Rural Institutions, Agricultural Development, and Pro-Poor Economic Growth

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CONVENTIONAL WISDOM: INVEST AND INTERVENE

According to conventional wisdom, the ideal form of pro-poor economic development is through investment in agriculturally-led growth.[1]

In the early stages of growth, increased production decreases food prices and shifts out the demand for labor. Inasmuch as poor households disproportionately consume food and earn a relatively large share of their income from labor, both mechanisms benefit the poor. Agricultural economists typically recommend a panoply of government interventions to go along with the investments in new technology and infrastructure, including price-supports and stabilization schemes, credit and input subsidies, and crop insurance. The interventionist policy recommendations, however, are based on a variety of misconceptions and misinterpretations about farmer behavior and rural institutions.

The interventionist doctrine for agriculture and rural development has remained remarkably resilient in the face of policy liberalization and globalization that took place in the 1980s and 1990s. Agricultural economists continued to justify regulations and subsidies of all kinds, presumably contributing to agriculture's resistance to the liberalization and globalization of industry.

Concurrently, donor support for agricultural development has waned. Three factors may account for this. First, the interven-tionist doctrine was at odds with prevailing "neo-liberal" attitudes. Second, there was growing dissatisfaction with the performance of many of the agricultural projects and programs. Third, many observers concluded that low agricultural prices signaled success and that further efforts were unnecessary.

The following section reviews some of the intellectual failures contributing to the popularity of interventionism in agricultural development circles and provides specific examples of how faulty reasoning has led to policy failures in factor and output markets. Section 3 shows how some of the very institutions and phenomena that have been used as evidence of inefficiency are in fact, consistent with efficiency. The review so provided exemplifies a fundamental framework for policy analysis, known as The New Institutional Economics (NIE). Section 4 concludes.

INTELLECTUAL FAILURES AND CHALLENGES

From the 1950s to the 1970s, the economics of agricultural development called for a major role of government in providing: i) essentials – incentives, transportation and marketing, new technology, and access to inputs; and ii) accelerators – extension, credit, irrigation, farmer cooperatives, and development planning) (Mosher 1966).

Johnston and Mellor (1961) and Mellor (1966) emphasized the positive linkages between agricultural growth and economic development, but continued to presume that a wide variety of government regulations and subsidies were

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[1] "If there is not economic growth, there isn't going to be an elimination of poverty ... you cannot deal with food security, hunger, and malnutrition unless you invest in agriculture" (Natsios, in USAID 2003; see also Roumasset 1992a, 2002, 2003). The neoclassical model of agriculturally-led growth was pioneered by Jorgenson (1961). Johnston and Mellor (1961) articulated the linkages between agricultural and economic development.

appropriate to get agriculture moving. This legacy continued even into the 1980s as agricultural economists continued to argue for pushing the agricultural sector but were somewhat indiscriminate about the appropriate instruments for so doing.

For example, a major collection of readings (Eicher and Statz 1984) failed to note the excess burden and dynamic costs of agricultural protection, even as these became the focal point of industry and trade policies.

In the late 1980s to the 1990s, intellectual support for interventionism was augmented by new theories that took account of imperfect information. The most general interventionist doctrine is based on the Greenwald-Stiglitz (G-S) theorem (1986) according to which a competitive equilibrium is not constrained Pareto-optimal, i.e. it is not on the feasible utility-frontier, whose limits are determined by feasible government actions as well as technology, factor endowments, and consumer preferences.

This theoretical result is interpreted to mean that government can always find a coercive intervention to increase economic efficiency over that achieved by voluntary contracting and competitive markets. Stiglitz (1993, 2002) has often used the institution of share tenancy to exemplify how economic organization can be in equilibrium but massively inefficient, asserting that a landlord's share of 1/2 would have the same disincentive effects as a 50% income tax. In this "New Information Economics," market failures are not limited to the usual cases of externalities, public goods, and non-convexities, but are far more pervasive, including failures due to moral hazard, adverse selection, or other information problems (Stiglitz 1993).

Similarly, de Janvry et al. (1991, 2001) while acknowledging the role that transaction costs play in rural organization, nonetheless conclude that "indirect sources of market failure need to be eliminated" including access to credit and insurance markets. This, together with de Janvry and Sadoulet (2000), have been misconstrued to mean that government should intervene in such markets with mandates and subsidies (see Weber et al. 2002). Some investments in agriculture, notably in agricultural research, are prematurely rejected in this view as mere "technofix."

However, these propositions are subject to the Nirvana Fallacy (Demsetz 1969). The equilibrium concept in question is a straw man in two important respects. First, it does not admit multilateral voluntary contracting. Second, it does not admit private governance of moral hazard and other information problems e.g. as described in Jensen (2000).

Even if G-S were generalized to allow for multiple distortions and even if some pervasive efficiency-improving interventions were found, the results would still suffer from *blackboard economics*. (Note that "blackboard economics" should not be taken as a general condemnation of rigor, but rather of equilibrium concepts that abstract from real-world institutions which internalize spillovers and mitigate information problems.)

In the following sections, some of the intellectual failures are reviewed in the context of agricultural and rural development. All of them result from misplaced exogeneity and a failure to provide a fundamental explanation for the phenomenon at issue.

