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AUSTRALIAN AGRICULTURAL ECONOMICS SOCIETY AWARDS 1985

For two decades, the Australian Agricultural Economics Society has sponsored an annual prize for Master's theses. At the Society's Annual General Meeting on 13 February 1985, the Society resolved to sponsor a biennial prize for Ph.D. theses, with the first award being made for a thesis accepted during the two-year period ending 30 September 1985. Both the Ph.D. and Master's prizes relate to theses in the field of agricultural economics accepted by an Australian or New Zealand University. For each prize, the most meritorious thesis is selected by a panel of three members appointed by the Society.

PH.D. THESIS PRIZE

The prize was awarded to Laurence Paul O'Mara for a thesis entitled 'Linkages from the farm sector to the Australian macroeconomy — towards a theoretical and empirical analysis' submitted for the degree of Doctor of Philosophy of the Australian National University.*

Thesis Abstract

The volatile fortunes of the Australian farm sector in recent years, and particularly the severe drought of 1982-83, have renewed interest amongst policy makers and policy advisers in the impact which developments in the farm sector may have on the macroeconomy. However, in the Australian literature, there are few detailed theoretical or empirical analyses of farm-macroeconomic linkages. Further, the existing Australian macroeconomic models do not provide a fully suitable framework for undertaking such an analysis.

In view of these gaps or inadequacies in the existing literature, the objective of the thesis is twofold — first, to make a contribution toward the development of a macroeconomic model framework which is suitable for analysing the role of the farm sector in the Australian macroeconomy and, second, to undertake some of the associated analysis.

To that end, a relatively large theoretical model is developed in which the linkages between the farm sector and the macroeconomy are emphasised. The model proves to be too large and complex to be tractable using strictly formal algebraic techniques. Therefore, in the first instance, the analysis is undertaken using a slightly less rigorous geometric characterisation of the model. After this geometric approach is fully exploited, some parts of the analysis are extended and refined using theoretical simulation techniques.

A number of important results are established in these theoretical analyses. It is shown that, in principle, the marketing and institutional environment in which the farm sector operates is of major importance in influencing the macroeconomic implications of production and price shocks originating in the farm sector. It is also demonstrated that shocks

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to the volume of farm production or to farm prices may influence macroeconomic variables such as non-farm gross domestic product, the interest rate and the state of the balance of payments in a direction which is at variance to that suggested by intuition or conventional wisdom. For example, an exogenous (drought induced) decline in farm production could have a beneficial impact on non-farm output and on the state of the balance of payments. Alternatively, a drought which has a (more intuitive) adverse effect on the overall level of economic activity may place upward pressure on the interest rate. In a similar vein, an exogenous increase in the price of farm commodities on overseas markets may reduce domestic economic activity and worsen the balance of payments.

Because of the time and resources required to develop and use a relatively large theoretical simulation model, it is not feasible, within the context of the thesis, to apply theoretical simulation techniques to each of the analyses which are undertaken less formally using the geometric characterisation of the model. However, the foundations are laid to permit the ready extension of the theoretical simulation technique to these remaining cases as part of a future research exercise. The existence of the theoretical simulation model and analyses should also facilitate the eventual development of an empirical version of the model.

Given that some further post-thesis research will be required in order to develop an empirical version of the full model structure, it was decided to seek some tentative and preliminary empirical results from a very simple empirical version of the model. A major conclusion to emerge from this empirical analysis is that the farm sector may *not* have declined in relative importance as a source of *short-term instability* in non-farm output over the period since the early 1950s and may even have increased in importance. This result may be counterintuitive, given the declining relative contribution made by the farm sector to the *levels* of such variables as gross domestic product, exports and employment over this period. It is argued that the increased volatility of farm commodity prices since the early 1970s has been an important factor influencing this outcome.

MASTER'S THESIS PRIZE

The prize was awarded to Mohammad Jaforullah for a thesis entitled 'Supply response of sugar cane in the mill zones of Bangladesh — an econometric study', submitted to the Department of Agricultural Economics and Business Management, University of New England, for the degree of Master of Economics.*

Thesis Abstract

The sugar industry is the second most important agricultural industry in Bangladesh. The government objective is to achieve self-sufficiency in the production of white sugar as a means of conserving foreign currency. This objective, however, has not yet been achieved due to fluctuations in the year-to-year production of sugar cane and inadequate

* Mohammad Jaforullah is currently a postgraduate student at the Department of Economics, University of Adelaide.

supply of sugar cane to the mills. The government has tried to overcome these problems by increasing the price of sugar cane from time to time, banning the production of gur (home-made non-centrifugal brown or yellow sugar) in the mill zones and providing extension services to growers.

