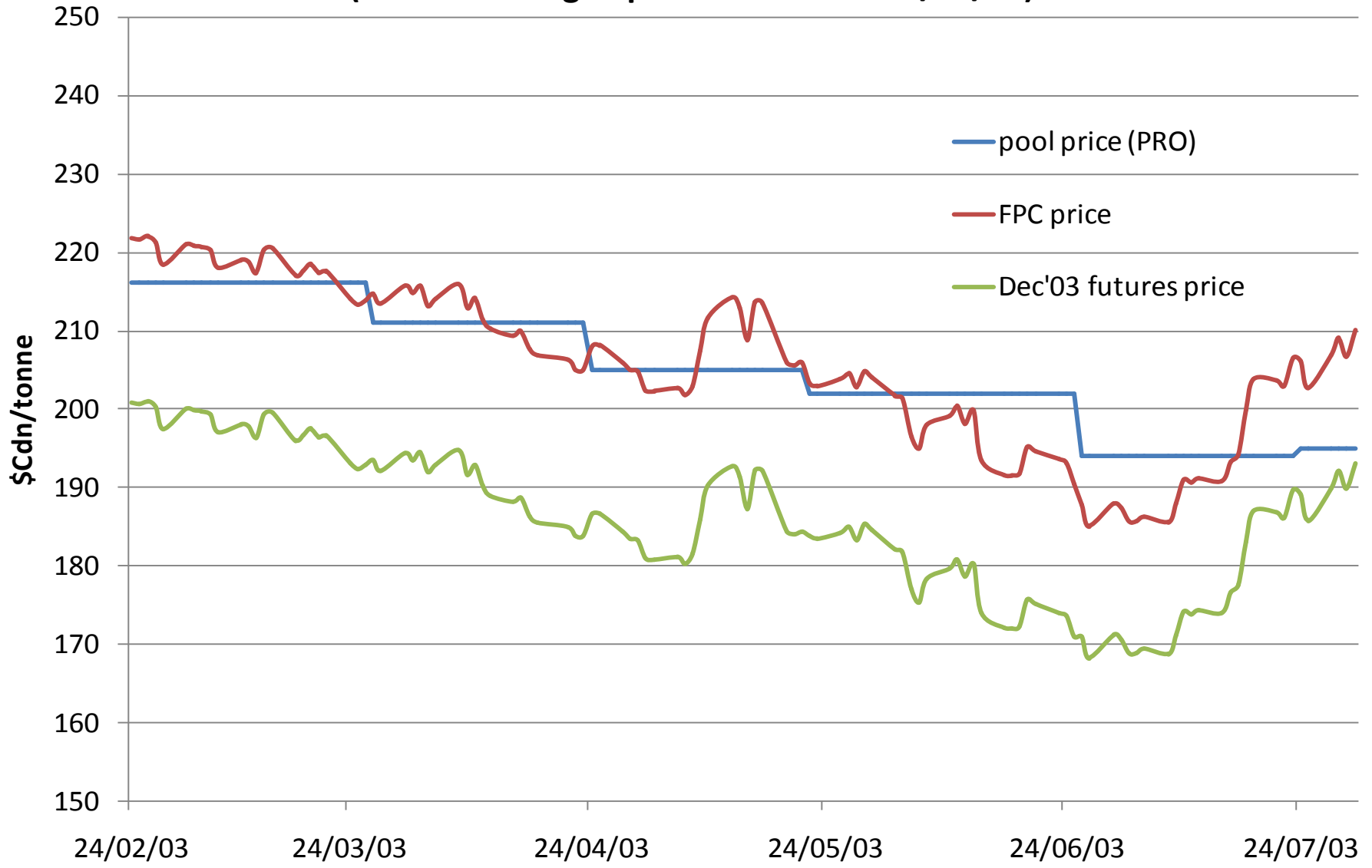
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