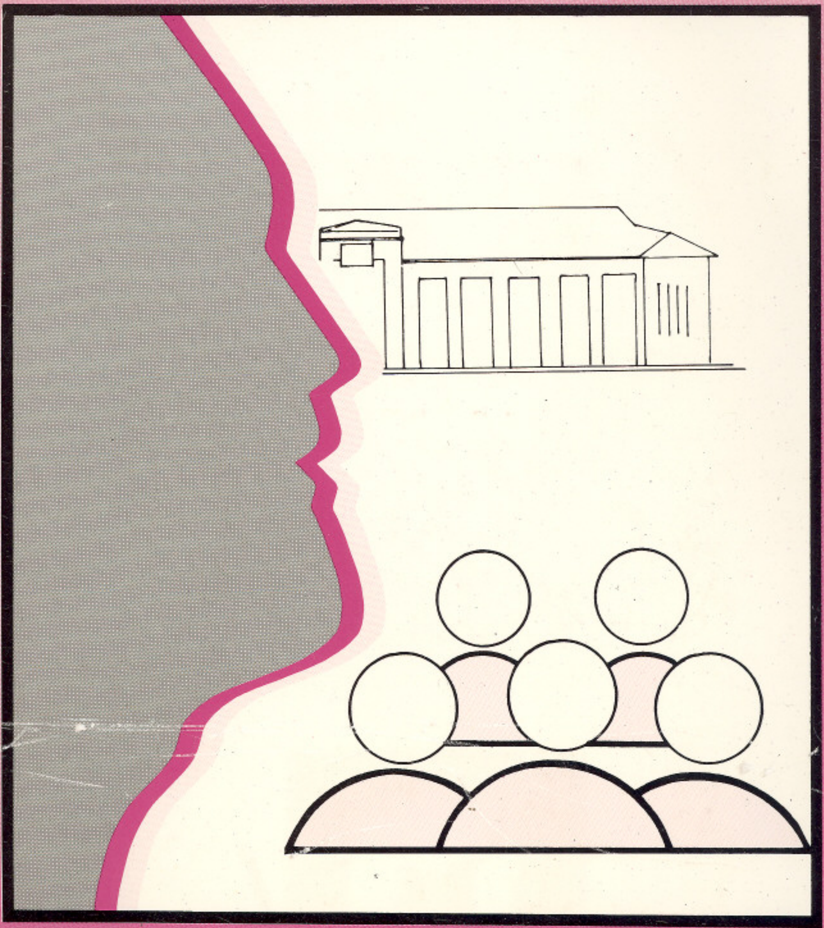


Syarahan

INAUGURAL

oleh

PROF. DR. CHEW TEK ANN
Fakulti Ekonomi dan Pengurusan
Universiti Pertanian Malaysia

Sharecropping in Perfectly Competitive Markets: A Contradiction in Terms

By

Chew Tek Ann, Ph.D.

1. Introduction

The puzzle of sharecropping as an economic institution is an old one. It had attracted the attention of early economists as far back as the eighteenth century, such as Arthur Young and Adam Smith. Early economists generally condemned sharecropping as an inefficient institution in that it did not provide incentives to the sharecropper, because he had to share the output with the landlord. Since the work by Cheung (1969) in which he claimed sharecropping to be as efficient as any other tenure system, there has been a wealth of theoretical and empirical work, more of the former than the latter, trying to prove the efficiency or otherwise of sharecropping. However, the results, both theoretical and empirical, have not been conclusive. The so-called sharecropping dilemma remains. Today, the profession is still divided into those who support the Marshallian equilibrium and those who believe in the Cheungian equilibrium. Some economists may regard this treatment of sharecropping as a confrontation between the Marshallian and the Cheungian schools outdated and a misinterpretation of Cheung's theory. The bottom line in this alternative, recent interpretation is that both schools are regarded as instances of different tradeoffs between contract design and enforcement cost. In line with this thinking, there cannot be just one single theory to explain sharecropping in so many diverse situations. However, since there is no theory as yet to support this multiple equilibria idea, I shall still cast my arguments on sharecropping in terms of a conflict between the two schools of thought. In this inaugural lecture today, I will provide the main features of both sides in the sharecropping controversy, assess the merits of their arguments, and attempt to reconcile the opposing viewpoints. I believe that the divisiveness of economists with regard to the sharecropping issue stems from a basic, false assumption used in the modelling of the sharecropping contract. This divisiveness cannot be just swept under the carpet by adopting the multiple equilibria concept.

The plan of this lecture is as follows. In Section 2, the sharecropping model is outlined. In Sections 3 and 4, the Marshallian and Cheungian positions are described. A reconciliation of the opposing viewpoints is given in Section 5. Empirical evidence is provided in Section 6. In Section 7, some unconventional approaches to solve the sharecropping problem are cited. The last Section has the concluding remarks.

