

CONTRACTUAL ARRANGEMENTS, EMPLOYMENT AND WAGES IN  
RURAL LABOR MARKETS:  
A CRITICAL REVIEW

By

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In recent years the literature concerned with economic development has shifted its focus to the rural sector of developing countries. Attention has turned from describing the broad outlines of the macro process of economic development to attempting to understand the institutions and the behavior of individuals and families in rural areas. In part this concern reflects the underlying reality that the bulk of developing country populations reside in the rural sector. The recent generation of a large array of data sets - from intensive village studies to large-scale national surveys - along with advances in computer technology have also enabled more precise descriptions of these settings as well as provided the material which can be used to test assumptions, models and hypotheses, and thus promote scientific progress.

The development of many of the models and theories of the rural economy in developing countries, hampered until recently by the absence of good empirical information, have generally sought either to account for the existence of certain "stylized facts" which appeared to contradict the implications of competitive models, or to provide the theoretical underpinnings for the assumptions characterizing the macro "surplus labor" models (Lewis, 1954, Ranis and Fei, 1961) which have dominated the development literature. Among the most popular stylized facts taken as data are (1) the coexistence of high unemployment and rigid wages (or discrepancies between the marginal product of labor and wage rates), (2) negative correlations between output per acre and farm size, and (3) the existence of share tenancy.

The essays assembled in this volume depart from this tradition somewhat. Their major focus is on the determination of the earnings of individuals within the rural sectors of South and South-East Asian societies, societies which are not so different as to bar a coherent collection of studies, yet sufficiently varied to provide the contrasts which illuminate understanding of the more fundamental regularities which may characterize rural labor markets. While the approaches and perspectives vary widely, a unifying theme is the characterization of the extent to which markets for the important factors of production in the agrarian setting, in particular labor markets, operate according to the principles of the supply-demand, competitive model. A second theme is the issue of whether the sometimes unique institutional features of rural markets — sharecropping or other contractual arrangements or even "institutional" wage rates — represent barriers to the efficient operation of markets, are optimal (second-best) responses to exogenous, technically determined constraints on markets (market failure), or are reflections of collusive or otherwise exploitative power relationships. The flexibility of institutional arrangements as well as wages and earnings in labor markets when there are fundamental changes in the supply of or demand for factors, an important policy question, is thus addressed through an examination of the underlying causes of institutional arrangements and their variability across different economic environments in the rural sector.

Much of the variations in rural wages and contractual terms considered in the conference papers relate to periods of five to fifteen years. General theories of development such as those of Lewis or Ranis and Fei are, however,

concerned with very much longer-term trends of real rural wages. While such models are silent on the behavioral and institutional features of the rural sector, the wage determination and contractual choice theories of rural markets do not and cannot explain very long-term trends, as they treat the structure of technology and the sectoral composition of output as fixed. They also largely ignore the determinants of reproductive processes and investments in human capital which underlie population growth and the growth and composition of the labor force. The conference on which this volume is based specifically excluded these very important topics from consideration, areas of research which must ultimately provide the linkage between the detailed short-run models and evidence that is the focus here and a richer general theory of economic development.

While the major focus of this volume is on the labor market, it is clear that labor earnings and employment are affected by the characteristics of markets not directly involving labor. In a world with perfect markets for all factors of production (including credit and insurance) an individual's income in each year would simply be the employment of his or her factor endowments valued at the market rate per unit. In this world, the initial distribution of endowments among individuals, for given tastes and aggregate quantities of each factor, would uniquely determine the individual distribution of income. Moreover, production - total output - would be at a maximum and would be unrelated to the distribution of the ownership of factors; production techniques would be identical on all farms facing the same market environment and operating the same quality of land, e.g. output and employment per acre would be unrelated to farm size; therefore productive efficiency could not be improved by any rearrangement of factor uses or distributions, barring scale economies.

To explain labor earnings in such a world, with a given endowment distribution, would require an explanation of the returns to each factor (wage rates, rent), for which the competitive supply-demand model has proved a powerful tool. Failures of one or <sup>several</sup> markets, however, not only would have important implications for the distribution of earnings and productive efficiency, but is likely to require more complex models in order to understand earnings determination. An important, unresolved question is whether such models can outpredict the simpler competitive models when only some markets are imperfect or absent.

Attention to market failure, however, is not only important for understanding the determination of earnings and the achievement of productive efficiency, but, as discussed below and in many of the essays in this volume, may aid in understanding as well the existence of and changes in the many and diverse institutional arrangements — the type of contracts, labor recruitment strategies and the "interlinking" of labor and one or more factors of production within one transaction<sup>1/</sup> — that characterize labor "markets". Indeed because of the general non-independence - the "interrelatedness" - of all factor markets, market failures anywhere in the rural sector may importantly affect labor market earnings or arrangements even if the market for labor operates perfectly. To explain earnings then requires information beyond the determination of wages and labor supply.

In this essay, we critically review the existing literature pertaining to labor and other factor markets in rural areas to place in perspective the contributions of the essays in this volume. In particular we look at the various models and theories of labor markets and tenancy with attention to

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<sup>1/</sup> Braverman and Srinivasan define interlinked contracts "as transactions in more than one commodity or service made between the same pair of individuals and linked in an essential way...delinking the contracts would be infeasible or costly for at least one party" (p. 4).

the issues of absent markets, market failure, collusive power and the interdependence of markets. A central theme arising from the review of modelling efforts in these two areas is that an understanding of institutional arrangements or imperfections in any one market (e.g. labor) requires attention to the imperfections in or constraints on other markets (e.g. land, credit). We will not attempt to give an impartial treatment to all ideas but will emphasize the major traditions of thought and recent empirical studies which are closely connected to the themes of this volume. We will also discuss some important themes which we think have been neglected in the literature as well as what the essays as a whole may suggest for future work on rural labor markets.

#### THE PEASANT HOUSEHOLD AND THE LABOR MARKET

The theoretical and empirical literature dealing with the employment of labor and the determination of wage rates in rural areas of developing countries has been shaped by concern with two major issues 1) how sensitive is aggregate agricultural output to the removal of agricultural laborers and 2) are there aspects of the rural labor market which bar the attainment of productive efficiency within agriculture. The first issue has taken on importance because an essential assumption of some popular macro development models is that, in the initial stages of industrialization, agricultural output will be invariant to the transfer of labor from agriculture to industry.<sup>1/</sup> The theoretical literature has thus focused for the most part on positing rural labor market structures and/or models of peasant behavior which could make this "surplus labor" assumption true. Likewise, the empirical literature on rural labor markets has been concerned with either

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<sup>1/</sup> The literature on planning models and benefit-cost analysis of projects is also concerned centrally with the opportunity cost of withdrawing labor from agriculture.

testing the validity of this development model assumption or with testing those assumptions of the theoretical models of rural labor market behavior which were developed to rationalize the assumptions of the development models. (For a recent review for India see Lal 1976.)

Two basic strands of thought characterize the "surplus labor" models of rural agriculture. The first assumes that rural labor can be withdrawn without cost because of the existence of large pools of unemployed or "underemployed" rural workers. The theoretical problem is to reconcile large-scale unemployment or underutilization of laborers with a non-zero wage for labor. The second theoretical approach seeks to explain the assumed insensitivity of agricultural output to the number of laborers by distinguishing between the number of laborers and total labor supplied, focusing on the labor supply behavior of the peasant household as well as on labor market structure.

a. Nutrition and Efficiency Wages

The most influential surplus labor model explaining the coexistence of idleness and constant wages is based on the efficiency or nutritional wage hypothesis elaborated by Leibenstein (1975) and later by Mazumdar (1959), Wonnacott (1962) and Stiglitz (1976). This model assumes that there is a technically determined<sup>1/</sup> positive relationship at low levels of income between nutritional levels and labor effort per unit of time (or per laborer). Given certain (weak) assumptions about the shape of the income-effort relationship, there is a unique wage - the "efficiency wage" - which minimizes the cost per unit of labor effort<sup>2/</sup>. Maximization of profits

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<sup>1/</sup> As Bliss and Stern (1978) stress, if the relationship is not technical it will be almost impossible to test empirically.

<sup>2/</sup> The theory assumes that labor can be measured in efficiency units. That this may not be possible when there are more than two factors of production has been discussed in the appendix to chapter 5 of Binswanger and Ruttan.

by farmers in surplus labor economies entails hiring laborers until the marginal value product of total effort (or efficiency units) hired is equal to the efficiency wage. Some workers would be left unemployed in such a setting; although they might be willing to work at a wage lower than the efficiency wage, it is not profitable for farmers to hire them, no matter how much time wages are bid down, due to the reduction in effort associated with lowered wages. Given profit maximization, large numbers of laborers relative to land and the assumed (non-behavioral) relationship between the level of nutrition and effort, it is clear that unemployment and positive, even high, wage rates will coexist; moreover, removal of laborers from this system will neither affect output nor the wage. If, of course, the marginal value product of the last laborer hired exceeds the efficiency wage and no more idle laborers are available, the wage rate will rise and the conventional supply-demand framework pertains.

The problem with the profit-maximizing nutritional wage model, of course, is that in the abject poverty conditions which are assumed, the unemployment equilibrium described cannot be long run, as unemployed workers would have no means of survival. Two additional assumptions are thus made to avoid a Malthusian result. Leibenstein assumed that, because of social pressures, landlords collude to lower wages, sacrificing profits and total output in order to support more people in the economy. He thus provides a rigorous definition of underemployment, if not a realistic model of the rural economy - those additional people who obtain wage work as a result of the collusive wage reduction below the profit-maximizing (efficiency-wage) level are underemployed in the sense that their transfer out of agriculture would not lower output. Stiglitz

achieves the same result by assuming that family farms have egalitarian concerns about the earnings (consumption) of family members; although the model does not consider what happens to wage workers with no land.

In both versions of the nutritional wage theory (because consumption determines labor effort at any given time supplied to work), utility maximization and profit maximization are thus not compatible. Equalizing consumption among workers (Laibenstein) or between workers and nonworkers in the family (Stiglitz) lowers their effort and thus profits. Moreover, in both models the subtraction of laborers actually increases output since the wage paid, and thus total effort, rises; the marginal product of labor is thus negative even though wages are positive.

Another way out of the dilemma posed by the starvation of unemployed landless workers is to assume that the unemployed have a fall-back option in self-employment activities such as hunting and gathering or a nonagricultural enterprise (mat weaving) which assures them survival at a lower utility than the agricultural wage. Such a model can indeed account for the coexistence of unemployment and a positive wage. However, because the marginal product of the "unemployed" workers must be positive they thus cannot be withdrawn to the industrial sector at zero cost. Furthermore their supply would not be infinitely elastic at a wage equal to their marginal product in hunting and gathering since limits on the hunting and gathering grounds would imply that withdrawal of some of the self employed would lead to a higher marginal product in self employment of the remaining ones.

The third means of "saving" the nutritional wage model is to assume that it holds seasonally (Rodgers, 1975) — during times of the year when labor demand is very low the efficiency wage is then the floor below which

wage rates do not fall despite high (seasonal) unemployment. At other times, when labor demand is relatively high, the conventional supply-demand framework holds. However, Bliss and Stern (1978), based on a careful review of the nutrition literature, conclude that the relationship between nutritional intake and effort must be weak within short periods of time because the human body acts as a store of nutrients. Any nutrition-effort association is therefore unlikely to apply to daily wage contracts. Furthermore, the relegation of the nutritional wage theory to slack season labor market phenomenon clearly limits its empirical importance and increases the difficulty of detection in the absence of estimates of the technical wage-nutrition-effort relationship. Empirically, year-long open unemployment appears not to be a marked phenomenon in rural labor markets (Paglin, 1965; Hansen, 1969; Rosenzweig, 1980), although this would appear to be consistent with both efficiency wage and conventional competitive market theories.