1. Land and Labor Institutions

Asian agriculture displays the coexistence of disparate property, tenure, and contractual institutions for connecting labor to land. While most Asian agriculture is smallholder, with the notable exceptions of tree crops such as oil palm and coconuts, there has been a recent increase of larger commercial farms, e.g. for the production of sugar in Indonesia (Fairhurst 2003). Instead of explaining diversity, however, much of the economics of agricultural development seeks to identify which behaviors and institutions are inefficient, much as the *old industrial economics* regarded market structure as exogenous and proceeded to characterize the conduct of different organizational forms, and proceeded to evaluate the efficiency of their performances.

For example, most agricultural economists assert that smallholder agriculture is inherently more efficient than large-scale commercial farming because it economizes on hired labor.[2] Utilizing

[2] See e.g. Binswanger and Rosenzweig (1986); Binswanger, Deininger, and Feder (1995).

family labor economizes on recruiting and supervision costs, the latter because hired labor suffers from both quality and effort shirking. These "labor market imperfections result in the productive superiority of family farms" (Deininger 2003, p. 84) and to the characterization of hired labor as inefficient (Otsuka 2002).

Using the ICRISAT village data, Frisvold (1994) finds that family labor is indeed more productive than hired labor, even before deducting the costs of supervision. The inefficiency of hired labor is also said to be at least partially responsible for the notorious inverse relationship between small and large farms, assuming that the latter are relatively more labor-dependent (Otsuka 2002; Deininger 2003). Similarly, Hayami (2003) finds that, while plantation agriculture was an efficient institution for the exploitation of Western colonies in Asia, family farms have more recently "proved to be equally or more efficient producers of tropical export crops using the family labor of low supervision costs, relative to plantations based on hired labor."

However, these studies fail to account for why labor is hired, for which tasks, and for the incomplete substitutability of hired and family labor. They also fail to account entirely for the role of land quality in crop choice and intensity of cultivation. It is not surprising, therefore, that one can find contradictory empirical results. Indeed, Benjamin (1992) finds that hired labor is significantly neither more nor less productive than family labor. This may simply be because there are both gains and losses involved e.g., hired labor facilitates specialization. On the proto-typical farm in which both family and hired labor are employed, rational choice implies that there will be a non-random division of tasks between family and hired labor and that, at the margin, the difference in their productivities will be equal to the difference in opportunity costs.

Share tenancy is another institution that is commonly attacked for being inefficient. The literature has been unduly influenced by Stiglitz's (1974) canonical model, wherein sharecropping is viewed as a pairwise-efficient means of incentivizing labor, relative to wage contracts, without the cost of risk-bearing that would be imposed under rent contracts.

After reviewing the leading theories of share tenancy, Hayami and Otsuka (1993) conclude that the risk-aversion vs. moral hazard model indeed "justifies the existence of share tenancy in the theoretically most consistent manner..." And, as noted above, Stiglitz (1993, 2002) remains convinced that the Marshallian effort disincentive is socially inefficient. The inefficiency hypothesis has been further buttressed by econometric studies, most notably Shaban (1987) for the case of India. Jacoby and Mansuri (2002) report similar results for Pakistan. Bautista (1991) observes that share tenancy in the Philippines is both less productive and inequitable.[3]

As is the case with the literature on the inefficiency of large farms and hired labor, however, this conclusion is premature. First, the canonical model does not imply, as originally claimed (Stiglitz 1974), that the optimal landlord's share varies positively with the tenant's degree of risk aversion, because risk aversion also blunts the tenant's incentive to shirk. Second, the model is incapable of explaining the empirical distributions of tenant shares, which cluster around 50%, with a smaller cluster around 2/3.[4]

A more fundamental problem is that the canonical theory treats share tenancy as a mere labor contract and thereby misses its essence as a typically long-term contractual arrangement for bringing management together with land that facilitates the tenant's learning-by-doing about production decisions (Reid 1976; Murrel 1983; Eswaran-Kotwal 1986; Roumasset 1995). Share tenants, themselves, hire substantial amounts of labor, especially for the more arduous and routine tasks. On the other hand, share contracting is a popular labor contract for specific tasks. Indeed, share tenants often hire casual workers on a share basis to do harvesting, weeding, and transplanting. However, receiving a share of the harvest does not make such workers tenants.

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[3] See Ray (1998) for additional examples, especially studies of tenancy in Southeast Asia.

[4] Deweaver and Roumasset (2002) show that for parameters representative of the Philippine case, the model predicts that optimal tenant's share declines from 1% to 80% as the tenant goes from risk neutrality to moderate risk aversion, and increases back to one as risk aversion increases further.

The persistent fallacy in all of the inefficiency arguments is one of misplaced exogeneity. Trying to judge the inherent efficiency of particular institutions is tantamount to the old Structure-Conduct-Performance paradigm whereby a market structure was taken to be exogenous, its conduct diagnosed, and its resulting performance judged. For example, the conduct of monopoly is characterized as increasing price by lowering quantity below its competitive level and its performance is judged to be inefficient. As the above examples illustrate, this paradigm, while now defunct in Industrial Organization, is alive and well in Development Economics.

Even leaving the identification problem aside, the tenant's compensation is not necessarily limited to his share of the harvest. Asian tenants often receive credit from their landlords at concessionary rates (often zero interest) and landlords help with tenant family needs and emergencies (Roumasset 1976; Sadoulet et. al. 1997).