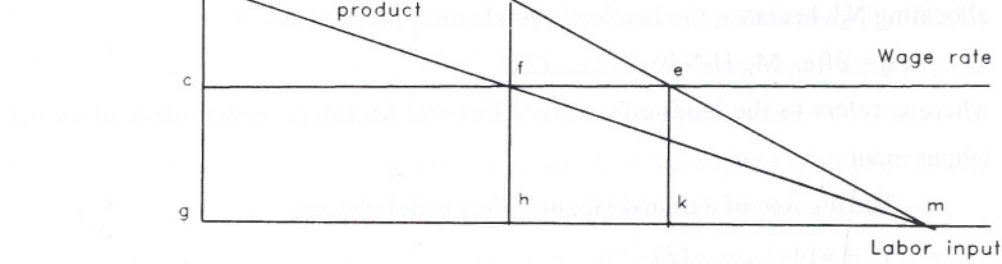
2. Sharecropping Model

The sharecropping contract is a very simple model that can be easily understood even by a first year student in Economics. As shown in Figure 1, am is the marginal product of labour, with bm being the sharecropper's share of the marginal product. Line ce is the wage rate for labour. Using the basic equimarginal principle, the sharecropper will apply his labour until the point f, which is the so-called Marshallian equilibrium point. Application of labour beyond this point will result in a loss to the sharecropper, because the opportunity cost of his labour is greater than his share of the marginal product. If the same plot of land is cultivated using an owner-cultivation system or a fixed-rent contract, the operator will apply labour until the point e, where the marginal product of labour is equal to the wage rate. Because f is less than e, sharecropping is thus deemed to be less efficient than owner-cultivation or the fixed-rent tenure, in that sharecropping results in an underapplication of labour and hence produces a lower output. Usually, the sharecropping model is couched in terms of application of the labour input. However, from the labour-type model, it usually follows that other inputs such as fertilizer, capital and so on, are also deemed to be underapplied in sharecropping. It is not logical to assume that only labour is underapplied, while other inputs are applied in normal amounts, equivalent to what will be applied under fixed-rent tenancy or owner-cultivation.

However, the same sharecropping model is also used to support a set of counter arguments that proclaim sharecropping to be an efficient institution. This argument runs as follows. Because the sharecropper shares the final product with the landlord, he (the sharecropper) will have that much more incentive to put in more effort compared to a fixed wage worker, whose remuneration is fixed irrespective of the effort he puts in (Reid 1976). Hence, the landlord does not need to monitor the sharecropper as intensively as he would a fixed wage worker. Thus, the conclusion is that the sharecropper will have that much more initiative and will put in that much more effort, resulting in a greater output compared to the system of employing workers on fixed wages. In this case, the equilibrium point is not explicitly stated, but one can assume that it will at least be equal to e.

Herein lies the crux of the problem in sharecropping. Is f or e the equilibrium point for the cropsharing contract? If f is the equilibrium point, can this point be truly described as an inefficient equilibrium?

Fig. 1: Model of Contract Choice



3. The Marshallian School

The first article that provides a rigorous argument for the Marshallian equilibrium is the work by Bardhan and Srinivasan (1971). This work was subsequently expanded and generalised, to include the effects of risk and uncertainty, in a landmark contribution by Stiglitz (1974), after which there was a long list of contributions by various distinguished researchers, with the latest being the paper by Otsuka, Chuma and Hayami (1992). Because Otsuka, Chuma and Hayami's work is the latest in a long line of contributions that uses the conventional, perfect competition approach, which I shall term the neoclassical approach, to model sharecropping, I shall examine here in detail the methodology used in this piece of work, to illustrate the erroneous assumption used. This incorrect assumption is the root cause of the long enduring controversy in the sharecropping literature and is common in all the work using the standard, neoclassical method.

Otsuka, Chuma and Hayami assume that the production function on a tiller's farm is defined as (p. 1979):-

$Q = \theta F(e_t, M_t, h)$ ....(1)

where Q is output, θ represents the state of nature, e_t is the work effort of the tiller and his family, M_t is the man-days of casual labour input per tiller and h is the land input per tiller.

Assuming that the landlord owns H hectares of land, enters into a seasonal contract with N_t numbers of tillers, and cultivates the remaining land himself after allocating $N_t h$ hectares, the landlord's production function is:-

$q = \theta f(e_l, M_l, H\text{-}N_t h)$ ....(2)

where e_l refers to the landlord's work effort and M_l refers to man-days of casual labour input.

The income of a casual labourer (Y_c) is defined as:-

$Y_c = wm$ ....(3)

where w is the real wage per day and m is days worked by a casual labourer. The tiller's income is written as:-

$Y_t = \alpha(Q - wM_t) + \beta$

$= \alpha(\Pi) + \beta$ ....(4)

where α is the sharing rate of net output (Π) and β is the parameter representing the fixed payment.

The three typical types of contract between the tiller and the landlord are expressed by different combinations of α and β, as follows:-

Fixed wage labour contract if $\alpha = 0, \beta > 0$;

"Pure" share contract if $0 < \alpha < 1, \beta = 0$;

Fixed-rent tenancy contract if $\alpha = 1, \beta < 0$.

