FDI in Retail: A Theoretical Analysis

Abhirup Sarkar

Debasmita Basu

Economic Research Unit,

Indian Statistical Institute,

203, B. T. Road,

Kolkata-700108

1 Introduction

With the vast changes in the agricultural and food retailing chains over the past quarter century in the low and middle income group countries, foreign direct investment (FDI) in retail has become a controversial issue in many parts of the world. In most of these countries, either the wholesale markets or the retail markets or both were under strict state supervision, which got

relaxed with the economic liberalizations that took place*. Along with this came the surge of globalization and the influx of FDI in various sectors. The introduction of FDI to the retail sector and the wholesale market became a matter of critical consideration in many countries like India. The retail and wholesale trade in India is the single largest component of the service sector in terms of contribution to GDP at 14%. With a large percentage of the population being dependent on this for their livelihood, whether or not to allow FDI has always remained a question in the democratic setup of India.

Before we get into the arguments favouring or disapproving of FDI in retail, let us first talk about the agricultural sectors of developing countries in general. The agricultural sectors in the developing countries are generally poor and backward. A salient feature is the presence of middlemen in multiple stages, which causes a wide gap between the price the farmer gets and the price that a final consumer pays. The farmers are small with no market power and are often isolated. They seldom have access to the formal credit markets. On the other hand, the middlemen and the rural moneylenders have market power. The consumers are also fragile and they end up paying a higher price due to market imperfection and presence of middlemen in many stages. The farmers and traders are often too small to have an access to the international market and hence are unable to enjoy the gains from trade. So the reforms in the

*See Swinnen (2007) for an overview

agricultural sector should help to remove these adversities and not to make the situations of the small farmers and consumers worse.

The proponents of FDI in retail place strong arguments favouring the introduction of FDI to the retail sector. The agricultural sector will get the much needed exposure to the international market. There will be vertical integration of the supply chain. The exploitative middlemen will be largely bypassed. Direct purchasing from the farmers will ensure that they get better price and there will be more incentive for agricultural investment. Large retail groups will invest in better storage which will reduce wastage as they already have the infrastructure and the know-how, reducing the traditional warehousing role of the wholesalers. Post liberalization, there has been a change in taste and preference of the urban consumers of the developing countries, and there has been a convergence of taste and preference all over the world. The introduction of FDI will cater to their needs better by ensuring better quality, wider variety of international standard and all these at a lower price.

However, there are some possible drawbacks, too. A large number of small traders may lose their livelihood to the uneven competition with the MNCs. For example, in India, given that retail and wholesale trade is the single largest component of the services sector in terms contribution to GDP at 14%, and that the unorganized retail sector of small and medium retailers employs over 40 million people, by sheer number this will not be insignificant. MNCs can in-

crease price after eliminating competition. Foreign Retailers have pointed out that setting up of manufacturing base in India is difficult since the infrastructure is poor, labor laws are unfriendly, etc. This would mean that the MNCs are not interested in buying from the domestic farmers as much as they are interested in selling to the domestic urban consumers. If the MNCs buy from the domestic farmers, the village market price will go up, increasing rural poverty. Agricultural price may become more uncertain due to higher integration with the world market reducing the incentive for agricultural investment.

The literature on the experience of FDI in retail sector sends a highly ambiguous message, although there is a general observation that asset-poor farmers have been losers (see Killick (2001), Reardon and Berdegu (2007)). Studies on the dairy production of the East European countries show contradictory results on whether the small farmers are benefitted. While Swinnen et al. (2006) show that small household dairy farms gain from FDI, while Gorton and Guba (2002) show that FDI instituted more formal contracting agreements, promoting the growth of a select number of medium-sized dairy farms and excluding micro-producers. Growth of supermarkets and fast-food sectors since 1990's in Argentina has resulted in changing pattern of production in favour of medium and large producers, with evidence of exclusion of small farmers (see Ghezan et. al. (2002)). Sarma (2005) emphasizes on the need for considering the constraints that would be faced by the retailers in the supply

chain.

In this paper we propose a theoretical model to see some of the possible effects of allowing FDI to the retail and wholesale markets. We consider only the agricultural sector, as agro products constitute the maximum of the retail sector. We start with a basic model with an oligopolistic wholesale market, where the wholesalers buy from the farmers and sell to the retailers in the wholesale market. The retailers in turn sell it to the urban consumers. The farmers, retailers, urban and rural consumers are price takers, while the oligopolistic wholesalers are price-makers. Section 2 in the paper tries to capture the effect of introducing FDI in this framework.

