



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

The Impact of Agricultural Futures on Output and Prices: A Classical Approach*

Romar Correa[†]

I

INTRODUCTION

The analytical underpinning of options, futures, and the like seems to have come unstuck. The foundation of the superstructure, we know, is the general equilibrium model. Through devices like Arrow-Debreu securities, all potential future states are assumed to unfold with date and state tags attached to them. The grand finale of Financial Economics, as with neoclassical economics, is the delivery of the efficient prices of these instruments.

Perhaps Debreu, but certainly Arrow, warned that their beautiful theorems were no more than elegant benchmarks and not to be used straightforwardly to address reality. Since the financial crisis has engulfed even the founding fathers of Finance in its conflagration, the time is ripe to look at alternative structural models. In the case of a dual economy like India, the appeal of a Ricardian model is natural. Ricardo was concerned with the transition to capitalism. The dynamics was traced by the class actions of landlords and capitalists. Here we are in illustrious mainstream company as well because general equilibrium scholars have long warned that the device of the representative agent in standard macroeconomics is without theoretical foundations. Agent heterogeneity is the rallying cry of post-Walrasian economic theory and Financial Economics. A radical Keynesian theme will also be encountered below, to wit, that the future is unknown and unknowable. The entire paraphernalia of probability theory, to which we can add stochastic calculus, Keynes would have described as “pretty, polite techniques” hopelessly inadequate to deal with the void which is the future.

Our context is the food crisis. Following the 2008 surge in prices countries, not excluding India, are outbidding each other in leasing or purchasing land from abroad. The target is Africa. Thus, the ‘quasi’ in the Abstract stands for the short- or medium-term flavour of the model. The quantity of land is not assumed to be given. The following aspects are salient (Magdoff and Taylor, 2009). The decreased production of food is due in no small measure to developing countries permitting the market to determine production and prices. The process has been augmented by the increased

*Keynote paper presented at the 69th Annual Conference of the Indian Society of Agricultural Economics held at Guru Nanak Dev University, Amritsar, December 17-19, 2009.

[†]Professor, Department of Economics, University of Mumbai, Mumbai - 400 098.

concentration of corporate ownership and control of the entire food chain; from seeds, pesticides, and fertilisers to grain elevators, processing facilities and malls. Research and development is not excluded. No consistent increase in output has resulted from crops that have been genetically modified (GM) by the insemination of genes from other species in contrast to non-GM crops. Companies like Monsanto specialise in crop characteristics that increase the dependence of farmers on proprietary chemicals. Thus, 'landlords' and 'capitalists' in the account below are generic categories. They only exclude small farmers and petty producers. Indeed, an alternative model is worth recalling and recommending even in an Introduction. For centuries, agriculture in developing countries was built up from local resources, varieties, and knowledge (Altieri, 2009). The result was biologically diverse small farms. This equilibrium was evolutionarily stable and resistant to changing climates, pests, and diseases. This model of traditional agriculture is worth emulating today because it generates biodiversity and continuous yields without agro-chemicals. In Asia, India accounts for 23 per cent of the small farms. Considering total output rather than yield from a single crop, small farms are more productive and resource-conserving.

The textbooks teach that agricultural futures evolve to mitigate the risks faced by traders of commodities. However, the impact of speculation by financial investors in commodities and commodity futures markets on food prices has not been inconsiderable nor salutary (Bello and Baviera, 2009). Speculation in agro-commodity futures was one of the factors in the sharp rise in food prices in 2007-2008. When the real estate bubble burst, hedge and other funds moved into commodity futures trade volumes and contracts increased but the supply of agricultural output did not. That the movement into and out of commodities futures was for the purpose of quick gains is evinced by the commodities bubble burst triggered by the FAO food price index rising by 71 per cent during the 15 months between end-2006 and March 2008 and crashing after July 2008 to the level of 2006. Futures markets increasingly reflect the risk appetites of investors with no interest in commodities. A study by Newman (2009) illustrates as much in the case of the international marketing of coffee, the agricultural commodity most traded on international exchanges. Traders churn 'paper coffee' in order to derive profit from price changes. Portfolio investment in commodities coffee as an asset class has increased sharply. Futures contracts on coffee accounted for about two-thirds of all coffee trading in 2007. These firms come increasingly to resemble financial holding companies dealing in an array of financial services. Trading in futures contracts entails high costs not just for buying the contracts but for financing margin calls. Long lines to liquidity are called for when oscillations in the present price fall outside the margin that is set below the original purchase price by the futures contract. Consequently, only the largest trading companies have been able to reap profits from trading futures. Critically, the recent surge in futures trading on the New York commodity exchange by commodity index futures has distorted the relationship

between prices and output. Thus, between 2002 and 2007, coffee prices increased at a rate and at a variance unmatched by the forces of demand and supply. Furthermore, a single number, the price of the New York coffee 'C' futures contract determines the price of coffee all over the world. The futures market led to the collapse of the arrangement of co-operative price setting of the International Coffee Agreement in 1989. The brunt of volatile coffee prices is being borne now by small producers and traders in coffee-exporting countries.

Newman's policy recommendation is to sever the process of price determination as the outcome of the forces of supply and demand from the price generated by a futures contract and restore the mechanism of collective price agreements.