The present study was directed toward identifying the relevant factors responsible for fluctuations in sugar cane production and for inadequate supply of sugar cane to mills. It concentrated on the analysis of sugar cane supply response in the mill zones.

To measure sugar cane supply response it was postulated that 'desired' planted area of sugar cane is a function of the expected relative price of sugar cane to jute, expected relative yield of sugar cane per hectare to jute, relative price risk of sugar cane to jute and relative yield risk of sugar cane to jute. Two dummy variables, one to measure the effect of the opening of a new mill and the other to measure the effect of the ban on gur production, were also included in the model. Since 'desired' planted area, expected price and expected yield are unobserved variables, some hypotheses were developed regarding them.

Two alternative hypotheses were proposed with respect to the 'desired' area variable. In one case, it was assumed that sugar cane farmers could fully adjust their actual area to the desired area in response to a change in expected price, *ceteris paribus*. In the other case, it was assumed that farmers could not fully adjust their actual area to the desired area in a single year in response to a change in the economic situation they faced. In this case it was assumed that the actual adjustment was proportional to the desired adjustment. For expected price, three alternative expectations hypotheses — naive, extrapolative and adaptive expectations — were used. With respect to expected yield, two alternative hypotheses — naive and extrapolative expectations — were employed. Various estimating models were derived using different combinations of the hypotheses regarding 'desired' area, expected price and expected yield. These models were estimated by using time-series data from 1952-53 to 1981-82 at the mill zone level of aggregation.

From the results it appears that sugar cane growers cannot fully adjust their actual to desired area in a single year in response to a change in an explanatory variable, *ceteris paribus*. They take about two years to make the full adjustment. It was also found that the sugar cane farmers' formation of price expectation is consistent with the naive expectations hypothesis. The economic lag between actual area and desired area exists not because farmers are slow in revising their expectations of future price and yield but because of the existence of some constraints on the production side. Most of the farmers in Bangladesh grow sugar cane using traditional methods of production. The present situation cannot be explained by appealing to 'fixed asset' theory but rather by the habitual production pattern of the farmers and the physical suitability of land for some specific crops.

The present study has also indicated that growers take account of the price of sugar cane, price of jute, relative sugar cane yield to jute yield, relative sugar cane price risk to jute price risk and relative sugar cane yield risk to jute yield risk in making decisions regarding allocation of land to sugar cane production. The estimated own-price elasticity of sugar cane supply (area) is 0.36 in the short run and 0.44 in the long run.

The short-run and long-run elasticities of sugar cane supply with respect to jute price are -0.27 and -0.33 , respectively. The sugar cane supply elasticities with respect to sugar cane yield relative to jute yield were estimated as 0.47 in the short run and 0.57 in the long run. The short-run and long-run elasticities of sugar cane supply with respect to sugar cane price risk relative to jute price risk are -0.08 and -0.10 , respectively. They are -0.04 and -0.05 , respectively, in the short run and long run with respect to sugar cane yield risk relative to jute yield risk. These estimates compare fairly well with previous estimates for some regions and states in India.

It is expected that the present estimates will be useful to sugar policy makers even if there is no ban on the production of gur in the mill zones. The imposition or withdrawal of the ban should affect the levels of sugar cane area and production only; it should not have any influence on the variation of area and production of sugar cane. In other words, the elasticity estimates will not be affected by the imposition or withdrawal of the restriction on gur production in the mill zones.

The finding regarding the ban on gur production in the mill zones is that it was a repressive measure. It forced farmers previously making gur from their sugar cane to sell their produce to the sugar mills. As a result, it deprived the farmers of the more profitable activity of gur production.

Moreover, it has been found that the establishment of a new sugar mill attracted some marginal farmers to sugar cane production. But they were possibly discouraged by the maldistribution of sugar cane selling permits, usage of defective weighing machines in cane purchasing centres and delay in payment of dues. As a result, the following year they switched their land to the production of other crops.

JOURNAL ARTICLE PRIZE

The prize for the best article published in the *Australian Journal of Agricultural Economics* in 1985 was awarded to R. J. Myers, R. R. Piggott and T. G. MacAulay for the article entitled 'Effects of past Australian wheat price policies on key industry variables' published in Volume 29(1), pp. 1-15.