Crop Insurance under Restricted Access to Financial Markets

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**Crop Insurance under Restricted Access to Financial Markets**

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**Motivation.** The subsidized crop insurance program has a long history in the United States. The discourse surrounding the implications of governmental support for crop insurance points in two directions. First, there are those for whom the crop insurance is a risk management tool, which in the absence of governmental subsidy, will not be accessible to farmers (USDA, 2015). Second, there are those who believe that subsidizing crop insurance creates incentives for farmers to change their risk behaviour and nothing more (Bloomberg Business, 2013).

This challenge is not new and various arguments were proposed to explain or to reconcile these beliefs. Among them, it was recognized that crop-insurance is subject to adverse selection and moral hazard (Nelson and Loehmann 1987; Skees and Reel 1986; Chambers 1989; Miranda 1991; Makki and Somwaru 2001) and systemic risk (Miranda and Glauber 1997; Barnett 2000). Alternatively, governmental supported crop insurance operates as an income transfer to the farmers (Goodwin 2001).

A distinct approach is embodied by the work of Chambers (2007), Chambers and Quiggin (2009) and Chambers (2015). They make an essential observation. In addition to crop insurance, farmers in developed countries have access to other risk mitigating tools (i.e. financial markets, off-farm work, storage). Thus, the crop insurance is evaluated against other risk management alternatives for a share of their budget. In this setup, due to the separation between production and consumption decisions, the subsidized crop insurance affects farmers’ production choices by altering relative returns across states of nature, but not their marginal risk attitudes.

**Theoretical Contribution.** While spot on, their conclusions assume that farmers and potential insurers have access to the same crop insurance alternatives (i.e. financial market span). We relax this assumption by allowing farmers and insurers to access closed subsets of the entire market span. In this case, farmers and insurers will evaluate the crop insurance against other alternatives in their respective subsets of the market span. Because farmers can price only the orthogonal projection of the crop insurance on their market span, their willingness to pay for the insurance is lower than the insurers’ willingness to accept. The crop insurance subsidy helps bridge the gap between farmers and insurers valuations. In this setup, the subsidized crop insurance influences farmers’ production choices by altering both the relative returns across states of nature and their marginal risk attitudes. However, these changes should not be mistakenly attributed to changes in preferences over risk, but to changes in the available financial opportunities.

**Conclusion.** We show that crop insurance choices are motivated by profit maximizing behaviour and not risk mitigation considerations. However, because farmers and insurers have access to different subsets of the market span, their marginal risk valuations differ. The subsidized crop insurance will enrich the farmers’ market span altering the marginal risk valuation, in addition to changing the relative returns across states of nature.

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**Description of the Figures**

The theoretical model developed in this paper is illustrated with the help of Figures 1, 2 and 3. Some of the points are as follows:

**Figure 1** illustrates the pricing of a consumption vector outside the market span. Point A: $A_1$ is a potential consumption vector in the market span $M_f$. Point B: $B_1$ is the orthogonal projection of $0A$ in the market span $M_f$. Point C: $EC$ is a potential consumption vector generated by the combined market spans $M_f$ and $M_q$.

**Figure 2** illustrates the separation between consumption and production decisions in the presence of incomplete financial markets (i.e. $M_f$): Point E: $0E$ is the optimal stochastic agricultural output. Point F: $EF$ is the farmer’s optimal participation in the financial market conditional on the financial market span $M_f$.

**Figure 3** illustrates the change in the optimal production decisions following the expansion of the farmer’s financial opportunity set (i.e. $M_{f+q}$): Point G: $0G$ is the new optimal stochastic agricultural output. Point H: $GH$ is the farmer’s new optimal participation in the financial market conditional on the financial market span $M_{f+q}$.

If you would like to follow up on the paper, please email me at d.voica@massey.ac.nz. Thank you.

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**Figure 1. Valuing the Stochastic Consumption**

![Figure 1 Diagram]

**Figure 2. Separation between Production and Consumption Decisions**

![Figure 2 Diagram]

**Figure 3. Expanding the Farmer’s Financial Opportunity Set**

![Figure 3 Diagram]