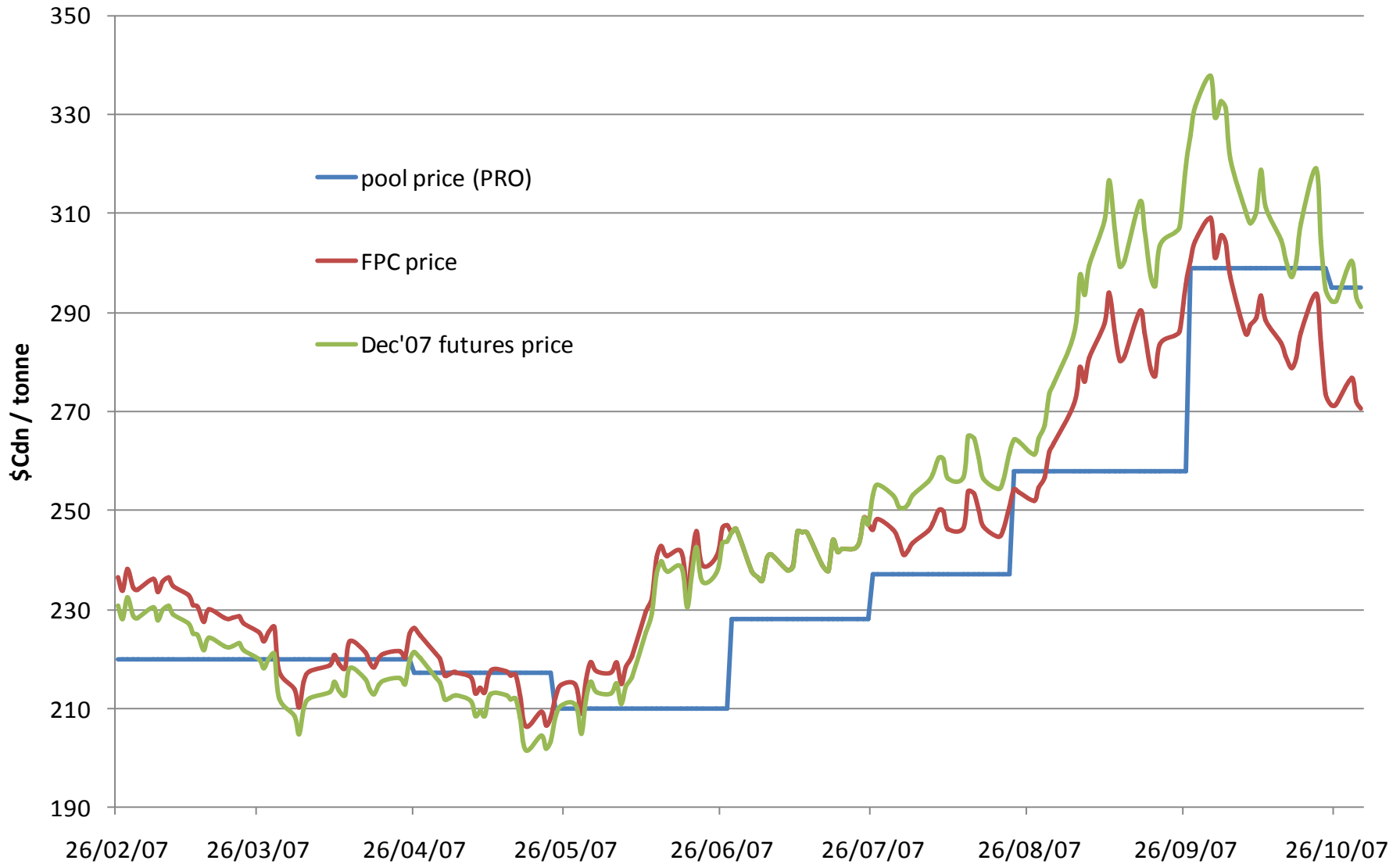
Preliminary Analysis