Rodgers (1975) has attempted the most ambitious tests of this framework, exploiting an implication of the theory not emphasized by its advocates, namely that employers would pay attention to the actual consumption of the workers. Thus, workers with dependents would by necessity have higher nutritional wages than unattached workers; similarly, workers from landed households - with rental income from land - would be better fed than landless workers and thus would supply the same effort as the latter for a lower wage.<sup>1/</sup> Rodgers finds that in the group of villages in Bihar from which he has data, average area wage rates are higher where

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<sup>1/</sup> Bliss and Stern (1978), however, show that this prediction holds only if applied to two regions with separate labor markets; in one region all workers have land and in the other all workers are landless. If landless and landed workers coexist in the same region, the prediction is not unambiguous.

households are primarily Moslem, i.e., where women tend not to be workers. While this evidence is consistent with employers paying higher wages to males with more dependents, it is also predicted by the supply-demand model in which men and women laborers are substitute factors in production. Rosenzweig's study of Indian district-level data based on a demand-supply framework in this volume indicates that both male and female wage rates in agriculture are higher where Moslem households are prevalent. The hypothesis of individual heterogeneity in wages as a function of land ownership or number of dependents is rejected in Rosenzweig (1980).

It is also inconsistent with the uniformity of wages for daily paid adult workers (of a given sex and for a given operation) found by Bardhan and Rudra (1981) in villages in West Bengal, Binswanger et. al. in semi-arid India and White and Makali in West Java villages.

Rodgers also points out that the nutritional wage theory might account for labor tying arrangements if effort is a function of sustained nutritional intake. Long-term employment contracts exceeding several weeks, however, are not very frequent in the South and South-East Asian context (Bardhan and Rudra 1981, Binswanger et. al., White and Makali). Furthermore they seem to be related more closely to the demand for specialized skills on an assured basis (such as bullock driving, herdsman) and the need for credit and problems of adequate collateral of the workers. (Bardhan and Rudra (1981), Bhalla, 1976, Binswanger et. al.). Moreover, nutritional considerations cannot explain the absence of long term contracts for female workers.<sup>1/</sup>

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<sup>1/</sup> Sheila Bhalla notes an exception in Haryana where, after the green revolution and substantial wage and income rises, females were also offered longer term contracts. But this obviously cannot be attributed to the wage-nutritious relationship.

Given the generally lower wage rate for females, nutritional considerations should apply to them as well as to men.

Efficiency wage relations can also be based on other than nutritional grounds and have been applied primarily to the nonagricultural sector. Can these versions be applied to agriculture as well? With workers of equal productivity the efficiency wage relationship could be based on "morale" effects where workers receiving higher wage provide more effort. In such a model survival of unemployed workers could be assured through the sharing of income by employed workers with unemployed members of landless households, because the efficiency of the worker does not depend on his own nutritional intake. To our knowledge this is therefore the only "model" which could account for both the coexistence of unemployment and positive wages and for a zero cost of withdrawing labor from agriculture. It has not been subject to either careful theoretical or empirical analysis, however.<sup>1/</sup>

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<sup>1/</sup> Two other models which rely on a relationship between wages and efficiency to explain the coexistence of unemployment with positive wages are based on labor turnover and on information constraints: The labor turnover model (Stiglitz 1974b) is based on the notion that firms paying higher wages have lower labor turnover. Raising the wage from a low level could thus initially reduce turnover sufficiently to reduce efficiency labor cost. In agricultural labor markets casual or daily labor provides the bulk of labor input and such laborers have a very high turnover anyway (White and Makali, Binswanger et. al.). The turnover model would appear to have limited applicability where turnover costs are evidently very low. Another reason for an efficiency-wage relationship is the possible screening function of wages (Weiss 1980). If laborers are heterogeneous i.e. have different levels of inherent efficiency, then high quality workers should have high opportunity costs in some self-employment activity, while low wage workers should have low opportunity costs. At very low wages the pool of applicants therefore consists only of the lowest quality workers. In raising its wage to progressively higher levels, the pool of applicants will start to contain workers of higher and higher quality. If firms have no way of distinguishing between high and low quality workers and paying them accordingly, they draw at random out of the pool of applicants. Raising the wage leads to a higher quality work force and we are back to the results of the efficiency wage theory. In the context of casual agricultural wage workers, in a peasant agricultural setting, this model can hardly apply since information about the quality of laborers resident in the village accumulates over time and is widely shared. It can also be acquired at a very low cost, for example by hiring a worker for one day only. Note that in this model unemployed (but self-employed) workers also have a positive marginal product and thus cannot be withdrawn from rural areas at zero cost. In the tenancy section we will return to a similar model by Newbery and Stiglitz about screening of potential tenants.

The assumptions and implications of the nutrition and morale versions of the efficiency wage hypothesis are summarized in figure 1. The first two columns present the outlines of the nutritional, efficiency wage models of Stiglitz and Laibenstein. Both of these models rely on either landlord or worker altruism to obtain a steady-state equilibrium. This equilibrium is characterized by "underemployment" rather than by open unemployment, with rural output increasing as rural labor is withdrawn. When efficiency wage relations are justified on nutritional grounds, a steady-state equilibrium with excess applicants can exist only if the landless unemployed have some non agricultural self employment opportunities in the rural areas, which would prevent them from starving, column 3. If the efficiency-wage relationship is based on morale effects, however, the landless unemployed could either i) rely on such self employment (column 3) or ii) share in the consumption of their employed family members (column 4), which is not possible under the nutritional wage version without a loss in output. While in each of these variants, excess applicant equilibrium is possible, rural output (both agricultural and rural nonagricultural) would be invariant to the withdrawal of workers only under the morale-wage model with sharing. It is thus the only true "surplus labor" model. The nutrition-wage model variant is unlikely to be an important determinant of rural wages in Asia because nutrition is unlikely to affect effort in the short-run and only short-term (daily) labor arrangements are commonly observed, especially for women. The wage-morale-effort relation is very difficult to detect. Since wages vary sharply over the season this association is either not stable, i.e. virtually untestable,<sup>1/</sup> or applies only to the slack

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<sup>1/</sup> Furthermore, if the wage-morale-effort relationship exists but is unstable, the relevant question becomes what factors determine the relationship at any time. Unless such factors exist and have a stable impact on the wage-effort-nutrition relationship, the theory is not testable and/or useless.

season.<sup>1/</sup>

b. Labor Supply and Market Structure: The Duality Hypothesis

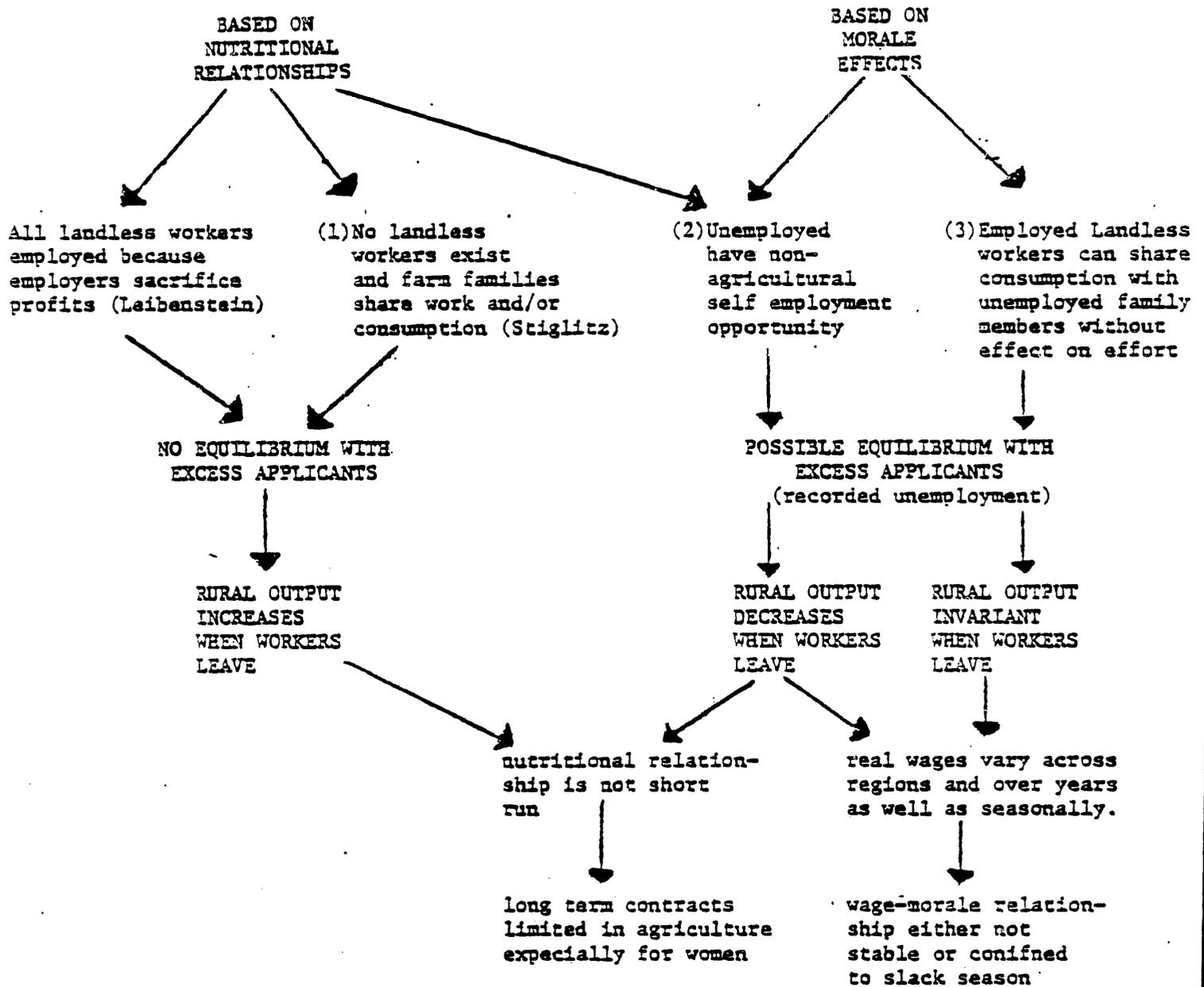
The alternative route to rationalizing the possibility of a zero marginal product of laborers in agriculture relies on the distinction between labor time supplied and laborers. If the withdrawal of one family member always (or on average) leads to an increase in the amount of work supplied by other family members which is just equal to the work formerly supplied by the departed family worker, total output would remain constant. The marginal product of labor time thus could be positive while the marginal product of a laborer could be zero. This view is evidently subscribed to by Lewis (1972). The theoretical issue then is what model of the peasant family could account for this behavior; the empirical focus is on family labor supply determinants.

