POTENTIAL OF WEATHER DERIVATIVES AS A RISK MANAGEMENT TOOL FOR AUSTRALIAN WHEAT FARMERS

by

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Declaration

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree.
I certify that to the best of my knowledge any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

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Abstract

This thesis is concerned with determining the potential of weather derivatives as a weather risk management tool for Australian wheat farmers. The research is intended to provide the fledgling Australian weather derivative market and the Australian agricultural industry with indications of their potential for weather risk management. It provides information to agricultural producers on their usefulness, as well as providing information to Australian banks and other underwriters as they attempt to establish weather derivatives in their current risk transfer portfolios.

A review of the weather derivatives literature is presented, followed by research on different areas of weather derivative use by Australian farmers. The applications of this research focus on wheat producers in New South Wales and southern Queensland in the wheat-sheep belt; and provides a basis for further analysis of weather derivatives in other Australian agricultural industries.

First a theoretical optimal hedging model is developed to determine potential demand for weather derivatives by Australian wheat farmers. The theoretical willingness to pay by farmers is estimated using historical price and yield data along with previously published elasticities and risk aversion levels. The results indicate potential demand is likely to be small although farmers who are more risk averse or who operate in riskier situations would be willing to pay a higher amount for this risk management tool.

The second section investigates one of the potential practical problems that may limit uptake of weather derivatives by Australian wheat farmers. Using historical rainfall data for three regional locations it explores how the benefits of a weather derivative contract are affected by geographical distance between the farmer and the location where the rainfall data is recorded. This geographical basis risk is found to be smaller than many imagine.

The third section answers the question of how useful weather derivatives are for reducing risk exposure of wheat farmers from unfavourable weather events. A hypothetical weather derivative is constructed and used to analyse the risk-reducing ability of the instrument for wheat farmers in two local government areas in New South Wales. The weather derivative proves to have little risk-reducing effect due primarily to difficulties in determining an accurate weather-yield relationship.

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