2. Credit and Marketing

Credit and marketing institutions are similarly castigated as exploitative and inefficient. The stereotypical middleman charges excessive interest rates for credit and pays the farmer pitifully low prices. The following (about Pakistan) is typical:

> ...owing to the involvement of many layers of middlemen between the growers and the consumers, every year the government has to intervene in the agriculture commodity markets to rescue the farmers from the clutches of the middleman by acting as a second buyer (Badar 2002).

In Southeast Asia, such claims are often directed specifically at ethnic Chinese: "It is not unusual to hear...that farmers or consumers are exploited by ...Chinese middlemen."[5] But in general and in Indonesia in particular, Hayami and Kawagoe (1993) have documented how "the stereotype has not held up under empirical tests."[6] They go on to document the nature of marketing operations in Western Java and Sumatra.

The stylized marketing organization relies on village collectors (often farmers, themselves) inter-village collectors, traders, and processors. Because the village collectors have a low opportunity cost of time and readily adapt to the demands of marketing entrepreneurship, and because institutions and dynamic relationships are developed to provide quality control and to mitigate the "holdup" problem, the marketing system tends towards efficiency.

The main obstacle to efficiency in this view is the tendency of governments, in the alleged quest to limit excesses of the ubiquitous middleman, to actually suppress entry and the natural evolution of appropriate institutions and entrepreneurship. Rather, government policy should be focused on increasing entry and fostering market integration through appropriate contractual and physical infrastructure, as well as by providing market information and facilitating standards and grading.

In the current era of globalization, the efficiency of small-scale marketing systems may now be in decline, however. In traditional marketing systems, production is indirectly coordinated with consumption only through successive layers of collection and distribution. Smoothing fluctuations in both demand and supply is done through inventories, the law of large numbers, and through international trade. With the rise of supermarkets and "big box" discount stores, however, Reardon et al. (2003) have shown that retailers often contract directly with producers for delivery of goods, processed and packaged to specifications, at particular places and times. This confers competitive advantages on larger producers and partially displaces traditional marketing systems.

The Berkeley/World-Bank mafia acknowledges economies of scale in agricultural marketing but denies that these undermine their conclusion that large farms are inefficient, asserting that farmer associations can exploit large-scale marketing opportunities.[7] This is a remarkable

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[5] Mears (1981) as quoted by Hayami and Kawagoe (1993), p.10.

[6] Ibid. p. 10. In so doing, they cite Bauer (1964), Lele (1971), Jones (1972), Mears (1981), Unnevehr (1984), and Timmer (1987), although Timmer left open the possibility of monopsony profits in outlying villages.

[7] See e.g. the review of literature and discussion in Deininger (2003) including the list of contributors.

inconsistency. Small farms are said to be more efficient because they avoid the additional contracting costs associated with hired labor. But the proposition that small farms can simply overcome diseconomies through contracts blithely ignores the requisite contracting costs. Indeed farmer cooperatives are notorious for broken agreements and favoritism, both of which undermine the sustainability of group contracts.

The "evil middleman" syndrome has similarly led to widespread interventionism in credit markets, in particular the "directed credit" syndrome whereby interest rate ceilings are combined with concessionary lending to rural banks, which, in turn, qualify for subsidies by targeting rural and agricultural clients. While this particular policy failure has been widely diagnosed, disagreement remains between intellectual supporters of interventionism and those who would trust credit mobilization and allocation to competitive markets.

The "Ohio State School" asserts that the high rates in the informal sector are warranted by transaction costs and the risk of default. They note that the low interest rates mandated by government regulations direct credit primarily to larger commercial farmers and other borrowers with above average incomes (Meyer and Nagarajan 2000; Coleman 2002). Accordingly they advocate spontaneous institutions such as micro-credit programs and competitive market allocation of loanable funds.

The intellectual climate regarding credit policy may have swung too far towards the laissez faire extreme, however. For example, the donor consortium, Consultative Group to Assist the Poorest of the Poor (CGAP), has come out with a set of "best practices" based on the "win-win" approach to rural credit.[8] In this approach (also called the "new paradigm" by Meyer and Nagarajan 2000), rural lending institutions should attain financial sustainability by eschewing government and donor assistance, and charging rates commensurate with the full cost of the loan and high enough to successfully mobilize savings. As Morduch (2000) points out, this approach is mandated neither by logic nor empirical evidence.

First, the goals of financial sustainability and growth through profitability are not coincident with maximum impact on the poorest of the poor. Moreover microfinance success stories have tended to "stretch accounting data in order to claim profitability" (Morduch 2000, p.627).

As a result, microfinance organizations have attempted to replicate apparent success stories, albeit with disappointing results. As reported by Morduch (2000, p. 618), "some donors believe that little more than 5% of all programs today will be financially sustainable ever." Morduch argues instead, that financial sustainability and program expansion are consistent with some degree of subsidization. What is important is that the subsidy be a "hard budget constraint" and that sound prudential management is maintained including selection and monitoring procedures that emphasize repayment. If these fundamentals are maintained, the resulting diversity of program designs will contribute to the evolution of successful approaches.