Following a long tradition of models of peasant farm families (Chayanov), Sen (1966) proposes a model in which the family unit consists of workers and nonworkers who jointly maximize a family welfare function containing as arguments the leisure time of each worker and the consumption of each family member. The family owns a fixed plot of land, with farm output and thus income solely a function of total family labor time, as family labor time cannot be sold in the market nor labor time purchased. Assuming the separability of the family utility function, Sen shows that total

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<sup>1/</sup> ..Ryan and Godhake measure both wages and unemployment rates over the season for the same panel of households. They find that wages and unemployment rates both vary, with unemployment rates much higher and wages lower in the slack season. Refined analytical models and very careful empirical work is required to sort out the relative roles of adjustment to seasonality via unemployment and via wage rate changes.

Figure 1: EFFICIENCY-WAGE THEORIES AND SURPLUS LABOR IN AGRICULTURE<sup>1/</sup>



<sup>1/</sup> Turnover and screening versions are unlikely to apply in a peasant agricultural setting. See footnote 1 p. 10.

farm output remains invariant when there is a reduction in the number of workers only if the marginal utilities of both consumption and leisure are constant in the relevant range; so that the marginal rate of substitution between leisure and consumption is a constant.

While the Sen conditions may or may not be plausible, it is important to note that they pertain to a farm household totally isolated from the labor market; the model indeed assumes the absence of any rural labor market whatsoever. For households in which (identical) family workers work for wages, however, the marginal rate of substitution between leisure and consumption is equal to the market wage rate, which is in turn invariant to the behavior of the individual household. The Sen condition of the constancy of marginal utilities of leisure and consumption would thus lead to an indeterminate solution within the relevant range for a household with wage workers.

The inapplicability of the Sen conditions to households with wage earners, or for economies in which all households participate in the labor market, illustrates the importance of assumptions about the rural labor market in predicting peasant behavior, rather than the impossibility of completely compensating labor supply behavior by the family. In a household with no land which consists of identical workers with dependents (non-workers) a reduction in family members (or the work time of one family member) would reduce the income (consumption) of every member, but not the real value of time (cost of leisure relative to the price of goods). In this case, the empirical issue is the magnitude of the income effect on leisure. For non-identical wage workers (male and female, for example), it can be

easily shown that the response of male (female) work time to an exogenous change in the work time of females (males) is equal to the ratio of the cross-compensated wage effect to the own compensated wage effect; i.e., the direction of response depends on whether male and female leisure time are substitutes or complements in the family welfare function. Both U.S. labor supply studies (Schultz, 1980) and the Indian study by Rosenzweig in this volume suggest that this cross wage effect on labor supply is negative; the creation of non-farm employment would thus result in an increase in the work time in agriculture by family members of the opposite sex, i.e. some compensation takes place. None of these studies, nor the recent study of Barnum and Squire (1979) (which assumes family members are identical) indicates, however, that family labor supply response would fully compensate for the reduction in the family labor force.

The assumption of non-participation by households in the labor market, if true, would have a number of important implications. First, among households with identical plots (size and quality) of land, the marginal product of labor will differ according to the preference orderings and demographic structure of the households. Because of these differential "subjective" equilibria, productive efficiency is not attained, in the absence of a well developed market for land. A second important feature of households which cannot trade labor is that increases in the price of output could lead to reductions in time worked (the dominance of the income effect) and thus in output supplied. This is in contrast to the case of well-functioning markets for all inputs (including labor), where the price-elasticity of output on individual farms must be positive.

If some farm households can participate in the labor market and others cannot, then a "dualistic" agricultural economy results as long as the land rental market is also absent. This extreme dualistic assumption, that some farms maximize profits and utilize hired landless laborers and others, small farms, use only family labor and do not participate in the labor market (work on other farms), is one popular explanation for the common and well documented observation that small farms employ more labor per acre than large farms.<sup>1/</sup> In this model, the cost of labor (the wage) to big farms is likely to exceed the marginal rate of substitution between leisure and goods on the isolated small farms. As Sen points out, however, this "strong" version of labor market dualism requires that in addition there be no transactions in land, since large land-owners could increase profits by leasing out small plots of land to families, taking advantage of their low opportunity cost of labor. Given the failure of two markets, land and labor, a dualistic agricultural structure clearly is inefficient.

The empirical evidence, as presented by Paglin (1965) for India and Hansen (1969) for Egypt, and as confirmed by almost all the empirical studies in this volume, strongly rejects in the Asian context this extreme form of dualism. Members of small farm households appear to participate substantially in the labor market as both buyers and sellers.

Given the pervasive evidence on inter-farm labor mobility within labor markets, more subtle hypotheses - which we will call "weak" dualism - have been put forward to account for size differentials in output per acre in

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<sup>1/</sup> For a recent review see Rudra and Sen (1980).

terms of labor cost discrepancies across large and small farm. The argument is that, given the uncertainty of agricultural production, employers of labor or sellers of labor from small farms (who may be the same persons) are unwilling to make large future labor commitments; there appears to be only a limited market for contingent labor contracts (Bardhan and Rudra 1981). As a result, most labor is hired on a daily basis. Moreover, because of differences in the timing of operation across farms, workers work for many employers during the year, as shown in Binswanger, et. al. and White and Makali. Transactions costs associated with job search are thus quite high in the "casual" labor market, with substantial resorting of employers and employees each day. It would thus not be surprising if the probability of finding employment or finding enough laborers on any given day was not equal to one. On small farms where individuals are primarily sellers of labor, days when workers cannot find market employment might be spent working on the land, up to the point where the marginal value of the utility of leisure, rather than the market wage, equalled the marginal product of labor effort. On large farms, for those days in which not enough laborers could be found at the market wage rate, the marginal product of labor would exceed the market wage. Due to these frictions - transaction costs - in the labor market, therefore, over the year the marginal product of labor could be lower on small than on large farms.

One of the important contributions of the Ryan and Ghodake and Pranab Bardhan papers in this volume is the computation of unemployment probabilities for wage labor. They find that the percentage of "working" days in which sellers of daily agricultural labor reported that they could

not find wage work was 14 and 13 percent respectively for male workers (21 percent for female workers in the Ryan study). P. Bardhan (1979a) also has found evidence that the probability of wage employment tends to influence the market participation behavior of women, although not that of men. Ryan constructs a direct test of the "weak" dualism hypothesis - that average "opportunity" costs for labor are greater on large than on small farms, where the opportunity cost of labor for small farm households is the product of the employment probability and the wage - and finds mixed results for male labor, but confirmation for female labor because of the greater measured involuntary unemployment of the latter group.

The existence of transaction costs associated with the problem of job matching are, of course, only one of the possible sources of departure of the rural labor market from the perfectly competitive model. Others mentioned, consistent with the weak dualistic or "wage gap" assumption, are the "dislike" by small farmers of or social pressures against wage employment (possibly for certain groups or castes) or fixed costs associated with (travel time), or, on the side of employers, the costs associated with supervising hired workers. The latter is akin to scale diseconomies under the assumption that hired workers are utilized only if family labor time is insufficient to drive down the marginal product to the market wage. Again, however, the inefficiencies associated with these labor market imperfections could be circumvented if the market for land were functioning perfectly. Indeed, as discussed below, a major motivation for sharecropping is the problem associated with supervising hired labor (in the absence of a land sales market).

To summarize we note that strong dualism, i.e. the absence of a rural labor market, is not necessary to achieve the labor surplus result of the Sen model. A maximizing model of the farm household in a perfectly competitive market setting can theoretically lead to fully compensatory labor supply behavior. The issue is entirely an empirical one, and the estimates by Rosenzweig and by Squire and Barnum indicate less than full compensation. Strong or weak dualism are therefore seen to be neither necessary nor sufficient to yield the surplus labor result. Either assumption only leads to divergent opportunity costs of labor, and therefore to differential factor use across farm sizes. While there is little evidence to support strong dualism both strong and weak dualism must assume that there exist at least some imperfections in the land rental market, a topic addressed in the tenancy literatures which we now discuss.

#### TENANCY, SHARECROPPING AND OTHER CONTRACTUAL ARRANGEMENTS

While the literature on the determination of wages and employment just reviewed takes the distribution of land as exogenously given, i.e., the sales or rental market for land is assumed to be absent, it is an empirical reality of rural economies that some labor is combined with land, not by the temporary sale of labor services but through the temporary acquisition of land. It is clear that the terms and arrangements associated with the market for land importantly affect the earnings of rural households and the production of aggregate output. The first four of the papers in this volume, two theoretical (Jaynes, Braverman and Srinivasan) and two empirical (Jodha, Roumasset), are part of a rapidly expanding literature concerned with the role of contracts which combine labor (and or other factors of production) with land when certain factor markets are absent or incomplete.

The major focus of the many theoretical models which have been proposed in this literature is on two issues: (1) what are the efficiency characteristics of a contract which provides laborers with a share of total agricultural output, an important contractual arrangement in the rural economy, and (2) how do welfare levels or earnings of such sharecroppers compare to those of laborers who work only for wages, i.e. what determines the contractual terms.

(a) Recent Tenancy Models.<sup>1/</sup>

If only the sales market of land were absent or involved very high transactions costs, a land owner could hire optimal quantities (relative to his own land) of all cooperating factors of production, including bullocks and management, and rent out any excess (non-land) factors he owns over and above the optimal amount. Productive efficiency, i.e. equal factor ratios on all farms with equal quality land, could still be achieved. An absent sales market for land is thus not sufficient to force the use of tenancy. The institution of tenancy and the market for tenancies substitute for the absent sales market. At least one other factor market must be absent (when there are no scale economies) before temporary rentals of land become a necessary tool to achieve the most efficient factor ratios for all factors of production and all agent. The absent or incomplete markets (involving high risks or transaction costs) could be those for insurance, family labor, bullocks or managerial skills.

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<sup>1/</sup> For other recent reviews covering similar materials see Bell and Zusman (1980) and Newberry and Stiglitz (1979).

Whether sharecropping, one form of tenancy, is a productively efficient system of cultivation relative to (a) self cultivation with the help of wage labor or (b) fixed rent tenancies, has occupied economists since Adam Smith. The classical economists, including Marx, understood sharecropping as an adjustment to the absence of markets or market failure, in particular of the markets for credit and capital. Within a setting of imperfect markets, and given that it is difficult to supervise labor, they viewed sharecropping as an improvement over wage labor, because of its positive incentive effect. Given that the worker shares in the output, he has an incentive to provide more labor than he might provide under a wage contract if not supervised very closely. However, they also recognized that share cropping provides the workers with less incentive to work than a fixed rate tenant or an owner cultivator would have. As discussed formally in Marshall's famous footnote, on an exogenously given area of land and with a given share, the worker receives only a fraction of his marginal product, with the fraction equal to his share.<sup>1/</sup> The classical economists also understood that the same incentives problem applies to all other inputs and especially long term investments in land quality. They therefore regarded long term tenancies at fixed rates as a superior system to sharecropping, if the level of development of a country or region permitted it.

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<sup>1/</sup> As Jaynes shows in this volume, Marshall's theory of sharecropping was a complete classical theory and the footnote only illustrates the incentives problem.

Cheung's work (1969) set the stage for the recent share-cropping literature in terms of the major issues to be addressed, and in terms of the major reasons for share tenancy. His work attacked the negative efficiency (incentive) implication of sharecropping and also broadened the scope of enquiry of the sharecropping literature to discuss the issue of how and at what level the size of the tenancy and the share of the crop are determined. All the literature from Cheung onwards has regarded both the tenancy size and the level of the share as endogenous to the respective models, while taking the wage rate as exogenously given. Contractual terms, but not the wage rate, are thus determined by economic forces, with the equilibrium solution to the contract choice problem involving maximization both by the landlord and by the workers. Workers equilibrium requires that "of the set of contracts available in the economy, there exists none which the individual worker prefers to the one which he has." And landlord equilibrium implies that "...there exists no subset (of the available contracts) which the landlord prefers to the subset which he employs." (Stiglitz, 1974, p. 222).