The agricultural sectors in the less developed economies are often plagued by interlinkages among land, labor, credit and product market. It has been seen that in developing countries often the moneylenders are the intermediaries in the product markets. The relatively rich farmers or landowners in the village usually have a better access to loans, which they lend to the smaller farmers at a rate of interest that is different from the interest rate these farmers face. Often these farmers are poor enough not to be able to reach the wholesale market on their own. The richer farmers cum moneylenders then offer a price different from the prevailing market, and act as a product market intermediary. The rich farmers may be able to successfully lend the smaller farmers the amount of money they need for the production and buy their output at a

price lower than the market price. The contract is devised such that the small farmers' participation constraint is barely satisfied and the moneylenders cum traders maximize their profits. MNCs can exploit the farmers through contract farming.They can act as the moneylender cum intermediaries, as they can have access to the international credit market and the international retail market. Although, it may have some positive impacts on the farmers as commercialization of backward agricultural sector is often done through contract farming (see Glover (1994)). This positive impact comes from a lower opportunity cost of the MNCs.

In section 3, we consider the interlinkage between credit market and the product market. We try to analyze the impact of FDI in the retail sector in the presence of such interlinkage. When an MNC comes in to the wholesale and the retail sector, it can act as a moneylender cum trader who lends money to the farmers when the crop is sowed and buys the product from the farmers to sell it to the urban retail market. Basically, the MNC offers a contract, where he charges an interest rate different from the market rate of interest and offers a product price different from prevailing market rate. We assume, as has been assumed in Gangopyadhyay and Sengupta (1987), that there is credit market imperfection, i.e., in order to obtain credit from outside the producer has to pay a higher rate of interest, which in turn renders the product market inaccessible. In such a scenario if FDI in the retail sector is allowed, we try

to analyze the optimal contracts to be offered by the MNC with FDI and the local monopolist. For the sake of simplicity we assume that the local monopolist cannot offer a contract[†]. We compare between the case where the MNC does not offer contract and the case when MNC does offer contract. The MNC would offer a parallel contract because of the existing interlinkage that is being already exploited by the monopolist moneylender cum trader in the village market. The farmers will be given exclusive contracts by the MNC. We consider only the benchmark case of complete information. We then try to compare between the two cases, when MNC can offer contract and when he cannot.

Section 4 concludes the paper.

2 A Basic Model with FDI in Retail

We construct a simple model with an oligopolistic wholesaling market. The economy consists of farmers, wholesalers, retailers, rural and urban consumers. The farmers are price takers, who produce an agricultural good y. They produce a fixed amount of the good and sell their produce in the village market. In this market the buyers are the village consumers and the wholesalers. The wholesalers in turn, sell their purchase in the wholesale market to the retailers.

[†]Even if he could, the MNC can outcompete him because of its lower opportunity cost of funds.

While the wholesaling market is oligopolistic, the retailers are price-takers. The retailers, in their turn, sell the product to the urban consumers in the retail market. This setup is schematically described in diagram 1 . First we look at the equilibrium without FDI and next we allow this setup to be open to FDI.

2.1 Equilibrium without FDI

Before the economy is thrown open to FDI, the structure of the economy is as follows. In the village market, the farmers are price takers and supply a fixed amount $\bar{y}$. The village consumers and the wholesalers purchase the output from this market. The wholesalers are oligopolistic. They play a Cournot game and sell it to the retailers. Finally, the retailers sell it to the urban consumers. For the sake of simplicity we assume linear demand functions for both the urban and the rural markets. The demand function of the urban consumers in the retail market is given by

$$p_u = A - Q_u$$

where p_u is the price prevailing in the retail market and Q_u is the quantity. A is a positive constant.

In the wholesale market, the competitive retailers buy from the oligopolistic wholesalers at price p_w per unit of y. The retailers have a retailing cost per unit of output c. To keep things simple, we assume this retailing cost c is the same for all the retailers, i.e., the retailers are all identical. The retailers will equate

Figure 1: Basic Framework

Figure 1a: Before MNC comes in

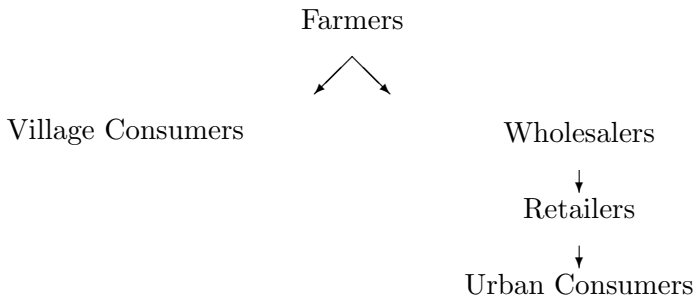
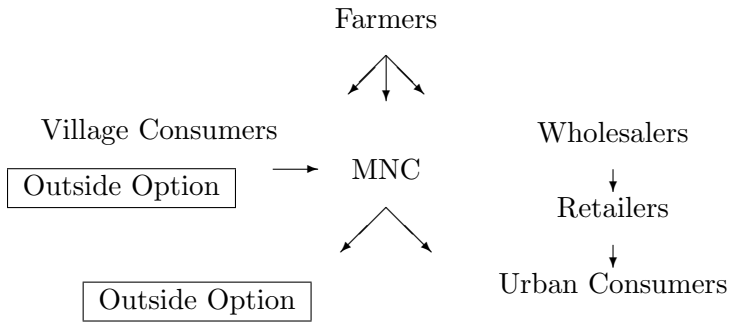