From the 4 initial equations above, the utility functions of the landlord, the landless tiller and the casual labourer were derived. Results were then generated using the standard optimization process of maximizing utility functions subject to various constraints. From such a mathematization process, a whole stream of theoretical results were generated (Otsuka, Chuma and Hayami 1992)[1]. However, the basic dilemma as to whether e or f is the equilibrium point remains unsolved. The results show that given an appropriate set of assumptions, either e or f can always be shown to be the equilibrium point. Hence, the sharecropping mystery in the real world remains.

4. The Cheungian School

Cheung's model follows the standard, neoclassical approach as outlined above, except for the inclusion of a key assumption. Into his mathematical model is built the critical assumption $wt = (1-r)q(h,t)$, where w is the wage rate, t is the amount of tenant labour per farm, (1-r) is the sharecropper's share of the product and q(h,t) is the farm production function where h is the amount of land (Cheung 1969, p. 20)[2]. In other words, the income of the tenant derived from working as a sharecropper must be equal to the income he would have earned if he had worked as a casual labourer. Cheung's argument is that in competitive market situations, a sharecropper cannot possibly capture any "rent" as the Marshallian equilibrium at f would have implied (area cbf would be some form of "rent" accruing to the sharecropper, if equilibrium is at f). Undoubtedly, the Cheungian result is influenced by the famous Coase Theorem (Coase 1960) which states that irrespective of the assignment of initial property rights, negotiations between the various parties under competitive market conditions, will lead to an arrangement where pareto optimality is achieved. In other words, Cheung argued that competition will "force" a sharecropper to apply his labour up to point e. Failure to do so will result in his eviction and his replacement by a fixed wage labourer, under competitive market conditions. The rationale used to justify the existence of sharecropping is the risk sharing nature of the cropsharing contract, not the existence of transaction cost discussed later.

A benevolent interpretation of Cheung's theory is that Cheung showed that the share contract is as efficient as any other contract form under the assumption of zero transaction cost, but that he is well aware that a theory of institutional choice requires the inclusion of transaction cost. That is why he developed the well-known tradeoff between risk sharing and imperfect incentives in Chapter 4 of his book (Cheung 1969). My counter argument is that any theory that proves that sharecropping contract is as efficient as any other contract under the *assumption of zero transaction cost is redundant, for the simple reason that sharecropping does not exist under such frictionless condition, according to the transaction cost literature.* This will be elaborated on later.

5. The Reconciliation

Thus, the Marshallian and the Cheungian solutions yield diametrically opposite results. The Marshallian solution says that the sharecropping equilibrium occurs at f while the Cheungian solution asserts that the equilibrium is at e. As stated in my Introduction, there is now the growing tendency to argue that there cannot be only just one single sharecropping equilibrium. No contractual form is universally efficient. Sharecropping can be efficient in certain specific environment and can be inefficient in others (Quibria and Rashid 1986, Otsuka and Hayami 1988). The task of an economist is then to identify the tradeoffs in contract design and enforcement that can explain contract choices. This viewpoint comes about because of two reasons. First, the results generated from the various neoclassical, mathematical models provide for both types of equilibria, given varying assumptions. Second, empirical results carried out by countless researchers have not been clear-cut in the conclusions, with some work favouring the Cheungian school while many other results appear to support the Marshallian equilibrium.

It may be true that, theoretically, there may be multiple equilibria within the share contract, depending on the type of tradeoff between contract design and enforcement cost. However, in the real world, if both equilibria exist, there has to be some theory or framework to accommodate both solutions. I believe such a reconciliation or accommodation of both equilibria can be found in what is known as transaction cost economics. The foundation of transaction cost economics was laid by Coase in his celebrated 1937 article, in which he postulated the rationale for the existence of the so-called firm. A firm arises because transactions can be carried out at less cost within a firm compared to relying on the market. There are costs involved, collectively termed transaction cost, in using the market mechanism, such as the cost of search for prices and the cost of drawing up contracts and enforcing them. Despite this remarkable insight about the nature of the firm, which was to win for Coase the Nobel Prize in Economics some 60 years later in 1991 (Coase 1991), the transaction cost approach laid dormant for the next 35 years, unexploited. It is only in the last 15 years that the transaction cost approach took off, spawning a large amount of literature (Knight 1957, Alchian and Demsetz 1972, Williamson 1975, Cohen 1979, Cheung 1983, Milgrom and Roberts 1988, Simon 1991, Wiggins 1991).