Cheung also assigned to risk and risk aversion a much larger role as a determinant of share tenancy, although not in his formal model. It can readily be seen that under a wage labor system all the risks of cultivation are borne by the owner-cultivator. Owner-cultivator income is the residual after paying production costs at fixed wages. Under a fixed rate tenancy, all risks are borne by the tenant since tenant's income is the residual after payment of a fixed rent; but under share tenancy the risks are divided between the two in proportion to the crop share.

As Jaynes' paper in this volume shows, however, Cheung's model achieves its efficiency outcome because it assumes away the problem of the negative incentives of sharing as well as the difficulty of monitoring effort; under those assumptions, share tenancy would not be observed. Cheung indeed needs to introduce risk, risk aversion and "transactions" costs informally to explain the very existence of the contracts whose terms he explores in a formal model where such sources of market imperfections don't exist. This is an approach similar to the one advocated in the last section of the Roumasset paper in this volume.

With respect to the risk aversion motivation for share-cropping, Newberry (1975) and Reid (1976) showed that (with constant returns to scale) share cropping provides no risk sharing benefits which landlord and worker could not achieve by dividing a plot of land "into two subplots, one of which is rented out at a fixed rental  $R$  and the other is operated by the landlord who hires labor at a wage  $W$  ...." (Newbery and Stiglitz, 1979, p. 314). Therefore a model in the Cheungian tradition, i.e. without problems of worker incentives, does not provide an explanation for the existence of share tenancy, even if there is production risk and risk aversion (Figure 1, conclusion C). Sharecropping can also be a means of risk avoidance under more complex characterizations of risks. Newbery and Stiglitz demonstrated that with a second independent source of risk, such as wage rate risk in the labor market, share contracts are superior to mixing wage and fixed rent contracts. . If there are no incentive (monitoring) problems or economies of scale but there are multiple sources of risk, the sharecropping contract acts as the necessary instrument to achieve productive efficiency, i.e. it prevents an inefficient allocation of resources rather than creating one (Figure 1, conclusion D).

Another class of tenancy models focuses on the costliness of labor supervision as a cause of sharecropping i.e. the "Marshallian" inefficiency. Stiglitz (1974) developed one model (among several) which assumes costly supervision, with the landlord setting the size of the tenancy just like the share, taking into account the impact of tenancy size on the tenant's input decision. The landlord can prevent the tenant from renting any other land or from working for wages, or he can stipulate these provisions in the contract and monitor and enforce them.<sup>1/</sup> The landlord thus has an extra control instrument and can - via his maximization - control the contractual terms in such a way as to limit the tenant to his reservation utility i.e. the wage rate. Productive efficiency is not achievable in this model, of course, given the effort monitoring problem.

The contribution of Braverman and Srinivasan in this volume is an extension of the Stiglitz model with costly supervision in which the tenant and landlord are allowed to engage in a simultaneous share cum credit contract, with the credit being used for the tenant's consumption. Such a tied contract becomes superior to an untied contract if the landlord has access to credit from third parties at lower rates of interest than the tenant. The landlord sets four contractual terms, namely the crop share, the tenancy size, the rate of interest which he charges

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<sup>1/</sup> Bardhan and Srinivasan (1971) had developed a similar model. However they did not allow the landlord to control the size of the tenancy. Newbery (1974) quickly pointed out that, in their model with incentive effects, full employment equilibrium could not exist since tenants would attempt to rent land until its marginal product was zero, i.e. there would be excess demand for land. Braverman and Srinivasan in this volume shows that in the model of Stiglitz, when landlords cannot control plot size, there may in fact be an optimal share level which elicits the level of effort at which landlord profits are maximized, but which give sharecroppers a higher utility level than in the labor market. Just as in the efficiency-wage models, an equilibrium with excess supply of tenants may therefore exist.

the tenant, and the proportion of credit requirements which the tenant borrows from the landlord. Given that the landlord has two extra instruments available, the landlord can almost always hold the tenant to the utility level which he would obtain as a wage laborer. Policies such as tenancy reform or provision of credit to the tenant at lower than market rates therefore cannot improve the tenant's utility level. Nothing short of land redistribution, intervention in several markets, or rising alternative wage levels can effect the tenants welfare.

Costly supervision arises in these models because of imperfect information. The landlord cannot know at a sufficiently low cost how much effort the tenant provides, only the tenant can know it. Information is asymmetrically distributed between them. A central planner subject to the same informational asymmetry could not improve on the existing allocation. Such improvements could only be achieved if the central planner had cheaper means of monitoring available than the landlord (an unlikely situation in the case of agriculture). Alternatively the central planner would have to redistribute land to the tenants to overcome their inability to purchase land in the land market (which leads to tenancy in the first place). But such a policy would also improve efficiency in a decentralized economy. As long as the underlying constraints on information or land transfer are not removed, the share tenancy equilibrium achieved is optimal with respect to the information and land market constraints, i.e. it is a second best optimum, relative to the set of informational constraints assumed in the model. This point is important recurrent theme.

A problem not addressed explicitly by the models discussed so far is the coexistence in the same region of all forms of contracts: owner cultivation, share contracts and fixed rent contracts (see Jodha, this volume, for an example). Moreover, "tenancy ladders" appear to be important in developed and developing countries, with workers first becoming

sharecroppers, then fixed rent tenants and finally acquiring land of their own. (For a discussion in the U.S. context see Reid, 1979.)

There are three "explanations" for the coexistence of tenurial contractual arrangement: (i) differences in risk aversion, (ii) screening of workers of different quality and (iii) market imperfections for inputs other than labor. Differential risk aversion, however, cannot account for the tenancy ladder, since there is little reason to expect the same individual to become completely risk neutral as he becomes older, even if he accumulates assets.<sup>1/</sup> It is therefore necessary to recognize that workers differ in other respects, such as ability, management skill or capital endowments.

If productivity per hour of work differs among otherwise homogeneous workers but the productivity differences are known only to the workers and cannot costlessly be observed by the landlord, landowners or workers face a screening cost<sup>2/</sup>. In this case Hallagan (1978) and independently Newbery and Stiglitz (1979) show that the choice of contract conveys information about the workers' perception of his ability. "Individuals who believe they are most productive [as workers] will choose the rental contract; individuals who believe they are very unproductive will choose the wage contract and those in between will choose the share contract." (Newbery and Stiglitz, p. 323). Each of the classes of workers prefers its respective contract. Utility levels for the more able workers are higher than they could achieve in a labor market without screening. Since information is asymmetrically distributed between landlord and workers, productive efficiency cannot be achieved. The implicit screening via contract

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<sup>1/</sup> Complete risk neutrality appears to be extremely rare among rural populations in developing countries, as indicated by several experimental studies (Binswanger 1980, Sillers 1980, Walker 1980).

<sup>2/</sup> The problem here is similar to screening models in the wage labor market which can result in an efficiency wage relationship for average worker quality as discussed in footnote of p. 10. Except here the screening instrument is a contract with more complex terms rather than a wage rate.

choice again represents a second best improvement in efficiency over the situation without tenancy contracts. This model leads to coexistence of contracts but not to a tenancy ladder, unless workers graduate from one efficiency class to the other as they grow older<sup>1</sup>.

The clearest route to the existence of a tenancy ladder and social differentiation of laborers and different types of tenants is via absent markets or imperfect markets for inputs other than labor.

Indivisibilities of inputs lead to economies of scale and

Newbery and Stiglitz point out that economies of scale can make share cropping attractive in the absence of incentive effects even if there are only risks in production. Indivisibilities arise in the case of bullocks or other capital equipments if rental markets for them are deficient. Rental markets in bullocks may be absent or poorly developed if there is lack of flexibility in the timing of bullock operations (e.g. seeding)<sup>2/</sup>. Such inflexibility makes reliance on rented bullocks too risky. Indivisibilities may also arise in management skills as in the case of the Bell-Zusman models (of which we consider only the latest 1980 version below) where landlords can get access to the tenants' managerial skills only by renting land to them.

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<sup>1/</sup> The model does not consider managerial efficiency but only efficiency as raw labor. Managerial skills tend to increase with age.

<sup>2/</sup> Bliss and Stern (1981) attribute the existence of sharecropping in their North Indian village largely to imperfect bullock markets and show that bullocks ownership is an essential requirement for renting land. Jodha's paper in this volume confirms this for semi-arid India by showing that tenancy is closely associated with the equalization of bullock/land ratios across the farms studied. Sheila Bhatta (1976) shows that villages in Haryana distinguish between tenants and other long term labor contracts paid by a crop share depending on whether the laborer or the landlord provides the bullocks.

Credit market imperfections are the third major reason and are built into a capital rationing model by Jaynes discussed briefly in this volume. In Jaynes' model each contractual form (wage cultivation, sharecropping or fixed rent tenancy) requires a fixed amount of landlord's time for supervision per unit of land allocated to the contract in order to overcome incentives problems. Nevertheless imperfect markets lead to the possibility of co-existence of all forms of contracts and to a differentiation of the terms of contracts among different tenant-landlord pairs because of differences in their respective factor endowments. In sharp contrast to models where tenants are not diversified by labor skills, untradeable management skills or capital endowments, the welfare level of tenants is no longer the exogenously-given reservation utility level offered in the wage labor market (or by a completely tradeable endowment of all factors, as in Jaynes' model). Different forms of contracts are available to different individuals because they allow them to make better use of their unique endowments which (because of market imperfections) could otherwise only be used in a less efficient way. These contracts thus improve tenants' utility levels.