Figure 1b: Before MNC comes in



the price p_u with the marginal cost $c + p_w$. Therefore, the profit maximizing equilibrium for a representative retailer is

$$p_u = p_w + c$$

Rewriting the urban demand function,

$$Q_u = A - p_w - c$$

There are n identical oligopolistic wholesalers in the wholesale market. The ith oligopolistic trader maximizes his profit given the retailers' optimized output and price. The wholesale market clears at all points of time. Hence the oligopolists together buy Q_u amount of the good from the village market. The ith oligopolist buys q_i amount of the commodity with $\sum q_i = Q_u$. The oligopolists play a Cournot game. The ith oligopolist's profit function is given by

$$\pi_i = (p_w - p_v)q_i$$

where, p_v is the price at which the oligopolist buys from the village market. The village demand function is given by

$$p_v = B - Q_v$$

where $Q_v = \bar{y} - Q_u$. Without MNCs buying from or selling to the domestic markets, the total output will be bought by the village consumers and the wholesalers.

Rewriting the ith wholesaler's profit function, we get

$$\pi_i = (A - B - c - \bar{y} - 2Q_u)q_i \tag{1}$$

The first order condition for profit maximization will be given by

$$\frac{\partial \pi_i}{\partial q_i} = A - B - C + \bar{y} - 2Q_u - 2q_i = 0 \tag{2}$$

Summing both sides for all n wholesalers, we get

$$n(A - B - C + \bar{y}) = 2nQ_u + 2Q_u$$

since, $\sum q_i = Q_u$

Solving, we get the solution to this model. The retail market output will be given by

$$Q_u = \frac{n}{2(n+1)}(A - B - C + \bar{y}) \tag{3}$$

Each wholesaler will sell

$$q_i = \frac{1}{2(n+1)}(A - B - C + \bar{y}) \tag{4}$$

The urban retail market price will be

$$p_u = \frac{n+2}{2(n+1)}A + \frac{n}{2(n+1)}(B + c + \bar{y}) \tag{5}$$

The village market price will be given by

$$p_v = \frac{n+2}{2(n+1)}(B - \bar{y}) + \frac{n}{2(n+1)}(A - c) \tag{6}$$

2.2 Equilibrium with FDI

Let us now assume that both the rural and urban markets are thrown open to foreign competition. MNCs with market power are allowed to buy the commodity from the farmers and sell in the domestic market. However, MNCs have the flexibility to buy the commodity from the international market and sell it in the domestic market or buy it from the domestic farmers and sell it to the international retail market. In the subsequent paragraphs we will see how the model works both in absence of and in presence of MNC. Suppose, to start with, only one MNC enters both the markets. The MNC can buy from the farmers if the price is lower than the international wholesale market. Indeed, the MNC will buy from the domestic farmers till the marginal cost of buying is equal to the international wholesale price p_w^*. MNC can sell in the domestic urban retail market and will do so if the price in the international retail market is less than the marginal revenue in the domesic market. MNC will sell in the domestic retail market till the marginal revenue from the domestic retail market is equated to the international retail price p_u^*. We define Q_M as MNC's purchase from the domestic market and Q_R as MNC's sale to the domestic market. Revised village market demand is given by:

$$p_v = B - \bar{y} + Q_u + Q_M$$

Revised urban market demand is given by:

$$p_u = A - Q_u - Q_R$$

The total cost incurred by the MNC when he buys from the domestic farmers is given by $p_v Q_M$.

The MNC will consider equating the marginal cost with p_w^*.

$$\frac{\partial p_v Q_M}{\partial Q_M} = B - \bar{y} + Q_u + 2Q_M = p_w^*$$

From that we get the optimal Q_M given Q_u. This optimal Q_M is given by

$$Q_M = \frac{1}{2}(p_w^* - B + \bar{y} - Q_u) \tag{7}$$

Similarly, the total revenue earned by the MNC when he sells to the domestic retail market is given by $p_u Q_R$. The MNC will equate the marginal revenue with p_u^*.