On the other hand, second-best interventionists argue that market institutions are inefficient due to problems of imperfect information (e.g. Stiglitz and Weiss 1981). Ray (1998) reviews both the theoretical literature and empirical studies from Asia and concludes that rural credit institutions display substantial inefficiency even after uncertainty and transaction costs are taken into account. Accordingly, Stiglitz and Uy (1996) argue for "mild" financial repression with both interest rate ceilings and policy discrimination across types of investors.

What is needed to progress from this impasse is a conceptual framework that is capable of evaluating the consequences of alternative credit policies. The theory must be able to explain the coexistence of formal and informal institutions for rural credit and other patterns that characterize the nature of credit institutions under a variety of policy umbrellas.

Among the many "market failures" and alleged justifications for government intervention, perhaps the most misunderstood concerns stabilization policy. One of the common justifications of a state trading enterprise to control domestic rice markets in Asia, for example, is that without government control, market prices would be unacceptably volatile. It is surprising how readily this justification is accepted without a

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[8] See Morduch (2000) for a detailed description of the win-win approach.

compelling rationale that governments can and should control prices. It is also rather remarkable that while the intellectual climate regarding credit policy has largely swung to non-interventionism, the intellectual climate for stabilization (like that for intervention in land and labor markets) has proved to be more resilient.

The case for government stabilization of prices is weak at best. If the source of domestic price instability is international price variability, even costless stabilization would be welfare reducing. Consumers gain more from low prices than they lose from high prices. The reverse is true for producers. If domestic supply were the source of unstable domestic prices, price stabilization via a costless buffer stocking scheme would be welfare increasing, but, of course, no such free lunch exists. Feasible acquisition and release strategies are likely to be welfare-reducing when they work, due to the limited degree of stabilization and high costs.

Moreover, empirical evidence suggests that attempts to stabilize grain prices do not work (Roumasset 2000, 2003b), and theoretical analysis shows that stabilization strategies involving buffer stocks tend to be destabilizing in the long run, due to the probability that stocks, storage capacity, or available budgets will eventually be exhausted (Wright and Williams 1990).

3. Policy Failures: A Synthesis

The intellectual failures reviewed above include market failure, behavioral failure, and institutional failure. All of these result from misplaced exogeneity. A full understanding of policy failures, however, goes beyond diagnosing errors in economic reasoning. Political economy instructs that bad policy results from rent-seeking as much as bad economics.[9]

Directed credit programs, for example, may have been justified by defunct economics but served as viable mechanisms for political patronage in

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[9] As Blinder (1987) notes, as long as there is sufficient diversity of economic analyses, policymakers can select the economist who best defends their politically-determined positions. However, greater understanding certainly contributes to greater transparency about unintended consequences, which in turn, weakens the political sustainability of bad policy.

many Asian countries. Subsidized interest rates resulted in excess demand for loans. Inasmuch as the prog-rams are "directed," there is room for rationing of loans to be done on the basis of various indicators of political loyalty, instead of potential investment productivity.

In an extensive review of several Asian economies, Meyer and Nagarajan (2000) characterize the predominant form of bank lending to the rural sector in the 1960s through the 1980s as targeted (e.g. to farmers), funded by governments and donors at subsidized rates, and negligible selection and monitoring procedures. Borrowers correctly perceived the programs as entitlements, not obligations, and repayment rates were extremely low, with the exception of economies with "strong civil and professional traditions" such as Korea and Taiwan. As described above, this approach stagnated the natural evolution of both the formal and informal sectors.

Similarly in Pakistan, the Agricultural Development Bank of Pakistan (ADBP), which provides most formal loans in rural areas, lends to large landowners much more than to small landowners (Faruqee and Khandker 2001). Large borrowers with lower marginal benefits use formal loans unproductively and have high rate of default. As a result, the ADBP's operations impose a heavy burden on the government because of large subsidies required to sustain its operations every year. The Asian Development Bank is now recommending not subsidizing interest rates in rural finance operations (Asian Development Bank 2003).

Rural credit programs in the formal sector have expanded substantially in most Asian countries, but it has been mostly short-term credit targeted to farmers. Because of subsidized rates and poor prudential practices, these programs have not been financially sustainable. Rather, programs are renewed, renamed, and revived through additional tranches from international donors or the general funds of governments. The "band-aid" response of international donors in the 1980s was to seek to make small farmers more creditworthy by subsidizing ambitious programs of formal land titling, e.g. as in Northern Thailand.

Feder et al. (1988) argue that simultaneously subsidizing the establishment of formal land titles and otherwise expanding formal lending improves

welfare by funding agricultural investments with high present values that had formerly been rationed out of the credit market. Econometric support for such claims is not founded on any viable theoretical construct, however, and remains suspect. Models are needed that can rationalize the coexistence of formal and informal credit markets and that can be used to examine the consequences of subsidies, regulations, and changes in property rights.

Another area of policy failure in Asia is land reform. For example, land reform in the Philippines outlawed share tenancy. As a result, land reform beneficiaries hired permanent workers who were paid a fixed amount for the season. Hayami and Otsuka (1993) conclude that this has been an inferior substitute for share tenancy.