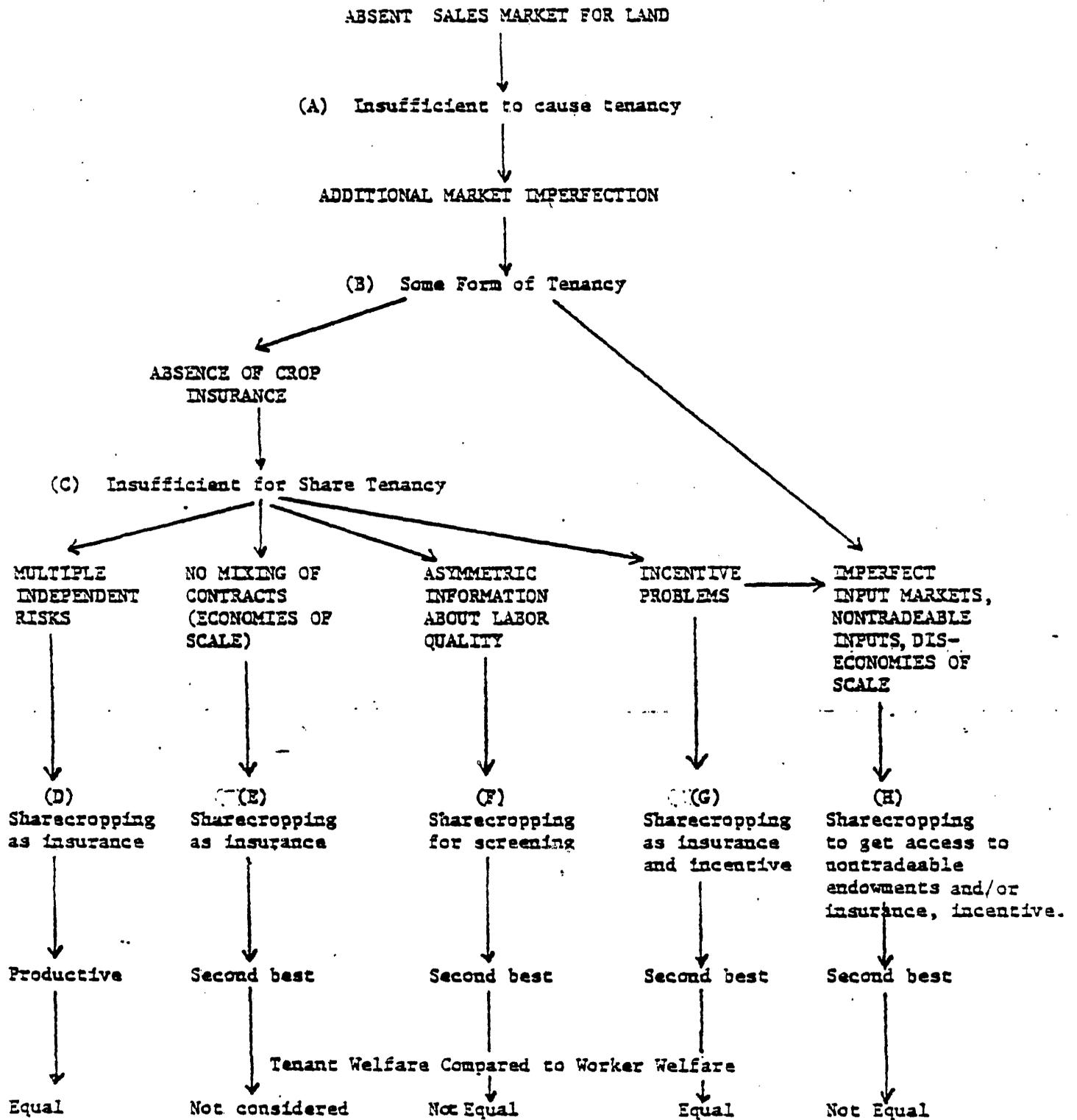
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In their most recent bargaining theoretic model, Bell and Zusman (1980) consider risk, incentive effects and four factors of production: land - not tradeable in a sales market but only via tenancy; labor which is freely mobile between share and fixed rent tenancy and the outside labor market; fertilizers or other modern inputs, also freely tradeable in a perfect fertilizer-cum-credit market and finally management capacity of the tenant, which can differ across tenants and which is completely nontradeable. A landlord can get access to it only by renting land to tenants. Clearly this fourth factor could also stand for other

nontradeable components of the tenant's endowment such as bullocks, or even female family labor (as in Bangladesh where the Cain et. al. study in this volume suggests that female workers can work outside their own farms only to a very limited extent). Output share, input share, fixed rental rate and tenancy size are all determined in a bilateral monopolistic bargaining process in which both landlords and tenants have some extent of power, determined jointly by the levels of their respective endowments and by their relative number. Thus this model can accommodate all levels of landlord power, from pure monopoly to large number competition. Tenants can deal with many landlords, a frequent phenomenon in many parts of the world. Equilibrium is reached when no landlord or no laborer can improve his utility by signing other contracts or changing landlords. Labor, fertilizer and management input are tenants' discretionary variables. Clearly, tenants' welfare in this model will be higher than the utility level achievable as pure wage workers. The possession of management skills gives them some bargaining power except if there is only one landlord and the supply of tenants is infinitely elastic, in which case management is no longer a scarce factor.

As summarized in Figure 2, the theoretical literature of tenancy suggests that there are several alternative combinations of reasons which can explain the institution of sharecropping. In order to explain some form of tenancy, of course, the land sales market must be riddled with imperfections and a second market imperfection is required (Conclusion A). When risks are present and crop insurance is absent the mixing of fixed rent contracts and cultivation with wage labor can substitute for the absent insurance market (Conclusion C). Only if the mixing of contracts is impossible or uneconomical (because of economies of scale in cultivation) does it become necessary to

FIGURE 2 : THE ROUTES TO SHARECROPPING



use the added instrument of sharecropping to substitute for the absent insurance market (Conclusion E). The extra instrument of sharecropping is also required when mixing of contracts is feasible but there are independent sources of risk (Conclusion C). In both cases, (as long as incentives problems are absent) sharecropping is instrumental to reach productive efficiency. Only second best optima, however, can be reached if risk is combined with costly supervision, with asymmetric information about labor quality, or with imperfections in input markets (Conclusions I, G, H.). Note that it is probably problems of risk and information which lead to the input market imperfections in the first place. In these latter cases, sharecropping represents not a barrier to efficiency but an instrument leading to improved efficiency in the face of market imperfections which would lead to inefficiency even in the absence of sharecropping.

With respect to welfare considerations, in all of these partial equilibrium models the tenant is at least as well off as a wage laborer for the simple reason that he would not accept the contract if it did not offer him a gain over and above that level. In many models, however, the tenant cannot gain utility beyond the exogenously-given wage laborers' level. In models without supervision costs and which reach productive efficiency, this result comes about by competition of tenants for tenancies and by the power of landlords to monitor and enforce all input levels. But it is not the institution of the share contract which prevents the tenants from improving their welfare but the assumed infinitely elastic supply of workers and thus tenants which forces this result. Only exogenous rises in wage levels, for example by more nonagricultural labor demand, can lead to workers welfare improvement.

This conclusion also holds even when incentive effects are present and tenants are differentiated, as long as landlords have a substantial extent of power to restrict the tenant's choices, as in Stiglitz's model, or in the Braverman-Srinivasan model of this volume. In both models the landlords can prevent tenants from working for other landlords or in the labor market, once they accept the terms of the contract. Clearly they must be able to collude among themselves to compel laborers to accept such conditions, i.e. they must have some source of monopoly power. It is not the share contract per se or the tying of share and credit contract which enables landlords to squeeze tenants but some form of monopoly power. The Binswanger et. al. contribution in this volume shows this clearly in an empirical setting with respect to tied labor-credit transactions, and Braverman and Stiglitz 1981 provide a corresponding theoretical discussion.

Tenants' welfare can only be better than that of wage laborers if they have something to offer which landlords cannot get, except via the tenancy contract, and if landlords cannot collude about contractual terms. In the case of the Newbery-Stiglitz screening model, it is labor skill, which landlords cannot assess without recourse to tenancy. In the case of Jaynes' model it is untradeable capital inputs of the tenant and in the case of the Bell-Zusman model it is the tenants' management skill. In all three cases the tenant cannot obtain the rent to these factors of production as a simple laborer, i.e. he cannot rent out his extra labor skills, management skills or capital endowments easily.

(b) Variations and Changes in Contractual Arrangements:

In this section we review recent empirical studies of contractual arrangements and terms. For the most part, the authors of the empirical studies of tenancy have not set them up in order to discriminate between precisely formulated models. Nevertheless there are general implications shared by groups of models which can be used to check the general modeling approach used for its consistency with reality. As these pertain to all contracts involving labor, we will review those as well as share contracts.

According to the theories just reviewed, contracts allow individuals to make better use of individual specific endowments in imperfect markets and allow them to arrive at combinations of income, effort and risk which reflect both their endowments and tastes. In environments with heterogeneous labor (see Neglected Themes below) and market imperfections one would therefore expect many different types of contracts to co-exist in small regions and terms of contracts to vary among individuals and across regions, and over time. This is indeed the case. Within the same village the following labor contracts are often found: daily time wages, daily paid piece wages, daily harvest share payment, contractual group payments based on piece rates to resident or migrant groups of laborers and sometimes a bewildering variety of longer term contracts (Bhalla 1976, Bardhad and Rudra 1981, Binswanger et. al., Clay 1976, White and Makali). The same sources document even larger varieties of contracts across villages and regions. Furthermore the coexistence of share and fixed rate tenancies is widespread.

Sharecropping terms are generally assumed to be fixed, most often at 50% of the harvest gross output. However, while 50/50 splits undoubtedly are frequent and predominate in many areas, a wide variety of shares is found,

often within small geographic areas or even villages (Bardhan and Rudra 1980, Jodha, Mangahas 1975). Furthermore, even where shares are uniformly at 50%, this split may hide many variations. Crop by-products (often up to 15% of the crop value) may accrue entirely to the owner or to the tenant, non-labor inputs may be shared differently, and the division of output may occur before or after deduction of costs for seed, fertilizer, and harvest labor. If, for example, division of output occurs after deduction of harvesting costs, the tenant can increase his share by participating in the harvest. Thus, as Bell (1977) points out, the 50/50 split of the main product hides many complexities and may lead to substantially different splits in value added depending on the full set of detailed sharing rules.

Virtually all models of tenancy suggest that terms should move against tenants as wages fall. Roumasset in this volume cites scattered evidence for Indonesia and Bangladesh and presents cross sectional regressions for selected crops in the Philippines consistent with this hypothesis. Kikuchi et. al. (1979) cite Filipino sources which indicate that, when Central Luzon Haciendas were opened for cultivation early in the century, land with zero or low fixed rentals was given to tenants in exchange for land clearing. As population density grew, the payments on a share basis increased.

Changes in wage rates should also reflect themselves in changes in the terms or in the mix of labor contracts available. A decline in wages, for example, should be reflected in contract terms or mixes which imply either lower income, increased effort or reduced risk, or a combination of the three. Four studies bear directly on this issue: Clay (1976), documents a declining real wage situation in Bangladesh

accompanied by shifts in the mix of contracts from harvest share payments to more frequent use of cash payments and to harvesting contracts with gangs of migrant workers. These shifts implied reduced real wages. Cross sectionally he relates the bewildering variety of harvest shares paid in the same year and the same sets of villages to the following variables in a statistically significant way: The share is lower the higher the yield of the plot, the higher labor requirements (i.e. length of work and earnings) and the higher the price (quality) of the grain harvested. But he also notes that these variables are not capable of explaining a large portion of the observed variance.

Bhalla's 1976 study, for green revolution areas in Haryana with rising real wages, stresses shifts in the contractual mix towards longer term contracts for both men and, to a lesser extent, for women. These shifts are associated with higher incomes and reduced risks.<sup>1/</sup> She attributes this trend to increased labor demand, increased demand on timeliness of operations, and attempts by employers to subvert the increased bargaining power of laborers as a group by fostering more one-to-one relationships which are cemented by credit and other side benefits.

In this volume, Kikuchi et. al. document declining real wage payments in Java, characterized by technological stagnation and increasing labor supply. Real wages were reduced by (1) an initial modest reduction in the harvest share and, more importantly, (2) shifts from open access to the harvesting operation for all who want to join, to progressive restriction of access

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<sup>1/</sup> In cross section studies Bardhan and Rudra 1981, and Binswanger et. al. explain a number of the variations in the incidence and nature of long term labor contracts observed cross sectionally by (1) the relative demands for securing timely labor, which differs across areas and according to technology used, (2) labor demand relative to labor supply in the local areas, (3) credit requirements of landless laborers who cannot obtain credit from formal lenders or traditional money lenders because of lack of suitable collateral, and (4) alternative employment and borrowing opportunities arising in the slack season in rural works programs or temporary migration.

for villagers only, and finally only for people directly invited to join the harvest. These shifts are associated with the addition of weeding and other labor as a requirement to join in the harvest, i.e. an increase in the working time or effort for a given share of the harvest and given risk. Note that this also amounts to a provision of credit by the worker to the farmer for the labor cost of weeding.