$$\frac{\partial p_u Q_R}{\partial Q_R} = A - Q_u - 2Q_R = p_u^*$$

From that we get the optimal Q_R given Q_u as

$$Q_R = \frac{1}{2}(A - Q_u - p_u^*) \tag{8}$$

Define $p_u^* - p_w^* \equiv c^*$. c^* can be interpreted as the retailing cost of the MNC. Given Q_R and Q_M, the ith oligopolist maximizes profit Π, which is given by

$$\Pi_i = (A - Q_R - Q_u - c - B + \bar{y} - Q_u - Q_M)q_i \tag{9}$$

Solving the maximization problem using (7) and (8) we get the total retail market output as

$$Q_u = \frac{n}{2(n+1)} \left(A - B - c + \bar{y} - (c - c^*)\right) \tag{10}$$

and each wholesaler will sell

$$q_i = \frac{1}{2(n+1)} \left(A - B - c + \bar{y} - (c - c^*)\right) \tag{11}$$

The urban market price will be given by

$$p_u = \frac{1}{2}p_u^* + \left(\frac{n+2}{4(n+1)}A + \frac{n}{4(n+1)}(B + c - \bar{y})\right) - \frac{n}{4(n+1)}(c^* - c) \tag{12}$$

The rural market price will be

$$p_v = \frac{1}{2}\left(p_w^* + \frac{n+2}{2(n+1)}(B - \bar{y}) + \frac{n}{2(n+1)}(A - c)\right) + \frac{n}{4(n+1)}(c^* - c) \tag{13}$$

Proposition 2.1. *Domestic retailing activities go down after the entry of the multinationals iff* $c > c^*$.

Let us denote the values of the variables before the MNC comes in with "tilde" and the the variables after the MNC comes in with"hat".

If we compare (3) and (10), we see that

$$\tilde{Q}_u - \hat{Q}_u = \frac{n}{2(n+1)}(c - c^*) \tag{14}$$

We clearly see that the domestic retail sector shrinks with the advent of the MNC, if the retailing cost of the domestic retailers is high.

Proposition 2.2. *The urban consumers will gain if $c < c^*$.*

Comparing (5) and (12),

$$\hat{p_u} = \frac{1}{2}\tilde{p_u} + \frac{1}{2}p_u^* - \frac{n}{4(n+1)}(c^* - c) \tag{15}$$

We see that after MNC comes in, the retail market price is the sum of a fraction of the cost difference; and the average of the international retail market price and the domestic retail market price before MNC came in. If the MNC sells in the domestic retail market, presumably p_u^* is less than the domestic retail market price before MNC came in. Therefore, clearly, the retail market price will go down if $c < c^*$, which would mean that the urban consumers would gain.

Proposition 2.3. *The rural consumers will lose and farmers will gain if $c < c^*$.*

Comparing (6) and (13),

$$\hat{p_v} = \frac{1}{2}\tilde{p_v} + \frac{1}{2}p_v^* + \frac{n}{4(n+1)}(c^* - c) \tag{16}$$

We see that after MNC comes in, the village market price is the sum of a fraction of the cost difference; and the average of the international wholesale market price and the village market price before MNC showed up. If the MNC buys from the domestic market, then presumably, p_w^* is greater than the domestic village market price. In this case, the village market price will go up

if $c < c^*$. The farmers will receive a higher price and the rural consumers will have to pay a higher price for food.

If the retailing cost of the MNC is less than the retailing cost of the domestic retailers then the domestic retailers will lose out to the MNC on account of higher cost of retailing. If the retailing cost of the MNC is higher than that of the domestic retailers then the MNC would be more interested in buying from the domestic village market than in selling in the domestic retail market. That would increase the village market price, hurting the village consumers and benefitting the farmers. On the other hand, even with $c < c^*$, there would be some trading activity of the MNC in the domestic retail market, that would increase the competitiveness in the domestic retail market, which would bring the price down. Hence the urban consumers would gain.

2.3 Equilibrium with more than one FDI

In the previous subsection, only one MNC was allowed to play. In this subsection, we see the equilibrium with more than one MNC playing in both the village market and the urban market. Let us assume m MNCs are allowed to buy good y in the village market from the farmers and sell in the urban retail market. All the MNCs are assumed to be identical. In the village market, each MNC will but q_m amount of the good and in the retail market, each MNC will sell q_r amount of the good. Q_M and Q_R are the total transaction made

by the MNCs in the domestic village market and the domestic retail market respectively. In that case, $Q_M = \sum q_m = mq_m$, and $Q_R = \sum q_r = mq_r$. Each MNC in the village market will buy the good till their marginal costs are equated to p_w^*. The total cost of buying from the domestic village market for a representative MNC is:

$$p_v q_m = (B - \bar{y} + Q_M + Q_u)q_m$$

where Q_u is the quantity purchased by the domestic wholesalers as before. The marginal cost will now be given by

$$\frac{\partial p_v q_m}{\partial q_m} = B - \bar{y} + Q_M + Q_u - q_m = p_w^*$$