If we accept the transaction cost approach, then the conventional, neoclassical approach used in modelling sharecropping, such as in Bardhan and Srinivasan (1971), Cheung (1969), Stiglitz (1974), Otsuka, Chuma and Hayami (1992) and many others, is clearly incorrect. This is because the standard procedure in that approach is to first model sharecropping in a perfectly competitive environment. The farm production function invariably specifies output as a function of land and labour. Monitoring input is not considered. Such an assumption is a contradiction in terms. Sharecropping, or any firm or market hierarchy for that matter, cannot possibly exist in a condition of zero transaction cost, i.e., under perfectly competitive market conditions. *There is no need for such an institution as sharecropping, or any type of market hierarchy, under such costless, frictionless conditions, according to the transaction cost literature*. Such an idealised, frictionless world exists only in the minds of economists, as a mental construct. Thanks to uncertainty/complexity, bounded rationality, small numbers relationship and opportunism (Williamson 1975), transactional friction will always exist in the real world. Thus, equations 1 and 2 above are incorrect[3], because the critical input, transaction cost, has not been specified. Consequently, any model that includes the above two equations is incorrect.

In most cases, we can get away with the omission of transaction cost in our economic models, because transaction cost is only incidental to the analyses at hand. However, for the case of sharecropping, omitting transaction cost is a fatal error because it is *the difference in the degree of transaction cost that provides the raison d'etre for the existence of different types of firms, including sharecropping.*

The redeeming feature in most neoclassical models of sharecropping is that transaction cost is subsequently brought in later, to modify the results generated from the initial, perfectly competitive model. Hence, there is the implicit recognition that in sharecropping there is a different utility maximising algorithm compared to the utility maximising algorithm existing in the wage labour market. Thus, the sharecropping labour market is distinctly different from the wage labour market and no amount of competition will bring about an equalisation of returns to labour in these separate markets. Unfortunately, such a qualification is only brought in after the basic results have already been generated from the perfect competition model. The consequence is that there is a plethora of possible conclusions, with the real world issue as to whether the Marshallian or the Cheungian equilibrium is valid, unresolved. In this respect, Cheung's cropsharing model suffers from a double "defect". First, he assumes an initial sharecropping model under perfectly competitive market conditions or zero transaction cost.

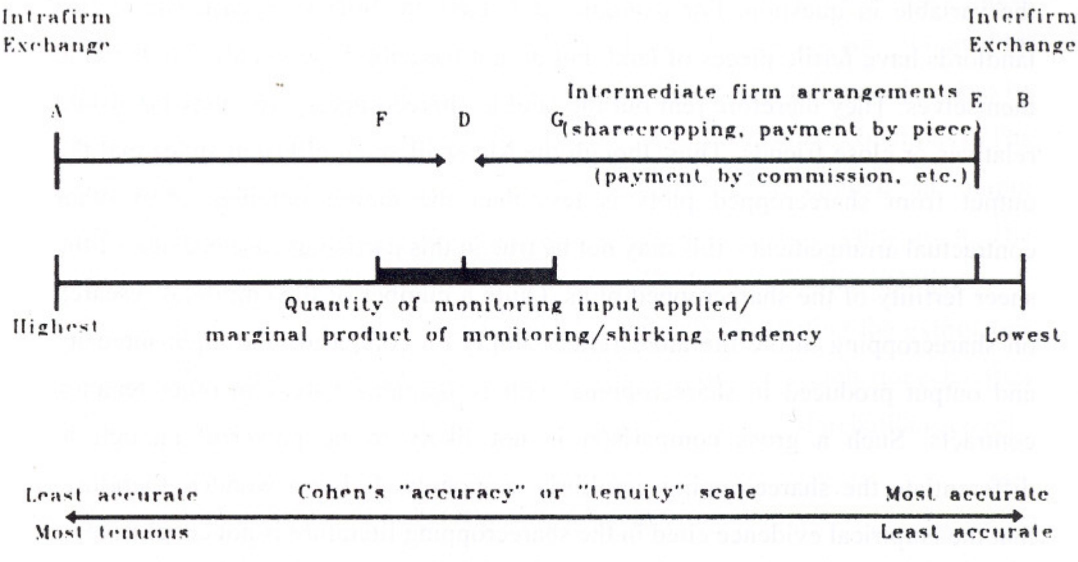
Second, he imposes the condition that that the returns from sharecropping must be equal to the returns obtained from working as a wage labourer. With such restrictive conditions, the result is a foregone conclusion. There will be no difference in equilibrium between the sharecropping contract and the fixed-rent contract or owner-cultivation.

But we know that, in the real world, there does exist distinct differences between sharecropping and wage labour employment. Even a casual familiarity with a sharecropping situation will lead one to realise that the relationship between a sharecropper and his landlord is much warmer and more cordial than that existing between a wage worker and his landlord. A landlord does not need to give detailed instructions to a sharecropper, as he is prone to do for wage labour.