Models of tenancy which rely on credit constraints for both landlord and tenant predict that changes to technologies with higher purchased input requirements should lead to more cost sharing. Hanumantha Rao (1975) cites a number of cross-sectional studies to this effect, and supportive evidence is contained in a rare time series study by Sheila Bhalla (1976). In East India, where technical change has been much less rapid than in other parts of India, Bardhan and Rudra (1980) also show that tenants' output shares are higher, the higher is their share in input costs, a finding also documented in Roumasset.

Technological and risk characteristics of crops also should influence the choice of share versus fixed rent tenancy. Hanumantha Rao (1971) in a cross sectional study of Andhra Pradesh shows fixed rents to predominate for the highly profitable crops -- tobacco, chillies and sugar cane -- which are characterized by high skill and purchased input requirements and by risky markets.<sup>1/</sup> Rice, on the other hand, was cultivated primarily under share tenancy. He attributes this difference to the scope for entrepreneurial decision making in the first set of crops and the desire of tenants to ap-

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<sup>1/</sup> This is confirmed by an analysis of more aggregative data (Singh 1981). Note also that rents fixed in terms of produce predominate for trade (plantation) crops such as tea or coconut, where price risks are especially high relative to yield risk.

appropriate the full returns of their management input. The preceding theory section suggests further that capital constraints on owners may favor the leasing of lands for crops with high purchased input requirements to larger tenants with good access to capital. This is consistent with the larger farm size of the fixed rent tenants found by Hanumantha Rao.

Finally, another prediction implicit in many recent models of tenancy is that landlord shares should be higher on higher quality land, because such land commands a higher implicit land rent: In this volume Roumasset finds this to be the case in the Philippines and Jodha presents some evidence for semi-arid India. Roumasset also finds that shares vary systematically with the crop, the more profitable and less labor intensive ones commanding a higher landlord share.

(c) Empirical Studies on the Efficiency of Sharecropping

A major question raised by the models of tenancy reviewed is to what extent incentives problems arising in share contracts can be overcome by agreements on, or control of, labor and other inputs. Empirical enquiry into this issue, therefore, is not directed to finding out whether incentives problems exist, but instead is directed to (1) the means by which incentive problems are overcome and (2) the extent to which they are overcome, as indicated by the presence or lack of differences in input and output intensities between sharecropped and owned farms or plots.

Two recent surveys of many studies on these issues for the Philippines and South Asia (Castillo, 1975, Singh 1981) indicate that there is widespread supervision by landlords of harvests and the sharing of the harvest to insure adherence to the terms of the contracts. Moreover, many landlords appear to participate importantly in cultivation and input decisions. Such

participation gives rise to opportunities for both determining and supervising the use of non-labor inputs and for checking labor inputs more closely. The sharing of fertilizer and other purchased inputs is another means of both reducing incentives problems and/or controlling input levels.

None of the studies reviewed reports direct agreements on and/or supervision of labor input. Most importantly, indirect control of labor input via plot size given to the tenant is not common and, in most regions, tenants typically rent land from more than one landlord and members of their household work for wages, i.e. the individual landlord appears to have no way of controlling plot size by restricting the tenant family to work exclusively on his plot. (For the most careful investigation see Bardhan and Rudra 1980). This is in contrast to the assumptions of the Stiglitz (1974) and the Braverman and Srinivasan models discussed earlier.

A large number of studies have attempted to document input and output intensities between sharecropped and owned farms and/or plots. When farm size effects are controlled for, most studies find at best only very minor differences, i.e. they suggest that incentive problems are largely overcome. However the following studies do find some such differences: Chakravarty and Rudra (1973) and Chattopadhyay (1979) found that on very small farms in West Bengal, Andhra Pradesh and Punjab input and output levels somewhat lower under sharecropping than under owner occupancy, but not on larger farms. And small sample studies in Bihar (Bell 1977), Haryana (Eagi 1979a, 1979b) and Bangladesh (Sussain 1977) show that value of output on owned plots is somewhat higher than on tenanted plots of the same farmers. In the Bihar case of Bell, this was primarily due to higher cropping intensities and the planting of higher valued crops on owned land, a finding consistent with Singh's investigation of a 1970/71 national probability

sample from rural India in which differences between owned and tenanted plots existed only in West Bengal, Bihar and Orissa.

(d) Tenancy and Innovation

It has long been alleged that tenancy alone, or in combination with linked transactions in credit, can act as a barrier to innovation. The theoretical discussions cast serious doubts on such a view. If contractual arrangements are by and large efficiency enhancing in a static context with several market imperfections, one should expect that when innovations promise new income streams, i.e. increase utility possibilities for the population as a whole, new or revised institutional arrangements would emerge to overcome barriers which prevent the realizing of such new income streams. The view that tenancy retards innovation may arise from the observation that small farmers are usually later adopters in the adoption cycle. Tenants are often, but not always, small farmers, and as the previous discussion suggests, may be severely capital constrained. These causes for adoption lags may often be confused with sharecropping. Moreover, there is a long tradition to the view that sharecropping may retard innovation because both landlord and tenant receive only a portion of the share and may not be willing to carry the costs. The most extreme version of this theme is contained in Badhuri's model (1973) of tied sharecropping and credit transactions, which has become highly influential and popular long before it was ever rigorously subjected to empirical scrutiny.

In Badhuri's model, which is called a model of semi-feudal production relations, the following variables are either exogenously given, or entirely under the control of monopolistic or colluding landlords: the crop share; the tenancy size; the rate of interest which the landlord charges to the tenant; the amount of effort which the tenant expends on the land; and the technology of production used by the tenant. In addition the tenant must borrow from the landlord for

his consumption. The amount borrowed is the only discretionary variable of the tenant. The tenant's consumption level is assumed to be at an exogenous subsistence level given by an alternative wage. There is no risk and no incentive problem.

Within the context of this model, it is argued that landlords may have an incentive to withhold profitable innovations: Innovations which raise output will increase both the landlord's rental income and the tenant's income from cultivation. But the increased income of the tenant will enable him to reduce his indebtedness to the landlord (remember that there is only consumption credit) and therefore reduce the landlord's income from money lending. The fact that most agricultural innovations increase the demand for purchased inputs and hence credit is not considered! Under certain conditions the net effect on landlord's income will be negative and he will withhold the innovation.<sup>1/</sup>

The major theoretical criticism of this model comes from Newbery (1975a): If some of the contractual terms are not exogenous but indeed under the landlord's control, then the landlord has the power to extract all the surplus generated by the innovation from the tenant by other means and he would be better off than by withholding the innovation. "The basic point is that if

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<sup>1/</sup> In the most recent theoretical investigation of somewhat more general, utility based models Braverman and Stiglitz 1981a find: (1) Innovation, depending on their risk/return characteristics, may lead to increases or decreases in the demand for credit. (2) Even if innovations increase utility possibilities for landlords and tenants, the competitive market equilibrium after the innovation can be such as to leave landlords worse off. In such a case it may be to their advantage to collude to withhold the innovation (but see text below). (3) Technical change may alter labor productivity in such a way that even for an individual landlord it may pay to withhold the innovation because his optimal contract under the new technology would lead to reduced effort of the tenant and lower tenant share. The Badhuri conclusions thus are not as outright implausible as Srinivasan (1979) argued they were.

the landlord has sufficient monopoly power to exploit the peasant and to withhold the innovation then he ought to have sufficient power to extract the extra profits generated by the innovation." (Newbery, 1975a, p. 270)<sup>1/</sup>

The Braverman-Srinivasan model in this volume reinforces this point. It shows that, in a much more complex world in which the landlords have extensive power over share contract and credit terms, landlords need only one instrument of control, namely the plot size, to extract all rents from tenants.

On the empirical side, not a single study of adoption of high yielding varieties which adjusts for farm size effects has shown serious adoption lags on tenanted or sharecropped farms or plots (Singh 1981, Castillo 1975). Moreover, the extensive survey of villages in Eastern India, by Bardhan and Rudra (1980), i.e. the very region which Badhuri had in mind when constructing the model, provides data which contradict the major assumptions and conclusions of Badhuri type models. Similar inconsistencies were found in a more recent survey in Bangladesh (Rahman, 1980) and for semi-arid tropical agriculture (Jodha).

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<sup>1/</sup> We will return to monopolistic power in a latter section.  
In order for landlords to choose the withholding of innovation rather than another tool of extracting rents one must show empirically that it is easier to collude to ban an innovation and enforce such a collusive agreement rather than enforce other contractual terms.

## NEGLECTED THEMES

The evident preoccupation in the literature on rural labor markets with surplus labor, labor market dualism and the rationalization of contractual arrangements has resulted in the neglect of a number of important features and issues pertaining to the rural labor markets. Among these relatively neglected areas, many of which are addressed in the essays in this volume, are (1) the dynamics or flexibility of labor market characteristics, institutions or arrangements, (2) the heterogeneity of labor, in particular the roles of women in the labor market, (3) the geographical mobility of laborers, (4) monopoly power and its sources (5) the impact of risk and credit market imperfections on labor relations and (6) the applicability of the conventional demand/supply or competitive models of labor markets to the low-income rural economy.

### Dynamics

A central concern in the development literature is with the evolution in real agricultural wage rates over time, since such changes importantly reflect the progress of economic development as well as provide evidence in support of or against surplus labor, macro development models. Evidently because in many areas of less developed countries, real wages have fluctuated around a basically stagnant trend as far back as the 18th century (Bhattacharya and Roy, 1976), the view that wages and contractual terms are institutionally fixed has pervaded thinking about the process of development. This view has diverted attention from the analysis of the causes of variations both over space and over time in wages and contract terms.

Variations in nominal and real wages and in contract terms across space are pervasive in South and South-East Asia. Such variations in themselves are not inconsistent with the view that wages and contract terms are fixed by custom or by culturally determined subsistence norms. If pressed hard, most holders of such a view would probably also regard institutional wage and contract norms as reflecting at least partially the very long term economic forces affecting a particular region, but would argue that institutional rigidities are very strong, i.e. that changes in economic conditions could affect such norms only in the very long run. Under such a view the norms adjust so slowly that for practical planning, modeling and development policy purposes one might as well ignore such adjustments. Moreover, partial explanation of cross sectional variations in terms of regional supply and demand forces, even if successful, would still be quite irrelevant.

Since spatial differences are consistent with both types of explanation, the question becomes whether changes in demand and supply forces reflect themselves in changes in wages and contractual terms within relatively brief periods of time. This question can only be answered on the basis of investigations over time. If it is found that wages and contractual arrangements change rapidly over time this would undermine explanations of wage and earnings determination which rely on institutional or cultural rigidities. Of course, culture and institutions may be important as determinants of wages since these factors could affect the supply of or demand for labor.