Solving, we find the total output bought by the MNCs given Q_u from the village market to be

$$Q_M = \frac{m}{m+1}(p_w^* - B + \bar{y} - Q_u)$$

and the output bought by a single MNC is

$$q_m = \frac{1}{m+1}(p_w^* - B + \bar{y} - Q_u)$$

Similarly, the total revenue earned by a representative MNC when he sells to the domestic retail market is given by $p_u q_r$.

$$p_u q_r = (A - Q_u - Q_R)q_r$$

The MNC will equate the marginal revenue with p_u^*.

$$\frac{\partial p_u q_R}{\partial q_R} = A - Q_u - Q_R - q_r = p_u^*$$

Solving, we find the total output sold by the MNCs given Q_u from the village market to be

$$Q_R = \frac{m}{m+1}(A - Q_u - p_u^*)$$

and the output sold by a single MNC is

$$q_r = \frac{1}{m+1}(A - Q_u - p_u^*)$$

The profit of a representative wholesaler is given by

$$\pi_i = (A - Q_R - Q_u - c - B + \bar{y} - Q_u - Q_M)q_i$$

Substituting for Q_u and Q_M we get

$$\pi_i = \left(\frac{1}{m+1}(A - B - c + \bar{y}) - \frac{2}{m+1}Q_u - \frac{m}{m+1}(c - c^*)\right) q_i \tag{17}$$

The representative wholesaler maximizes (17) with respect to q_i. Solving this we get the total output for the retail market as

$$Q_u = \frac{n}{2(n+1)}(A - B - c + \bar{y}) - \frac{mn}{2(n+1)}(c - c^*) \tag{18}$$

And, for a representative wholesaler, the solution will be

$$q_u = \frac{1}{2(n+1)}(A - B - c + \bar{y}) - \frac{m}{2(n+1)}(c - c^*) \tag{19}$$

Th retail market price will be given by

$$p_u = \frac{1}{2}p_u^* + \frac{n+2}{4(n+1)}A + \frac{n}{4(n+1)}(B + c - \bar{y}) - \frac{mn}{4(n+1)}(c^* - c) \tag{20}$$

The village market price will be given by

$$p_v = \frac{1}{2}\left(p_w^* + \frac{n+2}{2(n+1)}(B - \bar{y}) + \frac{n}{2(n+1)}(A - c)\right) + \frac{nm}{4(n+1)}(c^* - c) \tag{21}$$

Proposition 2.4. *If more than one MNC is allowed, the domestic retailing activities will go down as compared with the case when only one MNC is allowed iff* $c > c^*$.

Let us denote the values of the variables when more than one MNC is allowed by "bar". If we compare (10) and (18), we would see that the cost difference is magnified m times, while the other terms are unchanged.

$$\bar{Q_u} - \hat{Q_u} = -(m-1)\frac{n}{4(n+1)}(c - c^*) \tag{22}$$

Corollary 2.1. *If more than one MNC is allowed, the domestic retailing activities will go down as compared with the case when no MNC is allowed iff* $c > c^*$

If we compare (3) and (18), we see that

$$\bar{Q_u} - \tilde{Q_u} = -\frac{mn}{4(n+1)}(c - c^*) \tag{23}$$

And hence the result.

Proposition 2.5. *(i)* $\bar{p_u} > \hat{p_u}$ *iff* $c^* < c$, *and,*

(ii) $\bar{p_v} > \hat{p_v}$ *iff* $c < c^*$

From (12) and (20), we see that

$$\bar{p_u} - \hat{p_u} = -(m-1)\frac{n}{4(n+1)}(c^* - c)$$

Therefore, the urban retail market price will go up when $c > c^*$ with more FDI coming in. If the retailing cost of the domestic wholesalers is higher than that of the MNCs, then as FDI comes in, the retailers get crowded out. So even with an increased competition among the MNCs, the retail sector will witness an increase in price. However, if the domestic retailers have a smaller retailing cost, then the domestic retailing sector will increase as more FDI comes in and the urban retail market price will fall. From (13) and (21), we see that

$$\bar{p_v} - \hat{p_v} = -(m-1)\frac{n}{4(n+1)}(c - c^*)$$

The village market price will go down when $c > c^*$ with more FDI coming in. If the retailing cost of the domestic retailers is higher than that of the MNCs, then as FDI comes in, the domestic retailers get crowded out. So the village market experiences an excess supply, which will lead to the price fall.

We see that the results do not vary qualitatively if one or more MNC is allowed. However, if the domestic retailing cost is higher than the MNCs' retailing cost, then more MNCs would find it profitable to enter the domestic

retail market, which would reduce the domestic retailing activities further. If the domestic retailing cost is higher, then the urban consumers will face an even higher price as more MNCs enter, and will lose. If the domestic retailing cost is lower, then as more MNCs come in, the village consumers will have to pay a higher price, as now there will be more demand in the village market. Allowing competition among the MNCs need not be good for the domestic retailing sector and the urban and rural consumers.