We need to operationalise the theory of the firm, incorporating the concept of transaction cost, in order to explain sharecropping. Such a basic operational model is available in the transactional framework of sharecropping (Chew 1991, 1993). The essence in this framework is to regard the firm as a continuum where the marginal product of monitoring declines as we go from left to right (Fig. 2). The theoretical underpinning for this continuum is the varying degrees of tenuity existing between factor input and factor reward in the various types of firms (Cohen 1979, Chew 1991). Where the marginal product derivable from monitoring labour is high, as at the left, intrafirm portion of Fig. 2, it then pays to monitor labour closely. Where the marginal product derivable from monitoring labour is low, as at the right portion in Fig. 2, it does not pay to monitor labour - in the extreme case it is better to rely on the market mechanism or in other words, to purchase the labour, or other input, directly from the marketplace. The marginal product obtainable from monitoring is a function of the technical conditions governing production, the quality of the monitoring input, the inherent tendency to shirk in a given contractual situation and the price of monitoring and the price of output. We can imagine a variety of possible situations. For example, if the price of the output increases sharply, it may become economically viable to monitor labour closely, opting for an intrafirm contract (Fig. 2). Conversely, if the cost of monitoring increases sharply, it may be better to economise on monitoring, by substituting self-monitoring for supervision by monitors through the use of sharecropping or a piece-work contract. The monitoring input can be looked upon just like any other input, such as fertilizer, for example. However, monitoring is much more fundamental than fertilizer in the sense that a firm/farm can do without fertilizer, but the very reason for the existence of the firm/farm is due to the existence of transaction cost, as reflected in the quantity of monitoring input used. The equilibrium type of firm is then determined at the point where the marginal product of monitoring equals the marginal factor cost of monitoring - the basic, equimarginal principle.

Once we accept the transactional framework for sharecropping, the reconciliation of the Marshallian and Cheungian equilibria is then a simple matter of identifying the points in the transactional framework where these different equilibria occur. The Cheungian equilibrium results in equal outputs from wage employment of labour and the sharecropping contract. This can only occur at a point somewhere within the overlapping area FG (Fig 2). In the real world, it would be impossible to get a sharp demarcation point D, where an intrafirm arrangement suddenly gives way to a sharecropping contract. Sudden, abrupt changes do not occur in Economics or in other Social Sciences, for that matter - things are seldom black or white in Economics, but a form of continuum. There is thus in all likelihood a common area FG, where the quantity of monitoring input applied is the same for both wage labour and the share contract. Among the reasons for the existence of such an overlapping area could be the lumpiness of monitoring or supervisory labour and the effect of lagged responses to changes in prices and technologies. One can easily imagine a situation where a landlord cultivates some plots using wage labour and sublets other plots nearby to tenants using the sharecropping contract. Because the landlord already has paid supervisors monitoring his plots cultivated using wage labour, the landlord is most likely to extend the supervisory service to his leased-out sharecropped plots as well - an illustration of the lumpiness in the monitoring input employed. The result is sharecropping that is supervised much more tightly than would occur under normal sharecropping conditions. In such an unusual sharecropping situation, the resulting equilibrium will be at e. The output is then the same as that produced under a fixed-rent contract or under owner-cultivation. Note that such a Cheung-type[4] equilibrium will be an exception rather than the norm. As shown in Fig. 2, the overlapping range FG is a small area compared to the larger range GE where the normal sharecropping exists. It is heartening, for us, to note that the "father of modern economics" Alfred Marshall himself, obtained a similar conclusion. He stated that under certain conditions, "landlords can force the tenant (sharecropper) to cultivate the land just as intensively as he would under the English tenure (fixed-rent)" (Marshall 1956, p. 536). The Marshallian equilibrium, on the other hand, is then the common sharecropping equilibrium, occurring anywhere within GE in Fig. 2.

Fig. 2: Transactional Framework of Sharecropping



6. Supporting Empirical Evidence

In Economics, the ultimate test to determine if a theoretical model of the real world is valid or otherwise, is to test the model against empirical data. Unfortunately, for the case of sharecropping, the empirical evidence has not been clear-cut in its support or refutation of either sharecropping equilibrium. It is easy to see why the empirical evidence has been confusing. The difference between the two sharecropping equilibria, fe, is such a small difference. It is easy for this small difference to be overwhelmed by other factors such as differences in the fertility of the land and differences in the inherent farming skills of the tillers. Furthermore, sharecropping is a sort of continuum condition itself, with intensity of monitoring ranging from a high value at point G to minimal monitoring at point E. Similarly, there exists a range of owner-cultivation and fixed-rent contracts. For an accurate test to differentiate the Marshallian equilibrium from the Cheungian equilibrium, care must be exercised to ensure that the ceteris paribus condition holds, except for the variable in question. For example, it is easy to think of a case where rich landlords have fertile pieces of land, but do not have the time to cultivate the land themselves. They therefore rent out the land to sharecroppers, who may be distant relatives or close friends. Thus, though the Marshallian equilibrium states that the output from sharecropped plots is less than the output obtained from other contractual arrangements, this may not be true in this particular case because of the sheer fertility of the sharecropped plots. Quite a number of the empirical research on sharecropping in the literature relied simply on comparing the input intensity and output produced in sharecropping with comparable values in other tenancy contracts. Such a gross comparison is not likely to be powerful enough to differentiate the sharecropping equilibria accurately. It is no wonder, therefore, that the empirical evidence cited in the sharecropping literature is not conclusive.