From Agricultural Wages in India and other more scattered (but possibly more carefully collected) data sources we know that, for a standard day length and in money terms, agricultural wages vary substantially not only across regions, but also from year to year, and seasonally. Money wages are not real wages and controversies of what exactly happened to real wages continue (Bardhan and Srinivasan, (1974), Jose (1974), Griffin (1974), Lal (1976a))<sup>1/</sup> Nevertheless it is clear that real wages are not constant. They have risen sharply and rapidly in the Punjab and other areas where the green revolution has led to increases in labor demand. On the other hand in Bangladesh they have had a falling trend over the 27 years prior to 1975. In that year they were 30 percent or more below the level of the late 1960's (Clay 1976) as a consequence of the disturbances of partition and series of natural calamities. Clay's data for possibly the poorest country of the world thus sharply contradict efficiency wage theories, whose major implication is the fixity of a wage floor. White's paper in this volume presents the first, albeit still scanty, evidence, based on Indonesia data, that real wages at the village level vary considerably both within seasons and from year to year in ways which are largely consistent with supply and demand interpretations. These are only a few examples of variations observed over time which are inconsistent with institutional views. So are the sharp seasonal variations in wage rates, well

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<sup>1/</sup> The reason for the weak nature of the statistical basis and the continued controversies about real wages are twofold. First, in most countries there has been no sustained secular trend in real rural wages which could be easy to document, and the fluctuations give rise to various interpretations depending on cost of living deflators used. Second, constructing one or a few rural wage series is inherently difficult because of the heterogeneity of labor, heterogeneity of contracts offered to a single broad group of laborers and the coexistence of payments in cash, kind and food which result in severe valuation problems. Of these, the heterogeneity of contracts has possibly led to the most severe conceptual difficulties.

known from many aggregative studies and further documented in the papers by Ryan and Godhake and by White and Makali. In the section on variations and changes in contractual arrangements we have already reviewed four studies which indicate that contractual arrangements for wage payments tend to respond rather rapidly to changes in economic forces. (Clay, Sheila Bhalla 1976, Kikuchi et. al. 1979 and this volume)

It is evident that a great deal of work is required in order to understand the causes of wage and contractual changes. For example, it is not known why in certain areas adjustments take primarily the form of changes in the terms of contracts, while elsewhere terms remain unaltered but the relative importance of different types of contracts change. More generally, as economic development is inherently a dynamic process, to predict its consequences and/or to understand how to foster development clearly requires the study of change.

Heterogeneity of Labor, Wages and Earnings. Both the theoretical and empirical literature on rural labor markets has tended to ignore the heterogeneity of labor. Theoretical discussions focus on "the" rural wage and empirical studies often average male and female wage rates to create one wage (for example, Barnum and Squire, 1979; P. Bardhan, 1979a; Rodgers, 1975). Four dimensions of heterogeneity among rural laborers, however, appear important: (i) hired versus family field workers, (ii) manager-entrepreneur versus field worker, (iii) age differences and (iv) sex. The first distinction, as already noted, may be important in determining the demand for land and productive efficiency. Family members should have less incentives to shirk than hired laborers because of their participation in farm profits, if not because of altruism. This is one reason why farms which primarily employ family labor (small farms) could be more "efficient" than large farms which must hire and supervise non-family workers (hence, sharecropping).

The recognition that managerial skill is a distinct input in agriculture is also relevant to the issue of the relative efficiency of large versus small farms (as well as to tenancy, as discussed below). While Paglin's data indicate that the market for field labor functions well, he nevertheless finds that large farms appear to employ less inputs per acre than small farms. He suggests that this is because families with large land holdings and/or high incomes have less "motivation" to be efficient. This hypothesis implicitly assumes, however, that there is neither a market for managers or managerial skills nor a rental or sales market for land. The absence of a managerial market is puzzling; while there may be problems (costs) associated with discerning the marginal contribution of an individual field worker, the performance of a farm manager can be readily evaluated; there is a "bottom line" for managers associated with farm profitability. As the assumed absence of a market for managerial skills may play an important role in tenancy (Bell and Zusman, 1976), this segment of the rural labor market clearly needs more attention.<sup>1/</sup>

A little-studied topic related to the distinction between managers and field laborers is occupational mobility over the life-cycle. In particular, little is known about the typical life-cycle profile of earnings and occupations of an individual in the rural labor market or about the probabilities of landless workers becoming managers and/or owning land. The existence of a "tenancy ladder", discussed below, suggests that there is much life-cycle mobility in some rural labor markets, as does the finding in Binswanger *et. al.* in this volume that labor contractual arrangements

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<sup>1/</sup> For the Philippines Castillo (1975) reports census results which indicate that only 0.1 percent of farm operators are hired managers, covering less than 5% of operated area.

typically differ for the young and mature workers. Their village-level evidence as well as the data reported in Rosenzweig also suggests, however, that age is not importantly related to wage rates among casual field laborers; any life-cycle advancement in earnings is thus likely to be a function of acquisition of specialized skills, access or ownership of land or other assets, or of changes in sectoral location.

The roles of children in the rural labor market, found to be quantitatively important by Hansen in Egypt and Cain (1977) in Bangladesh, has also received little attention. India district-level data studied by Rosenzweig and Evenson (1977) and Rosenzweig in this volume indicate that the labor supply of and demand for children are quite sensitive to the levels of adult sex-specific wages and to child wages. Moreover, Rosenzweig and Evenson found that both the schooling of children and fertility varied significantly with the relative market values placed on the labor services of adults and children. Labor market arrangements and patterns, as they pertain to age groups, thus importantly affect the long-run quantity and quality of the labor force as well as the contemporaneous distribution of earnings.

Along with children, the most neglected group participating in the rural labor market is women. Two of the contributions to this volume, Cain et. al. and K. Bardhan, intensively examine the question of why the patterns of employment and the wage rates of women in terms of work tasks or occupation differ so markedly from those of males in the rural labor market. The studies by Binswanger et. al., and Ryan and Godhake document these evident differentials and P. Bardhan and Rosenzweig examine the separate labor supply behavior of women and men. All these studies suggest that,

as in developed countries, there are differential patterns of male and female employment and earnings in rural labor markets. Female wages are generally lower and unemployment rates higher (Kalpana Bardhan 1977 and this volume, Ryan and Godhake) and women are absent from certain segments of the labor market. Indeed, in Bangladesh (Cain et. al.), women seem not to participate in field labor at all, apparently because of social restrictions legitimized on religious grounds.<sup>1/</sup> Caste related taboos are closely related to the absence of higher class women from field labor in many areas of India (Kalpana Bardhan, this volume). In semi-arid India, men but not women are hired according to long term field labor contracts<sup>2/</sup> and women's access to contract work paid on piece rate basis or to temporary migration is usually mediated via male members of the family (Binswanger et. al., Berman). These patterns cannot easily be explained by the division of labor associated with childbearing and household production or by market productivity differentials. The evidently more restricted occupational and farm-to-farm mobility of women compared to men, moreover, has implications for production efficiency and creates difficulties in making welfare evaluations of rural labor market mechanisms.

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<sup>1/</sup> Note that in Moslem Indonesia no such ban exists and that religion alone is not a sufficient causal factor.

<sup>2/</sup> This may be a much more general restriction all over the subcontinent. Bardhan and Rudra (1981) for example did not interview female regular field workers.

Geographic Dispersion of Wages and Mobility. One of the most important but neglected features of rural labor markets is the geographic dispersion of wage rates within sex and skill categories (Hansen, 1969, Rosenzweig, 1978, Rodgers, 1975). While the evidence suggests that mobility between farms and tasks within geographical areas (at least for males) is high, (i.e., the absence of dualism), these geographical wage disparities suggest limited geographic mobility of labor. Two causes appear important in addition to the problems associated with information flows - asymmetric information and the virtual absence of a sales market for land. With respect to the first, the problem of shirking (costs of supervision) would make employers reluctant to hire workers who are complete strangers; asymmetric information thus contributes to geographical immobility by reducing the private returns to migration. An imperfect sales market for land, however, increases the private costs of any permanent long distance move involving the entire household, since such a move may entail a significant capital loss. Immobility here does not imply absence of choice but instead may reflect a second best adjustment to the informational and land market problems. This is another example of how the characteristics of one market (land) affects the attributes of another market (labor).

Ascertaining the responsiveness of labor flows across geographical areas to wage disparities is as important as understanding the sources and causes of immobility. Breman's paper in this volume provides an example in which the incentives associated with seasonal disparities in geographical wage rates leads to the temporary migration of laborers. These movements are organized by middle-men who also aid in solving the asymmetric information problem and also provide credit to groups who appear

to have difficulties obtaining it through other channels. While the misery and the poor working conditions described by Brenan are undoubtedly appalling this institutionalized migration clearly augments the income of the participating workers as well as total agricultural output under the constraints of production seasonality and high ratios of workers to land.

Most studies of migration in developing countries have concentrated on the implications for urban or rural development of rural-urban flows (Lipton 1980, Sabot 1981). Sanjay Dhar's study is one of the first to study non-seasonal (permanent) migration, by males, to and among rural areas in India. He finds that although mobility between states is not high, it is considerable among districts within a state, with individuals migrating to areas where there are better opportunities, as measured by wages and unemployment. Rosenzweig, while treating each district as a distinct labor market in studying wage determination, finds evidence from micro data that males from households owning land and women from all household types tend to be less geographically mobile than males from landless households. These papers just begin, however, to study the important role of geographical mobility in earnings inequality and in production.

Sources of market power: Competitive market outcomes can result in extremely low wages or otherwise adverse contractual terms if labor supply is large relative to demand. Therefore even extremely low wage levels do not necessarily indicate market failure or the prevalence of monopolistic or monopsonistic exploitation. Moreover, as was discussed, the linking of contracts is also not necessarily a source or indicator of market power. The assumption that imbalances in market power are a basic cause of poverty in rural areas, however, underlies much of the thinking about rural labor markets. Despite this, only a few studies have been concerned with identifying and quantifying the gains appropriated by different social groups arising out of monopolistic power. Also, a more careful theoretical characterization of differences in competitive and monopolistic equilibrium in a world with contracts has just barely begun (Braverman and Stiglitz, 1981b).

The spatial distribution of agriculture and high travel or migration costs (in terms of money, time and/or capital losses) discussed earlier, make local monopolistic power of landowners a distinct possibility. It would be particularly likely where one or a few large owners confront many workers or potential tenants in a small geographic area. While land holding sizes are very unequal in most South and South East Asian countries, very large ownership holdings of say 100 ha or more (where travel times would become important) are very rare, unlike in South America or the U.S. Post Bellum South. Large ownership holdings are largely confined to Pakistan, some areas of Bihar and the tea, rubber and sugar plantations operated with permanent hired labor forces. It is in such circumstances that one ought to look for monopolistic power of owners and constraints imposed by these on tenancy size and outside labor market involvement. Monopolistic

power relationship of large owners relative to small tenant is also undermined by the (possibly increasing) phenomenon of "reverse tenancy" from small owners to large landlords documented in many studies.