3 Contract Farming

It is often the case that a well functioning rural credit market is absent in the agricultural sector of a developing country. Farmers face an interest rate which is higher than the market. The formal credit market would require a collateral which, the small and the marginal farmers do not have. Also, getting credit from the formal sector is a long and laborious process, making the formal credit market virtually absent from the village market. The small and marginal farmers can effectively take loans from the rural informal money lenders, to run the production. A stylized fact is that with globalization, large corporate houses are offering contracts to the primary producers and farmers for the supply. With contract farming, the small and marginal farmers can avail any amount of loan necessary for running the production. However, the

farmers are required to sell their output to the large corporate houses at a price given by them. Hence, we modify our basic model to see the effect of contract farming. We introduce production in to the model. In order to produce the agricultural good, each farmer needs to take a loan of amount L. Farmers are differentiated by the rate of interest they have to pay. A typical farmer is denoted by a parameter θ, where θ is distributed according to the distribution function $F(\theta)$ with support $[\underline{\theta}, \bar{\theta}]$. Farmer faces an interest rate $r(\theta)$. The rural credit market is highly fragmented and the interest rate is often determined by the personal relation between the lender and the borrower. Basu (1983) and Bhaduri (1977) suggest that the rural markets are essentially isolated, and hence farmers may face different rates of interest. This also explains why there is no arbitrage between the farmers facing different interest rates. It might also be the case that a farmer gets a fraction of his loan requirement from a rural money lender which charges a higher interest and the remaining from a bank. The bank might require that a fraction of the loan requirement must be arranged by the farmer (from perhaps a rural money lender) and this fraction might depend on the collateral the farmer can provide. If collaterals vary across farmers, effective rates of interest would also vary. Following the standard literature on rural credit, we say that the production function is essentially a function of the loan amount. The cost the farmer incurs is the interest payment. A representative farmer of type θ will maximize his income Y_f. The

farmer's production function in terms of the loan is given by $f(L)$, where L is the loan amount, $f(L)$ is a standard neo-classical production function which is twice differentiable, with $f_L > 0$ and $f_{LL} < 0$. The farmer is a price taker in the village market and receives the price p_v for each unit that he produces. His income is given by the following equation.

$$Y_f = p_v f(L) - (1 + r(\theta))L \tag{24}$$

The farmer chooses the optimal L^* by maximizing (24). The first order condition is

$$f'(L) = \frac{1 + r(\theta)}{p_v} \tag{25}$$

The total output of the economy is then given by

$$S(p_v) = \int_{\underline{\theta}}^{\bar{\theta}} f(L^*(r(\theta)), p_v) d\theta$$

As p_v increases, the production level increases for each farmer, as they take more loan now and the total supply increases ($S' > 0$). The village consumers have a demand given by $D(p_v)$, which is strictly decreasing in p_v, i.e., $D' < 0$[‡]. The quantity demanded by the village consumers must equal the total supply net of what is demanded by the wholesaler. Let Q_u be the amount demanded by the wholesalers. Then,

$$D(p_v) = S(p_v) - Q_u \tag{26}$$

[‡]In this section we are deviating from our earlier assumption of linear demand

Differentiating (26) w.r.t. p_v, we get

$$D' = S' - \frac{\partial Q_u}{\partial p_v}$$

Rearranging, we get

$$\frac{\partial p_v}{\partial Q_u} = \frac{1}{S' - D'}$$

In this section, we assume that the wholesaler has some market power when she buys from the village market, but is a price taker in the retail market. The retail market price is given and is set to p_u. The wholesalers will then maximize their profits by equating their marginal costs of buying from the farmers with the price in the urban market. The representative wholesaler's profit is given by

$$\pi_w = p_u Q_u - p_v Q_u \tag{27}$$

Differentiating (27) with respect to Q_u, we get

$$p_u - p_v + \frac{Q_u}{(S' - D')} = 0$$

Rearranging, we get:

$$Q_u = (S' - D')(p_u - p_v) \tag{28}$$

Clearly, the RHS of (28) is positive. The retail market price is greater than the village market price for an equilibrium to exist and $S' > 0$ while $D' < 0$.