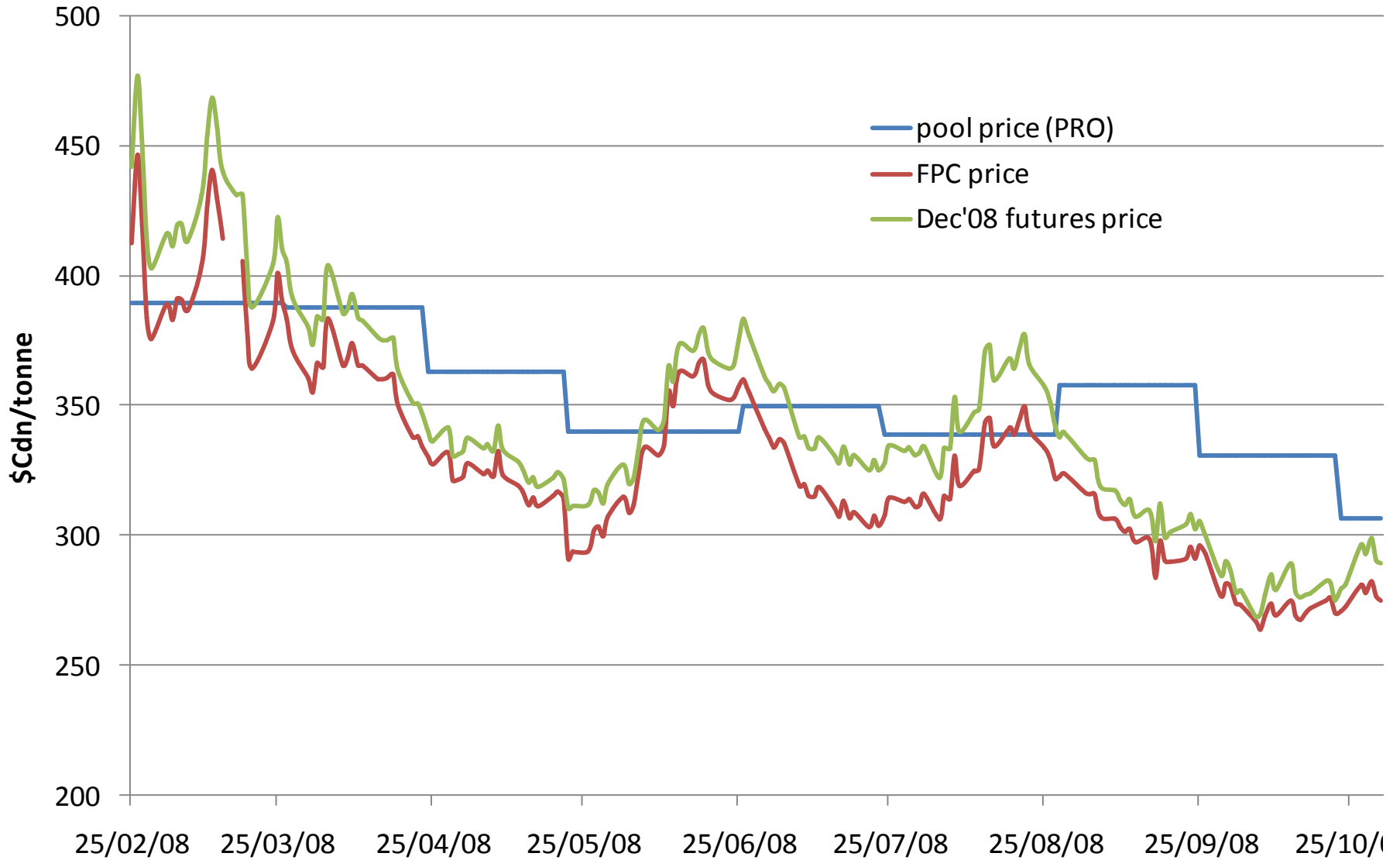
2003-04 Crop Year (deadline to sign up PPO contracts: 31/07/03)



2007-08 Crop Year (deadline to sign up PPO contract: 31/10/07)



2008-09 Crop Year (deadline to sign up PPO contracts: 31/10/08)



Next Steps

- ❑ Collect remaining data and estimate the models
- ❑ Incorporate preference for different cash flow schedule in the analysis
- ❑ Consider other types of behaviour
 - e.g. herding

Thank You

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