Studies of informal collusion by employers or landlords to fix wages or contractual terms are also very rare. The frequent assumption that contractual terms are fixed by custom has diverted the attention of many researchers from the topic, or else monopolistic collusion has simply been taken for granted (Griffin 1976). Binswanger et. al. found attempts of fixing either daily or regular farm servants wages in five of their six villages but an equally widespread recognition by employers and workers that daily wages were virtually not controllable by collusion. Clay, Bardhan and Rudra (1981) and Kikuchi et. al. (1979 and this volume) studied the process by which daily wages or contract terms are altered and did not find much indication of collusive behavior. Little evidence thus exists that in the market for daily labor there are important departures from competitive behavior.<sup>1/</sup>

Moreover, as discussed, evidence that landowners are able to control tenant's involvement with other landlords, other employers or other lenders,

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<sup>1/</sup> But in one of their six villages Binswanger et. al. did find evidence for highly successful collusive behavior of employers in setting terms of contracts of annual farm servants. Such collusion was facilitated by the unusual isolation of the village from outside temporary or permanent labor opportunities and by ideological disparagement by the village community of the caste group primarily involved in these contracts. A somewhat different issue is extra-economic coercion such as violence to extract unpaid labor commitments from worker/debtors or tenants. In Eastern India Bardhan and Rudra (1980, 1981) show that such unpaid labor commitment are rare. Very little is also known about the use of individual violence or threats thereof to enforce contract terms such as labor commitments or debt repayments. In some of the villages studied by Binswanger et. al. employers, money lenders and village officials used to beat workers or debtors with impunity, but such practices have now become very rare.

the crucial monopolistic power instruments for the models of Stiglitz (1976), Braverman and Srinivasan and Badhuri (1973), is also virtually absent.

The organization by workers into unions in part represents an attempt by workers to increase their collective power vis a vis employers. Attempts at organizing rural labor into unions (often affiliated to political parties) have been confined, however, to Kerala, Tamil Nadu and West Bengal in India, although only in limited areas of Kerala have unions enjoyed stability and growth over an extended period (Alexander, Beteille, Jose 1976). Sporadic, unorganized agitation by workers is more widespread (Bhalla 1976, Bardhan and Rudra 1981) and there is evidence that landowner organization is particularly important in areas where labor movements have been strong (Alexander, Beteille). Labor movements in rural areas of all of South Asia and South East Asia, however, appear to be weak and unimportant compared to the strength of labor unions in industrial sectors. Moreover, while the history of these limited rural labor movements has been fairly well documented, little is known about their effectiveness in raising earnings, i.e. the product of employment and wages.

The lack of evidence demonstrating the importance of the pre-conditions for monopolistic power, or which indicate successful collusion, of course, does not mean that wages and contract terms do not reflect the relative bargaining strengths of (1) entire social groups arising out of relative demand and supply or (2) of individuals arising out of relatively unique individual characteristics and endowments which are tradeable only in imperfect markets for factors of production. Systematic investigation of these issues has just barely started.

Risk, the Capital Market and Labor Relations

A number of the studies cited above provide fairly detailed data on the prevalence of different types of transactions involving labor which are linked to credit. They also suggest that collateral requirements by lenders and the absence of suitable collateral by certain types of borrowers play an important role in determining what types of labor or tenancy contracts they can engage in. While the evidence in this area is still scanty, it suggests — along with the importance of bullock requirements in determining access to tenancy contracts discussed earlier — that capital and bullock market imperfections play a much more important role in determining contractual terms than all but the latest formal models have assumed. But these capital market imperfections are themselves very poorly understood, although they must be closely related to the structure of production and market risks faced by farmers and hence lenders. Our ignorance is partly due to the extreme difficulty of collecting accurate data on the precise terms and collateral requirements of informal credit transactions.

Where transactions are linked with credit, little is known about the relationship between the amount and the terms of credit on the one hand and other terms of labor or tenancy contracts on the other hand. Bardhan and Rudra (1981) show that in 86 of 110 studied villages in West Bengal loans could be taken for future labor commitments. "In 58 of these villages the number of days in which the loan is repaid by the laborer is calculated at a wage rate which is below the market wage rate prevailing at the time of repayment" (p. 93). Repayment at slightly lower than market wage rate is also found by Rahman in Bangladesh. In a regression analysis of wages of regular farm servants in one of their villages, Binswanger et. al. found some

evidence that workers receiving loans at lower than the usual interest rate also received higher wages, i.e. within an individual contract (as against systems of whole villages studied by Bardhan and Rudra) relative bargaining strength of individuals appears to be reflected in both wage payments and credit terms. Jodha finds some link between the giving of loans by tenants to owners and higher input shares of owners. The classical economists and the most recent tenancy models attach great importance to credit market imperfections as a source of tenancy arrangements, and the link between credit and longer term labor contracts is clearly empirically important. More research effort is urgently required here.

Testing the Demand-Supply Framework: Given the data problems almost endemic to the study of low-income countries, it is not surprising that there have been virtually no attempts in the literature on low-income rural labor markets to estimate and test the most developed of the alternative models of the rural labor market -- the demand-supply model. The data requirements are formidable, as one important implication of this framework is that the employment level of each factor of production depends on the prices of all factors. Three of the papers in the last section of this volume, those by Rosenzweig, P. Bardhan and Evenson and Binswanger, represent some of the first attempts to estimate the constituent components of the demand-supply model using rural labor market data from a low-income country.<sup>1/</sup>

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<sup>1/</sup> See also Lal 1976, and K. Bardhan 1976.

The Evenson-Binswanger study in this volume utilizes modern duality theory to parameterize and estimate the demand for labor as well as for other major factors of agricultural production - land, bullocks, fertilizer - in India. Because the specifications used are derived from an underlying model of profit maximization, the authors are able to obtain estimates of the responsiveness of labor demand to changes in wage rates, output price and other factor prices, and to test the behavioral restrictions associated with profit maximization. The Rosenzweig paper focuses on labor supply behavior and is also based on an optimizing model, permitting tests of the implied behavioral restrictions. Both Pranab Bardhan and Rosenzweig estimate jointly the supply and demand functions for labor (in a simultaneous equations, general equilibrium system) treating the distribution of land as exogenously given but wages and employment as endogenous variables.

The estimates of all three papers call into question the basic assumptions of the surplus labor models, suggesting that reductions in labor supplied would significantly increase agricultural wages and that the variability in wage rates over time and across space is importantly explained by variations in demand for and supply of labor. The studies also suggest that household and farm behavior is not markedly different from that observed in high-income countries nor that the competitive model of the labor market can be readily rejected, although all studies indicate (and rely on) a significant degree of geographical immobility. The study of Rosenzweig additionally suggests that wage differentials between males and females in rural agriculture are importantly affected by sex differences in demand and supply, as conditioned both by economic and cultural factors.

The three econometric studies of employment and wages ignore the institutional labor market complexities that are the focus of many of the other papers in the volume and in particular abstract from issues of tenancy. Future work within the supply-demand framework is thus likely to be concerned with both a better integration of the land, credit and labor markets, and with testing for the importance of additional modeling of greater institutional detail, the non-wage contractual terms and conditions pertaining to the employment of labor.

#### CONCLUSION

The literature on rural labor markets in low-income countries appears to be characterized by two major inconsistencies - between theory and fact, and among models describing different aspects of the rural economy. With respect to the former, the pervasive variations of wages across regions, over years and across seasons revealed in almost all empirical studies of rural settings in low-income countries are in contrast to both the obsessive preoccupation of wage determination models to justify fixed wages and the assumptions imposed in theoretical models of contractual choice. The contractual choice models and the special labor-surplus and dualistic models have been formulated in part because of the presumed inadequacy of market-oriented supply-demand models to adequately describe the determination of employment, wages and earnings in rural areas. But no convincing evidence has been obtained from such environments which would appear to contradict the implications of this basic approach for rural wages and employment, whether in its most rudimentary form or in the form of a more complex econometric model.<sup>1/</sup>

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<sup>1/</sup> Supply and demand frameworks appear to have substantial explanatory power in terms of the direction of changes in wages, earnings and contractual rewards. How well they predict the magnitudes of changes cannot easily be answered because we lack a comparative standard to judge what "how well" means: Alternative theories of wage/earnings determination which take the contractual realities into account do not yet exist in empirically testable form which would allow a comparative evaluation of the predictive power of different models.

It is important, however, to recognize that contracts involving labor have other welfare dimensions than just the implicit or explicit wage. They may act as insurance devices or allow individuals to make better use of individual-specific capabilities or endowments in otherwise inadequate markets. Supply and demand frameworks are neither designed nor able to predict how contractual terms, or the mix of contracts available, will change as labor demand, supply, or technology changes. Therefore they cannot predict the full welfare consequences of these changes i.e. the likely effects on effort, risk and capital gains or losses faced by groups of individuals who have endowments which are not easily tradeable.

In a longer run perspective, economic development is associated with improvement in transport, travel, communication and information facilities. These in turn remove some of the underlying information, risk and credit market imperfections and lead to new markets where none existed. The demand and supply framework, which takes markets as given, is not capable of predicting the sequence in which such markets would emerge, or their distributional consequences. Since the construction of transport and communication infrastructure often involves the public sector, better models are indeed required if policy is to accelerate and/or influence the patterns of such emerging markets in an informed way.

The progress towards a richer, integrated theoretical framework which can deal with the complexities associated with the market failures as well as the determination of wages and other contractual terms has been hampered, however, by the evolution of theory along two, mutually inconsistent paths. Rural wage determination models developed so far have assumed the complete absence of a land rental or sales market; i.e., they take the

distribution of land as exogenously given. The contractual choice models, on the other hand, treat the wage rate as exogenously given, while concentrating on land and credit market transactions. Such models thus have little to say about the determination of earnings or employment. The strength of models of contractual choice is rather their clarification of the efficiency and equity implications of contracts and in their identification of the underlying causes of market imperfections which lead to the contracts. They also suggest the difficulties associated with policy intervention in single tenancy or credit markets aimed at curing symptoms or apparent deficiencies in such arrangements. Without this integration of all of the major interrelated markets - for land, labor, and credit - into a single, coherent rural model, however, the ability to predict the consequences of economic development within the rural sector will be severely handicapped.

The previous points argue for more modeling work when apparently there is already a confusing over-abundance of models. But many of these models are not helpful in sharpening our understanding of the rural economy or predicting its behavior because they contain crucial assumptions which are clearly contradicted by simple observation of rural realities. Such models at best can sharpen our intuition by working out logical implications of counter-factual assumptions. Of course future models, in order to be useful, must make simplifying assumptions which are at variance with the complexities of the real world. But this should not be taken as an excuse for assumptions which crucially determine the conclusions of the models, but which are pervasively rejected by the empirical studies.

The proliferation of models and the lack of attention to testability has been in part due to the lack of good data. As such data are now becoming more prevalent, attention can be turned to winnowing out either models which are "too" counterfactual and/or models which perform badly as predictors. The studies reviewed here show what can be done with patience and persistence. Since predictions of changes over time are the ultimate test of models and theories, particularly theories of economic development, more attention needs to be placed, however, on the generation of good panel data or resurveys of old samples in order to accelerate this transformation of models into knowledge.

We conclude with the reminder that the models or frameworks that are reviewed in this essay, and form the bases for the analyses reported in this collection of conference papers, are models of institutions and behavior in existing rural markets, not models of economic development. Explanations of the long-term changes associated with development must, ultimately, be found in models which explicitly treat the reproductive and technological behavior which leads to the long term evolution of supply and demand itself. Attention has recently turned to the study of decisions which have long term consequences - human capital investment, fertility, health, technical change and agricultural intensification.<sup>1/</sup> Such decisions, however, are themselves conditioned by the outcomes and institutional arrangements in rural factor markets. The integration of market and household-behavioral models within an explicit dynamic framework enveloping all sectors of an economy is yet to come.

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<sup>1/</sup> For examples of such studies in the context of agriculture see Boserup (1965), Harris (1971), Binswanger and Ruttan (1978), Rosenzweig and Evenson 1977, Darity 1980, Behrman and Wolfe 1980, and Rosenzweig and Schultz (1982).

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