3.1 MNC Enters but does not Offer Contract

In this framework we now allow the MNC to come in. In this model, we allow MNC only to buy from the domestic farmers and then sells the output to the international market at a given international price p^*. Suppose, the MNC buys an amount Q_M from the domestic farmers. This quantity will be determined at the point where the The MNC's marginal cost of buying is equal to the international retail price p^*. The demand function of the village consumers will now look like the following:

$$D(p_v) = S(p_v) - Q_u - Q_M \tag{29}$$

Differentiating (29) partially with respect to Q_u will give

$$D' = S' - \frac{\partial Q_u}{\partial p_v}$$

Rewriting, we get

$$\frac{\partial p_v}{\partial Q_u} = \frac{1}{S' - D'} \tag{30}$$

Again, differentiating (29) partially with respect to Q_M yields

$$D' = S' - \frac{\partial Q_M}{\partial p_v}$$

Rewriting, we get

$$\frac{\partial p_v}{\partial Q_M} = \frac{1}{S' - D'} \tag{31}$$

The total cost incurred by the MNC when he buys from the domestic farmers is given by $p_v Q_M$. The MNC will consider equating the marginal revenue with p^*.

$$p_v + Q_M \frac{\partial p_v}{\partial Q_M} = p^*$$

Substituting from (31) we get

$$Q_M = (S' - D')(p^* - p_v) \tag{32}$$

The wholesaler, as before, will maximize his profit.

$$\pi_w = (p_u - p_v)Q_u \tag{33}$$

The first order condition will be given by the following equation

$$\frac{\partial \pi_w}{\partial Q_u} = p_u - p_v - \frac{\partial p_v}{\partial Q_u} Q_u = 0 \tag{34}$$

Substituting from (30) and rewriting (34), we get the amount of the good purchased by the wholesalers.

$$Q_u = (p_u - p_v)(S' - D') \tag{35}$$

Putting (32) and (35) in (29) we get the village market demand.

$$D(p_v) = S(p_v) - (S' - D')(p_u + p^* - 2p_v) \tag{36}$$

3.2 MNC Offers Contract

Now, suppose the MNC can offer individual contracts to the farmers. The θth farmer faces interest rate $r(\theta)$ and the village market price p_v. The θth farmer's income before taking up the contract will be given by

$$Y_f = p_v f(L) - (1 + r(\theta))L$$

The farmer maximizes income with respect to the loan amount. A representative farmer's income maximizing condition will be given by

$$f'(L) = \frac{1 + r(\theta)}{p_v}$$

Suppose, the MNC can get any amount of loan from the international market at an interest rate i. MNC can sell the output in the international market at price p^*. Now, had the MNC been producing on its own, the profit function would be

$$\pi_M = p^* f(L) - (1 + i)L$$

The profit maximizing condition will be given by

$$f'(L) = \frac{1 + i}{p^*}$$

The MNC has complete information about the farmers' productivity and can give them individual contracts. The farmers get a share of the MNC's profit. The MNC offers him an interest rate $\delta(\theta)i$ and a price $\eta(\theta)p^*$. After taking the

contract, it will be given by

$$Y_c = \eta(\theta)p^* f(L) - \delta(\theta)(1 + r(\theta))L$$

The new profit maximizing condition after taking the contract will be given by

$$f'(L) = \frac{\delta(1+i)}{\eta(p^*)}$$

A representative farmer's participation constraint is given by

$$Y_c(L^*(\delta, \eta, p^*, i)) \geq Y_f(L^*(p_v, r(\theta))) \tag{37}$$

where L^* denoted the optimal loan taken by the farmer. In order to maximize the production from contract, as we can see from MNC's profit maximizing condition, the MNC must set $\eta = \delta$. We assume that MNC can give each farmer a unique contract. Since the MNC will be paying a fraction of its profit to the farmers, $\delta \leq 1$. We assume, additionally, that

$$\frac{1 + r\bar{\theta}}{p_v} > \frac{1+i}{p^*}$$

This assumption guarantees that the farmers with higher θ will opt for the contract. That farmer with the lowest θ accepting the contract will be given a contract where $\delta = 1$ and beyond that δ will be less that unity. The MNC will choose each δ such that the farmers' participation constraints are satisfied, i.e.,

$$\delta = \frac{Y_f(L^*(p_v, r(\theta)))}{Y_c(L^*(\delta, \eta, p^*, i))} \tag{38}$$

MNC will not offer contract to those farmers for whom $\delta > 1$. Total productivity of the farmers increase when the farmers take the contract. MNC does not buy from the open market anymore. In the open market the supply comes from the farmers who do not take the contract and the demand will be from the village consumers and the wholesalers. Let the supply from the farmers who do not take the contract be denoted by S_2. The villagers' demand $D(p_v)$ will then be given by

$$D(p_v) = S_2(p_v) - Q_u \tag{39}$$

Differentiating (39) w.r.t. p_v, we get

$$D' = S_2' - \frac{\partial Q_u}{\partial p_v}$$

Rearranging, we get

$$\frac{\partial p_v}{\partial Q_u} = \frac{1}{S_2' - D'}$$

In this model, we assume that the wholesaler has some market power when she buys from the village market, but is a price taker in the retail market. The retail market price is given and is set to p_u. The wholesalers will then maximize their profit by equating their marginal cost of buying from the farmers with the price in the urban market. The wholesaler's profit is given by

$$\pi_w = p_u Q_u - p_v Q_u \tag{40}$$

Differentiating (40) with respect to Q_u, we get

$$p_u - p_v + \frac{Q_u}{(S_2' - D')} = 0$$

Rearranging, we get:

$$Q_u = (S_2' - D')(p_u - p_v) \tag{41}$$

Clearly, the RHS of (41) is positive. The retail market price is greater than the village market price for an equilibrium to exist and $S_2' > 0$ while $D' < 0$.