II

A MODEL

It is not necessary to think in terms of classes. A representative agent that is both landlord and capitalist will suffice. There could be entrepreneurs who organise production by renting land and capital from landlords and employing workers. The following treatment is drawn from Foley and Michl (1999) (hereafter F-M). There are two periods, 0 and 1. The problem of the capitalist is to choose between consumption and the accumulation of capital, K_t , in every period t . The inducement to invest in any interval is given by the net rate of profit or the inflation-adjusted interest rate, r_t . Here preferences are described by a Cobb-Douglas utility function. Labour is assumed to be available at a conventional wage. The use of land as an input in production leads to the emergence of land rent in every period t which is denoted by v_{ut} . Recall that we do not need the assumption of the 'givenness' of land. The amount of land to be used at every time point, U_t , is a choice variable. The asset price of land in terms of output or capital, p_{ut} , must adjust in each period to induce landlords to hold the existing stock of land.

The problem of the capitalist has been solved in F-M. To repeat, we can expand the problem by introducing the choice of land or else solve out a landlord optimisation problem separately. In both cases, we do not impose a no-arbitrage condition as F-M do.¹ The reasons that have been offered for why the law of one price does not hold range from neuroeconomics through behavioural finance to two-sector dynamics. The salient features of the solution are as follows: $K_2 = 0$. That is, a terminal null salvage value of the capital stock emerges endogenously.

The solution with land admits of more than one scenario.

Case 1: $p_{u2} = 0$, $U_2 > 0$. The first portion of the expression admits of various interpretations. The outcome of Knightian uncertainty is that only feedback and historical data matters. In other words, for decisions taken in 0 and 1, the data concerning period 2 have no role to play. Alternatively, the phrase might reflect the Indian government's ban on agricultural futures markets. The future price is not

allowed to be 'discovered'. The inequality in the second portion of the case, along with the market for capital, is $K_2 = 0$, $U_2 > 0$, the 'abundant land' regime. Looked at as a single-agent optimization problem, there might be some inefficiencies here. Since the story ends in period 2, there should be no unutilised land then. A terminal value condition will have to be imposed unlike the case of the choice of capital. At time 2, $v_{u2} = 0$. On the other hand, since the two-period slice of time is only illustrative of a general infinite-horizon problem, there should be assets left over after the model-builder has left off. Thus, positive stocks of land are natural for future choices to be made. Finally, if free movement of capital across assets is permitted, in an intertemporal equilibrium, $K_2 = U_2$. Since private capital is not forthcoming, the State will have to step in as an autonomous investor to provide a positive value of the capital stock in the last period.

Case 2: $p_{u2} > 0$, $U_2 = 0$. In the present case, capital and land can grow in tandem with full employment of both resources. Two sub-cases can be identified. In the case of less-than-perfect arbitrage, the positive future price is unbounded above. The evidence of commodity prices driven by speculators and untethered to fundamentals applies here. On the other hand, if we impose the no-arbitrage condition, then the returns on both assets must be equal. That is to say, $p_{u2} + v_{u2} = (1 + r_1)p_{u1}$. Our reservations concerning the application of the condition are reinforced since the price of agricultural futures seems unrelated both to the level of land rent and to the rate of profit. An explanation for a developing economy would be couched in terms of the inadequate penetration of markets into the countryside. Once more, the State must enter when markets are missing. Since public and private investment are complements, efficient State intervention in both the markets for land and capital will result in market values of rent and the rate of interest.

We have not dealt with the labour market. Implicitly, the demand for labour depends upon the technique that maximises the rate of profit. The supply of labour depends upon the growth of population. One or both sectors must grow at the same rate so as to provide the number of jobs necessary to employ the labour force.

III

CONCLUSION

The impact of agricultural futures on output and prices is not clear. It is not surprising that the Indian Planning Commission has not found systematic evidence to either support or prohibit it. Two possible prices are possible in equilibrium, a null price and a positive price. The no-arbitrage assumption might be useful or might not be illuminating. In all permutations, reliance on the market is not sufficient. Corresponding to the two cases cited are values of the shadow prices of the constraints. We recall the old connection between planning and shadow prices. The

State must decide on the case that maximises social welfare. It must step in, period by period, as an investor. In addition, it must perform the more subtle task of being market-maker in a milieu where markets do not exist. The attempts to regularise land ownership and rights are a step in this direction. The alternative is ‘depeasantisation’, the forced eviction of peasants from their farms to urban slums in societies with a huge stake in agriculture where the State has abdicated the countryside.

NOTE

1. The calculations are available with the author on request.

REFERENCES

- Altieri, M.A. (2009), “Small Farms, and Food Sovereignty”, *Agroecology, Monthly Review*, Vol.61, No.3, pp.102-117.
- Bello, W. and M. Baviera (2009), “Food Wars”, *Monthly Review*, Vol.61, No.3, pp.17-31.
- Foley, D.K. and T.R. Michl (1999), *Growth and Distribution*, Harvard University Press, Cambridge, Massachusetts.
- Magdoff, F. and B. Taylor (2009), “Agriculture and Food in Crisis”, *Monthly Review*, Vol.61, No.3, pp.1-16.
- Newman, S. (2009), “The Downside of ‘Financialisation’ of International Commodity Markets”, *Development Viewpoint*, No.32.