The most powerful methodology, at this point in time, to distinguish the two types of sharecropping equilibria is the econometric model developed by Shaban (1987). This is the most powerful methodology available because it is based on the pairwise testing of sharecropped and owner-cultivated plots, with both plots, located in the same locality, being cultivated by the same farmer. This removes the influences due to extraneous differences such as differences in soil fertility, irrigation, plot value and village location. Hence, the test to differentiate the Marshallian equilibrium from the Cheungian equilibrium becomes that more accurate. Furthermore, the same farmer cultivating both the own plots and the sharecropped plots implies that there is only a single utility maximiser, unlike the case where the sharecropper and the owner cultivator are different persons. Errors arising from different utility functions, different farming skills and different sets of resources commanded by the sharecropper and the owner-cultivator - all these can considerably reduce the accuracy of the test to decipher the Marshallian equilibrium from the Cheungian equilibrium[5]. It is pleasing to note, for our case, that the preponderance of evidence from Shaban's work seems to support the Marshallian equilibrium, affirming indirectly the validity of the transactional framework of sharecropping.

Acharya (1992) repeated Shaban's work, this time testing the methodology against a set of data obtained from 113 paddy farmers in two tarai (plains) villages in Nepal[6]. A slight improvement to the estimating set of equations was obtained by incorporating farm size as an explanatory variable. (This variable was found to be not significant in Shaban's work and was excluded in his final equations). The results obtained from Acharya's work are conclusive. Inputs applied and output produced are significantly lower in sharecropping than in owner-cultivation. The sharecropping equilibrium obtained is unequivocally the Marshallian solution.

Another piece of work that was quite thorough in isolating the extraneous influences that may mask the sharecropping effect is the research done by Bell (1977). Again, in this case, the weight of evidence favours the Marshallian school.

7. Other Approaches

A variety of unconventional approaches have also been used to try to explain sharecropping. Among these approaches are the bargaining theoretic approach by Bell and Zusman (1976), the game theoretic approach by Roumasset (1979) and the decision theoretic approach (agency model) used by Hurwicz and Shapiro (1978). Factors other than the transaction cost itself, such as supervision and management factors (Eswaran and Kotwal 1985) and entrepreneurial skill (Hallagan 1978) have also been used in models to explain sharecropping. Another piece of work is the contribution by Datta, O'Hara and Nugent (1986), where transaction cost is used to explain wage, fixed-rent and share contracts separately. Studies on input cost sharing in sharecropping include Braverman and Stiglitz (1986), Bardhan and Singh (1987), and Allen and Lueck (1993). While all these models[7] are interesting in their own right, none of them, unfortunately, provides the definitive answer to settle the Marshallian versus Cheungian conflict[8].

8. Concluding Remarks

It is inevitable that as a discipline matures and qualifies as a science, a certain degree of mathematization of the subject matter in that discipline occurs. In Economics, the amount of mathematization has been overwhelming, with the neoclassical, mathematical approach being the favoured tool used to analyse economic events and behaviour. The assumptions used in the neoclassical approach are the standard assumptions of perfect competition. There are five assumptions for perfect competition, i.e., many buyers and sellers, homogeneous product, no collusion among sellers or buyers, no barriers to entry and perfect information. In the real world there is no such thing as perfect competition, as information is never perfect. Man is not omnipotent, omnipresent and omniscient. Yet perfect competition models are used endlessly to generate results, for comparison with real world issues. The reason is fairly simple. Perfect competition models are easily amenable to mathematical formulation and manipulation. In contrast, the theories for oligopoly and monopolistic competition are messy and not as well developed as theories for perfect competition.

It is my contention that the careless use of the perfect competition assumptions for studying the institution of sharecropping has led the Agricultural Economics profession astray on this topic for the last 30 years. In many other cases, the use of the perfect competition model has brought rich and fruitful results for studying a wide variety of problems. But this is not so for the case of sharecropping. This is because the very rationale for the existence of sharecropping or firms, i.e., transaction cost, is assumed as zero in perfect competition models. To speak of sharecropping in perfectly competitive markets is therefore a contradiction in terms. Perfect competition models are frictionless models. In the real world of imperfect human beings, given to opportunistic behaviour at the slightest chance (Williamson 1975, Cohen 1979), firms or market hierarchies emerge to overcome the ill-effects of friction arising from human imperfections. *It is therefore meaningless to use a frictionless model to explain an institution that arises because of friction.* In this regard, it is ridiculous to compare f with e (Fig. 1) and term any shortfall from e as a form of inefficiency. The equilibrium e refers to the frictionless equilibrium for sharecropping. The equilibrium f refers to the real world equilibrium for sharecropping. The equilibrium e is a myth and therefore does not exist for sharecropping in the real world. To force the sharecropper to move from f to e entails an enforcement cost that would not be covered by the incremental returns. The reason the share contract emerges is because, given the technical conditions of production and the prices of inputs and output, sharecropping is the most efficient institution along GE in Fig. 2. And sharecropping anywhere along GE implies a lower monitoring cost in comparison to an intrafirm arrangement anywhere along AF (Chew 1991). Sharecropping therefore has a distinctive characteristic, i.e., there exists a certain degree of cooperative behaviour between the landlord and tenant in contrast to the officious, impersonal, employer-employee relationship existing in fixed wage employment.