Another Philippine example concerns the failure to consider properly basing landlord compensation on land quality. By basing compensation on the principle that 25% of yield is a fair rent, reform confiscates value from owners of good and average farms but actually over-rewards owners of poor-quality land (Roumasset and James 1979). As a result, friends and relatives of poor-quality landowners submit bogus claims that they have been working the land as tenants so that the landlord receives more than the land is worth (and landownership remains in the family).

There is a good reason, however, why politicians embrace the bad analysis supporting land reform. The implementation of land reform has always been very spotty. The administration in power can be very strict towards its enemies in the implementation of reform and very lax with its friends. Thus land reform becomes a potent political weapon.

Another persistent policy cockroach[10] relates to the attempt to control agricultural prices through government parastatals, who are tasked with the impossible mission of maintaining high and stable producer prices as well as low and stable consumer prices (Roumasset 2000). Trying to distort and stabilize prices by prohibiting private trade and enabling parastatal monopolies has the opposite effect of fragmenting markets and blunting incentives for farmers and the agribusiness sector. Attempts to control prices will decrease the welfare of consumers, producers, or both. Moreover the inframarginal nature of price controls that results from limited parastatal resources implies that favorable inframarginal prices will be conferred on those who have gained a political advantage or whose political favor is curried by iron-triangle politicians and bureaucrats.

The antidote to *blackboard economics* is methodo-logical fundamentalism (Nozick 1975). Economic cooperation in agriculture is more complex "than is imagined in your calculus, Horatio."[11] The principle of comparative advantage implies that different characteristics of land and landowners will call for different intensities and composition of inputs and organizational forms with unlimited differences in architecture. Judging the relative efficiency of different organizational forms commits the most fundamental fallacy in economics – judging performance without understanding the nature and causes of the phenomenon of interest.

Prescribing policy reforms based on the premise that politicians, bureaucrats, and academics can socially-engineer institutions superior to those shaped, tested, and improved in the crucible of evolution is a recipe for government failure. The New Institutional Economics provides an alternative paradigm that encourages greater caution in tinkering with institutions that have evolved in the crucible of competition.

The New Institutional Economics of Agricultural Organization

The alternative to misplaced exogeneity involves characterizing the true nature and seeking the fundamental causes of behavior and organization. In a cross section of farms, for example, which type of land is allocated in large parcels, to which eco-nomic actors, and why? How has the composition between family and hired labor changed and why? Under what conditions do landlords choose to contract with tenants to manage their land?

The central decision-making model of development microeconomics is the farm-household model. A simple version is depicted in Figure 1, which shows the household labor supply schedule

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[10] Paul Krugman once remarked that the purpose of economics is to flush bad ideas, but like New York cockroaches, they keep coming back.
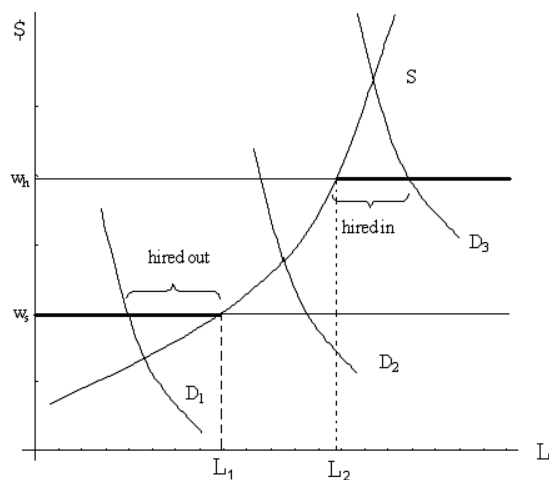
[11] From Shakespeare's Hamlet

Fig. 1. Quasi-Separability of Farm Labor Demand and Farm Household Supply

of a representative farm household and three possible labor-demand schedules, depending on (quality-adjusted) farm size.

For D_1, the family exports its excess labor, and the relevant shadow price of labor is w_s, the "selling wage" after deducting journey to work and other necessary expenses from the nominal wage. For D_3, the farm-household imports hired labor, and the shadow wage is w_h, the hiring wage after including the employer's agency cost, including recruiting and supervision costs and the residual costs of labor shirking (see section *Credit and Marketing*). If labor demand intersects household supply in the intermediate range between w_h and w_s, the shadow wage rate is given by the household's marginal opportunity cost of labor.[12] Accordingly, the rational farm household can be said to be maximizing shadow profits, based on the shadow-wage schedule,

$$w = w_s, \quad L < L_1$$
$$w_h, \quad L > L_2$$
$$SL, \quad L_1 < L < L_2$$

The profit maximization problem of the farm is only quasi-separable from the household utility

maximization problem, inasmuch as the labor supply schedule is not independent of farm income.

Similarly, the household-farm produces the shadow-profit maximizing quantity of the agricultural commodity, where the shadow price is bounded by the buying price and the selling price, and coincident with the household demand schedule in between. Again there is a limited source of non-separability, inasmuch as household demand is dependent on farm income. The "wedge model" contrasts with the household-farm model of Lau et al. (1981) and Ahn et al. (1981) wherein household consumption is determined recursively, based on the profit-maximizing behavior of the farm. Nonetheless, a recursive algorithm can be employed to solve the wedge model, albeit by guessing household consumption and iterating until the guessed consumption level is consistent with both the household utility function and the shadow-profit-maximizing farm income.