Therefore, the village consumers' demand will be

$$D(p_v) = S_2(p_v) - (S_2' - D')(p_u - p_v) \tag{42}$$

3.3 Comparing the Equilibria

Here our entire focus is on how the farmers would be affected if the MNC offers contract exploiting the product market and credit market interlinkage as compared to the situation when the MNC cannot offer any contract. We compare the two equilibria to see how farmers who are entering into a contract with the MNC and farmers who are not entering into such a contract are affected by contract farming. We start from a situation where hypothetically the village market price, the only variable in our model, is the same in the two cases, that is, $\tilde{p_v} = \hat{p_v}$. Let $\tilde{p_v}$ be the equilibrium price in the market where there is no contract farming. We will denote this price as p_v henceforth. We would now like to look at the excess demand in the model with contract farming

at this price. We are fixing the village price at its old equilibrium level where there was no contract farming. Then we see if there is an excess demand at this price in the new situation, that is, when there is contract farming. If there is an excess demand (supply), then the village price in the former situation will be higher (lower) than the latter. The farmers will be hurt (will gain) in that case. From (36), we get the demand for the village consumers in the absence of contract and from (42), we get the demand for the village consumers in presence of the contract. We would like to calculate ΔD, which is simply the difference between (36) and (42).

$$\Delta D = S(p_v) - (S' - D')(p_u + p^* - 2p_v) - S_2(p_v) + (S_2' - D')(p_u - p_v) \quad (43)$$

We define S_1 as the supply in the no-contract regime by the farmers who would have taken the contract had the MNC been allowed to offer contract. We have seen that

$$S = \int_{\underline{\theta}}^{\bar{\theta}} f(L(r(\theta), p_v))d\theta$$

From here, using Leibniz rule,

$$S' = \int_{\underline{\theta}}^{\bar{\theta}} f_L \frac{\partial L}{\partial p_v} d\theta$$

We know that

$$S = S_1 + S_2$$

and $S' = S_1' + S_2'$. Therefore, rewriting (43), we see that

$$\Delta D = S_1 - S_1'(p_u - p_v) - (S' - D')(p^* - p_v)$$

Clearly, the third term is positive. Therefore, a sufficient condition for ΔD to be negative is given by

$$S_1 - S_1'(p_u - p_v) < 0$$

We define the elasticity of supply of S_1 as e_{S_1}. We know that $e_{S_1} = S_1' p_v / S_1$. Therefore, the sufficient condition can be rewritten as

$$S_1 - (S_1 e_{S_1}/p_v)(p_u - p_v) < 0$$

Simplifying, we get if

$$p_u > \left(1 + \frac{1}{e_{S_1}}\right) p_v \text{ then } \Delta D < 0 \tag{44}$$

Proposition 3.1. *If* $p_u > p_v(1 + \frac{1}{e_{S_1}})$,

(i) the contract equilibrium will hurt the farmers who do not take the contract, and,

(ii) village consumers will be hurt when there is no contract.

If (44) holds then clearly, the village price is higher in the former scenario than in the latter. This would imply that the farmers with a lower θ, i.e., the farmers who are more productive will receive a lower price and hence, will lose if the MNC is allowed to offer a contract. The villagers will have to pay a higher price in case of no contract.

Proposition 3.2. *If* $p_u > p_v(1 + \frac{1}{e_{S_1}})$, *the farmers who take up the contract be worse off.*

Since δ is chosen so that just the participation constraint is just satisfied, the incomes of the farmers taking the contract are equal to their incomes if they do not take up the contract. When the farmers are offered contract the village price falls given the condition described in (44), their opportunity cost declines (interest rate remains unchanged). Farmers' income will fall even when they take the contract. So clearly, the farmers who take up the contract are also worse off.

4 Conclusion

In this paper, we have built theoretical models in an attempt to see the consequences of allowing FDI in the retail sector. In the first model, we have a simple oligopolistic wholesale market and competitive village market and retail market. If now MNCs are allowed buy goods from the domestic farmers and sell it in the retail market, we find the conditions when the domestic retail sector shrinks. We also find the condition when the farmers and urban consumers can gain, and the rural consumers lose. In the next model, MNCs are allowed to offer contract to the farmers. We compare the contract equilibrium with the equilibrium without contract. We find the condition when all the farmers will be hurt where the MNC can offer contract, as compared to the situation when the MNC cannot offer contract.

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