The neoclassical economists' fixation with the concept of first best efficiency or comparing an equilibrium in the real world with an equilibrium under perfect market conditions to determine efficiency, is the prime cause of the confusion in the sharecropping literature. Efficiency is an extremely elusive concept, difficult to grasp and define in the real world (Pasour and Bullock 1975). To reiterate, there are valid and cogent reasons why sharecropping is chosen over other tenurial arrangements in a particular situation. Clearly, the cost of close monitoring is not worth the returns, hence the decision to substitute self monitoring that is inherent in a sharecropping contract, for external monitoring by others. *The necessity for monitoring arises because of the existence of transaction cost in the real world.* This fundamental fact in transaction cost economics, is ignored by a host of neoclassical economists who are bent on churning out frictionless, mathematical models one after another, to explain sharecropping. The result is a whole lot of "sterile theorising" or "blackboard economics" (Coase 1991). Quite a number of these models are formidable contributions in theoretical economics, yet in terms of value in solving the sharecropping riddle or in providing insights into the relative merits of sharecropping vis-a-vis other tenurial forms in the *real world*, most of these contributions are practically useless.

Footnotes

1. Similarly, in Bardhan and Srinivasan's (1971) paper, the farm production is written as $Q = rF(q, L)$, where Q is output, r is landlord's share, q is the land leased to sharecroppers and L is the labour input of the sharecropper. In Stiglitz (1974), the production function is written as $Q = g(\theta)F(L,T)$, where Q is output, θ is the state of nature, L is labour and T is land. In both these papers, considered classic contributions, the monitoring input is not specified. At the time these papers were written, transaction cost economics was pretty dormant.
2. In Cheung's model, the production function is written as $Q = mrq(h,t)$, where Q is output, m is number of farms, r is landlord's share, q is the production function, h is the amount of land and t is the amount of tenant labour per farm. Again, the monitoring input is not specified.
3. The correct formulation should be $Q = g(\theta)f(L,T,C_i)$, where Q is output, θ is the state of nature, L is land, T is tenant labour and C_i is the monitoring cost. C_i varies depending on whether the tenancy is a fixed-rent contract, sharecropping or owner-cultivation. Besides, within each tenancy itself, C_i varies within a continuum (Fig. 2). C_i is only zero in the perfect competition or imaginary world. In the real world, C_i is always positive however competitive the market condition is, with C_i lower in sharecropping than in wage employment. The fact that C_i can never be

zero in the real world is the essence of our message in the title of this paper. Unfortunately, a model such as this has yet to be developed.

4. It must be emphasised here that the Cheung-type equilibrium is derived under different assumptions from that used by Cheung himself to derive his equilibrium. Cheung assumed costless, frictionless conditions, whereas in this case there is transaction cost, but the costs are assumed equal for both sharecropping and nonsharecropping situations, thereby neutralising themselves out in Fig. 1.
5. Shaban also used the joint test to see if all inputs are lower in sharecropping as compared to owner cultivation. This joint test, compared to the test for individual input equations, is a more powerful test of Cheung's theory as the test covers all inputs, taking into account the interactive effects of different inputs with each other. As explained in Section 2, it is not logical to think that only certain inputs are underapplied in sharecropping while other inputs are applied in "normal" quantities. It is either all inputs or none.
6. I was a member of the thesis committee that supervised this piece of research.
7. The citations here are by no means exhaustive. There is such a large literature on sharecropping. I am sure there must be some other work that are missed out here. Some of the citations listed use the neoclassical, perfect competition methodology. But because they focus on some rather unusual aspects, such as input sharing for example, they are included in this Section.
8. To repeat, there is the viewpoint that there is actually no conflict between the Marshallian school and the Cheungian school - each school refers to equilibrium under different sets of circumstances. This viewpoint is related to the opinion that there cannot be just one single theory for sharecropping in the real world, given the diversity of circumstances under which sharecropping occurs. However, so far there is as yet no theory to unify or accommodate the two schools of thought, except for the transactional framework of sharecropping, proposed by Chew (1991). This framework,

however, is a rebuttal of the neoclassical approach used in modelling the share contract.

References

Acharya, Ram N., The Economics of Sharecropping: A Study of Two Tarai Villages of Nepal, M.Sc. thesis, University of Agriculture Malaysia (1992).

Alchian, A. and H. Demsetz, Production , Information Costs and Economic Organisation, *American Economic Review* 62 (December 1972), pp. 777-95.

Allen, Douglas W. and D. Lueck, Transaction Costs and the Design of Cropshare Contracts, *Rand Journal of Economics*, 24(1) (Spring 1993), pp. 78-100.