However, the wedge model begs the question regarding determination of the unit transaction-cost wedge. That is provided by agency theory. Figure 2 illustrates agency theory in the context of alternative labor contracts. Piece rates are commonly used in situations where the product of labor is easily observable, for example, sizing and sharpening the cane stalks prior to planting, and the planting of stalks at uniform spacing. These tasks are tantamount to intermediate products delivered to the farm operator, who pays according to quantity. This institution economizes on minimum agency cost, i.e. the minimum sum of supervision cost and minimum shirking cost. For tasks that are not amenable to *ex post* inspection, supervision is used to concurrently monitor the labor activity in question and workers are paid according to the time spent on an activity, not its result.

The four panels illustrate the comparative-statics proposition that if tasks are sufficiently easy to monitor through *ex post* inspection then the corresponding agency cost at optimal monitoring will be lower than the agency cost of wage contracts. The opposite is true for tasks that are hard to monitor. For each task, the unit transaction cost is given by the least of the two minimum agency costs (MAC) for the task in question.

The wedge model can be used to explain behavior of the household-farm, the basic building

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[12] A similar model and circumscribed comparative statics are provided in de Janvry et al. (1991), and Sadoulet and de Janvry (1995). An extension of the model to include behavior under uncertainty is in Roumasset (1979).
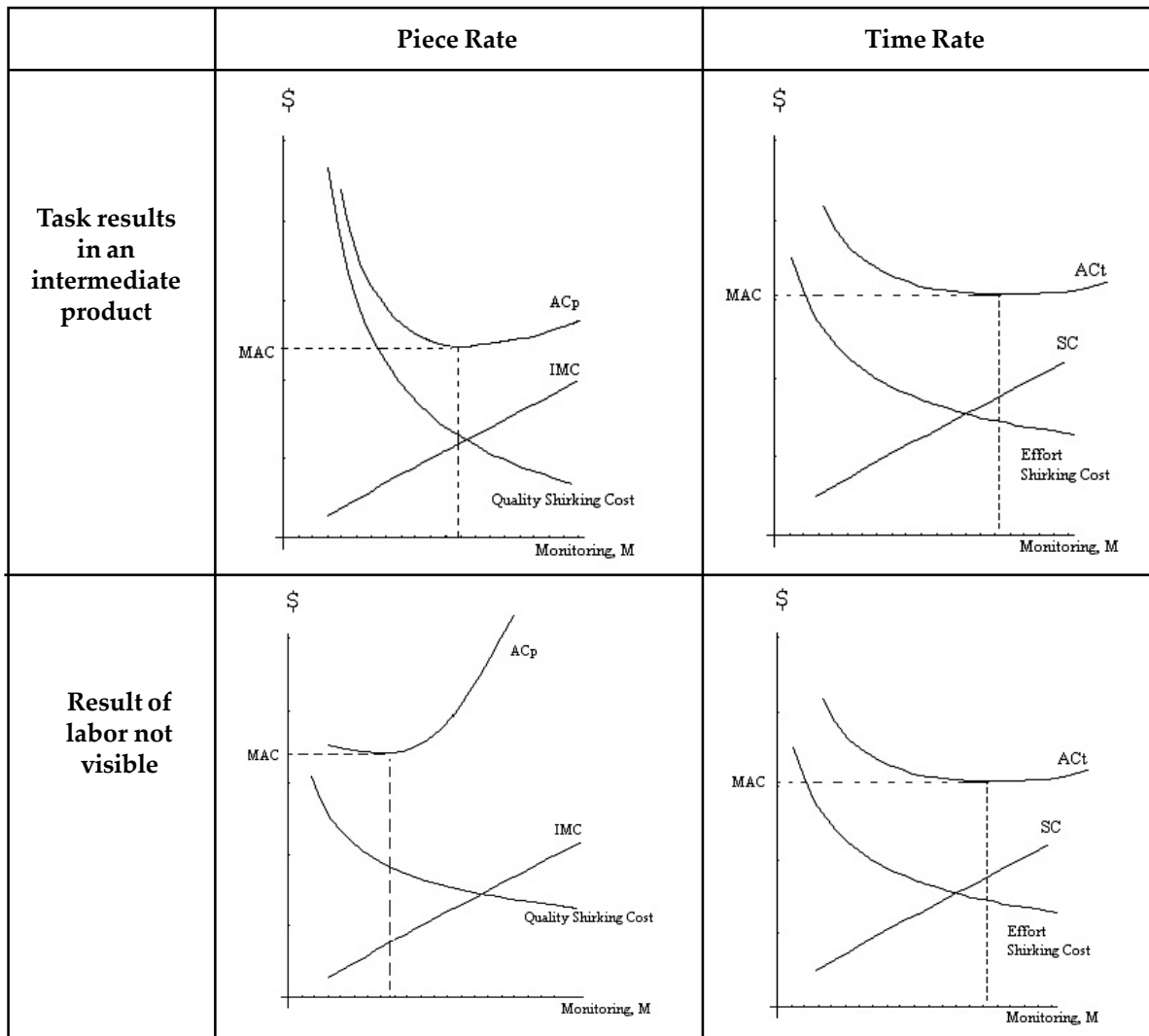
	Piece Rate	Time Rate
Task results in an intermediate product		
Result of labor not visible		

Fig. 2.   Specialization of contracts by task

block for theories of agricultural development. The agency-cost model can be used for explaining rural institutions. Both are essential for understanding the consequences of contemplated policy reforms.

The New Institutional Economics (e.g., Roumasset 1978) also recognizes that different levels of analysis may be appropriate for the analysis of different problems. Models that recognize transaction costs such as the two above are classified as *second best*.[13] When the subject

of inquiry is the terms of agricultural organization, e.g. tenant's and harvester's shares of production, the first-best model, which abstracts from transaction costs, has been found to be appropriate. In first-best analysis the terms of contracts are set such that factors receive their marginal products, just as if there were competitive markets.[14] *Third-best* analysis or political economy allows for multilateral opportunism in the pursuit of favorable government treatment by special interests (Dixit

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[13] Note that while both models accommodate transaction costs, the first regards them as being exogenous while the second determines unit transaction costs endogenously.

[14] This is the implicit theoretical underpinning of Hayami and Kikuchi's (1982) study of rural institutions in the Philippines and Indonesia. Sufficient assumptions and a theoretical demonstration of market and contract equivalence are provided in Roumasset (1979).

1996). The following three sections rely primarily on the second-best level of analysis. The fourth section provides a brief synthesis using all three levels of analysis.

1. Land, Labor and the Nature of the Farm

Consider the evolution of hired labor. In Marxist view, the new rice and wheat technology that swept through Asia in the 1970s disenfranchised the peasantry and led to falling wages and increased unemployment. In the induced innovation view (Binswanger and Ruttan 1978; Ruttan 2003), the causation was just the reverse. Population pressure on limited land resources drove down wages thereby inducing land-saving technological change. In effect, this allowed "biological capital" (modern varieties and chemical inputs) and labor to substitute for land. The increased demand for labor had a positive effect on wages, just not enough to offset the effect of population pressure (Hayami and Kikuchi 1982).

The induced-technological-change explanation just described is a first-best argument. However, not only did labor per hectare increase, its composition changed dramatically. In the 10 years following the adoption of the new rice varieties in the Philippines, hired labor in weeding for example increased from less than 20% of total labor to more than 80% (Roumasset and Smith 1981). Figure 3 illustrates the use of the wedge model to explain this dramatic institutional change.

Figure 3 represents a typical farm household in the province of Laguna and shows how four factors combined to increase hired labor dramatically. First, and most importantly, the intensification of production, ultimately caused by increasing land scarcity and accommodated by the new rice technology, increased the demand for labor per hectare. This is illustrated by the shift in the demand curve to the right.

Secondly, increased farmer incomes resulted in increased schooling of farm children. This, combined with the increased specialization among farm workers, lowered the amount of farm-household labor per hectare. These higher opportunity costs and lower substitutability for skilled labor are illustrated by the shift in the labor supply curve to the left.

Thirdly, the market wage went down (from W_{m0} to W_{m1}) as population growth, including in-migration, increased by more than enough to supply the increased labor demand.

Fourthly, the transaction cost wedge between the market wage and the gross hiring wage decreased due to the advent of labor contractors and other new institutions of labor contracting (Roumasset and Uy 1980). These third and fourth factors are illustrated by a downward shift in the gross hiring wage (from W_{h0} to W_{h1}).
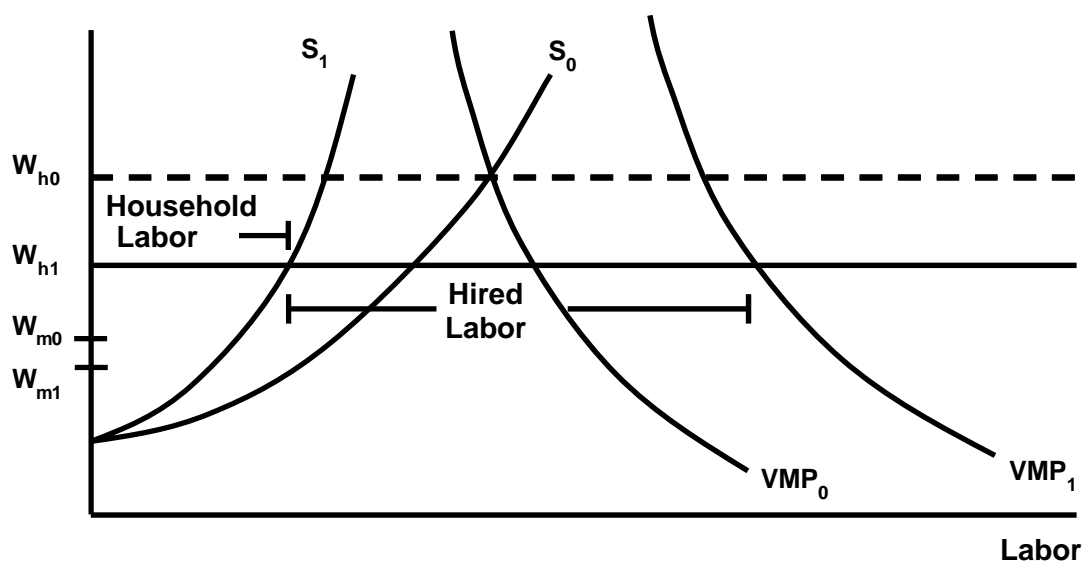

Fig. 3. High yielding varieties and the advent of labor markets

As hired labor increased, a menu of agricultural contracts emerged for incentivizing labor in different tasks. The previously discussed Figure 2 shows how agency theory can be used to explain the tendency for piece rate contracts to be chosen when the task amounts to delivering an observable intermediate product. Statistical analysis of sugarcane contracts in the Philippines confirms this tendency (Roumasset and Uy 1980). For example, cane stalks are prepared for planting (uniformly sized and sharpened) and laid out for inspection. The farm operator simply inspects them for quality and uniformity. Next the stalks are planted, and the operator inspects for proper height and spacing.