Bardhan, P. and N. Singh, On Moral Hazard and Cost Sharing Under Sharecropping, *American Journal of Agricultural Economics*, 69 (1987), pp. 382-383.

Bardhan, P.K. and T.N. Srinivasan, Cropsharing Tenancy in Agriculture: A Theoretical and Empirical Analysis, *American Economic Review*, 61, (March 1971), pp. 48-64.

Bell, C., Alternative Theories of Sharecropping: Some Tests Using Evidence from North-East India, *Journal of Development Studies*, 13 (July 1977), pp. 317-46.

Bell, C. and P. Zusman, A Bargain Theoretic Approach to Cropsharing Contracts, *American Economic Review*, 66 (Sept. 1976), pp. 578-588.

Braverman, A. and J.E. Stiglitz, Cost-Sharing Arrangements Under Sharecropping: Moral Hazard, Incentive Flexibility, and Risk, *American Journal of Agricultural Economics*, 68 (1986), pp. 642-652.

Cheung, S.N.S., *The Theory of Share Tenancy*, (1969), Chicago University Press, Chicago.

Cheung, S.N.S., The Contractual Nature of the Firm, *Journal of Law and Economics*, 36 (April 1983), pp. 1-21.

Chew, Tek-Ann, Share Contracts in Malaysian Rubber Smallholdings, *Land Economics*, 67 (Feb. 1991), pp. 85-98.

Chew, Tek-Ann, The Transactional Framework of Sharecropping: Further Implications, *Canadian Journal of Agricultural Economics*, 41 (1993), pp. 209-221.

Coase, R.H., The Nature of the Firm, *Economica,* (Nov. 1937), pp. 386-405.

Coase, R.H., The Problem of Social Cost, *Journal of Law and Economics*, 3(2) (1960), pp. 1-40.

Coase, R.H., 1991 Nobel Lecture: The Institutional Structure of Production, in Williamson, O.E. and S.G. Winter (Edit.) *The Nature of the Firm*, (1993), Oxford University Press, New York.

Cohen, L.R., The Firm: A Revised Definition, *Southern Economic Journal*, 46 (Oct. 1979), pp. 580-90.

Datta, S.K., D.J. O'Hara and J.B. Nugent, Choice of Agricultural Tenancy in the Presence of Transaction Cost, *Land Economics*, 62 (May 1968), pp. 145-58.

Eswaran, M. and A. Kotwal, A Theory of Contractual Structure in Agriculture, *American Economic Review*, 75 (June 1985), pp. 352-67.

Hallagan, W., Self-Selection by Contractual Choice and the Theory of Sharecropping, *Bell Journal of Economics*, 9 (1978), pp. 344-54.

Hurwicz, L. and L. Shapiro, Incentive Structures Maximizing residual gain Under Incomplete Information, *Bell Journal of Economics*, 9 (Spring 1978), pp. 180-92.

Knight, F.H., *Risk, Uncertainty and Profit*, (1957), Houghton Mifflin, New York.

Marshall, A., *Principles of Economics*, 8th Edition, (1956), Macmillan, London.

Milgrom, P. and J. Roberts, Economic Theories of the Firm: Past, Present and Future, *Canadian Journal of Economics*, 21(3) (August 1988), pp. 444-458.

Otsuka, K. and Y. Hayami, Theories of Share Tenancy: A Critical Survey, *Economic Development and Cultural Change*, 37 (Oct. 1988), pp. 31-67.

Otsuka, K., H. Chuma and Y. Hayami, Land and Labor Contacts in Agrarian Economies: Theories and Facts, *Journal of Economic Literature*, 30 (Dec. 1992), pp. 1965-2018.

Pasour, E.C. Jr., and J.B. Bullock, Implications of Uncertainty for Measurement of Efficiency, *American Journal of Agricultural Economics*, 57 (May 1975), pp. 335-39.

Quibria, M.G. and S. Rashid, Sharecropping in Dual Economies: A Synthesis, *Oxford Economic Papers*, 38 (1986), pp. 94-111.

Reid, J.D. Jr., Sharecropping and Agricultural Uncertainty, *Economic Development and Cultural Change*, 24 (1976), pp. 549-76.

Roumasset, J., Sharecropping, Production Externalities and the Theory of Contracts, *American Journal of Agricultural Economics*, (Feb. 1979), pp. 640-647.

Simon, H., Organisation and Markets, *Journal of Economic Perspectives*, 15(2) (1991), pp. 25-44.

Shaban, Radwan A., Testing Between Competing Models of Sharecropping, *Journal of Political Economy*, 95 (Oct. 1987), pp. 893-920.

Stiglitz, J.E., Incentives and Risk Sharing in Sharecropping, *Review of Economic Studies*, 41 (April 1974), pp. 219-55.

Wiggins, Steven, N., The Economics of the Firm and Contracts: A Selective Survey, *Journal of Institutional and Theoretical Economics (JITE)*, 147 (1991), pp. 603-661.

Williamson, O.E., *Markets and Hierarchies: Analysis and Antitrust Implications*, (1975), The Free Press, New York.

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