Gama or *Ilani*, as practiced in the Philippines, is an institutional arrangement whereby the worker contracts to weed and harvest a specified parcel for typically 1/6 of the rice harvested for that parcel; *ceblokan*, practiced in Indonesia, typically requires transplanting, in addition to harvesting and weeding, for the same 1/6 share (Roumasset 1978; Hayami and Kikuchi 1982).[15] These arrangements were preceded by *hunusan* in the Philippines and *bawon* in Indonesia, wherein only harvesting was done for the share of the harvest, typically 1/6. Before the new institutions of *gama* and *bawon*, the share was sometimes lowered to 1/8 (Roumasset 1978).

Why did the share settle at one-sixth and the work increase instead of the share simply declining? Hayami (1998) suggests that another function of *gama/ceblokan* was to provide an explicit selection mechanism for choosing who would weed/harvest and to allocate a specific parcel to each group of workers. In addition to selection, this provides improved incentives over the open *hunusan/bawon* systems that were open to anyone in the village.

Under the old system, a kind of free-riding occurred wherein workers would harvest faster than efficiency warrants, just to be able to harvest more. Moreover, having workers harvest the same plot that they weeded (and sometimes transplanted) provided additional incentives to weed/transplant with greater care. Thus while first-best principles
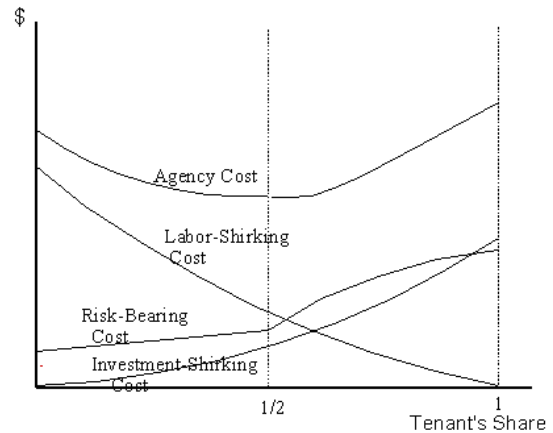
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[15] Remarkably, a similar arrangement was documented in *The Constituion of Athens* almost 3,000 years ago. Workers contracted under a sharing arrangement in ancient Greece were called *Hectomori* or "sixth partners."

Fig. 4. An Eclectic Theory of Share Tenancy

can explain either the falling harvesters share or the increased work required, second-best considerations are required to understand why one institution was favored over the other.

Figure 4 provides a second-best efficiency explanation of the institution of share tenancy. The larger the tenant share, the less the agency costs of labor shirking (monitoring cost plus residual shirking costs). On the other hand, the greater the tenant share, the greater the tenant's incentive to overuse or under-maintain land quality. Share tenancy (with a tenant's share of roughly one-half) minimizes the agency cost of both sources combined. There is nothing inherently inefficient in the contract, just explicit recognition of the contracting costs inherent in specialization.

Inasmuch as the tenant is the farm manager, not a worker, it is futile to classify "forms of tenure" as share tenant, lessee, and wage worker. Rather, the need is to classify organizational forms by which ownership, management, and labor are connected.

Figure 5 illustrates a taxonomy of firms classified according to degree of specialization. Note that pure owner-operator and owner-manager are on opposite sides of the specialization spectrum, even though the conventional taxonomy classifies them both as owner operator. The pure owner-operator household does all the management and all the labor. There is no hired labor. The owner manager hires most of the labor, and reserves for himself only those tasks which are bundled with managerial discretion, e.g. fertilization.
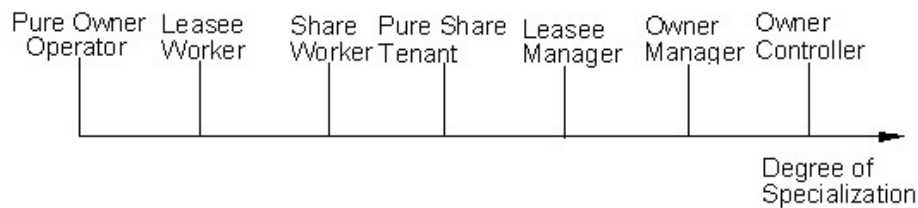
Fig. 5. A Spectrum of Agricultural Firms

Share tenancy is characterized by an intermediate amount of specialization - the tenant does most of the management, all discretionary tasks, and some other tasks, e.g. land preparation. Evidence from the Philippines and Nepal confirms that specialization is driven by intensity of cultivation, which is driven in turn by favorable land quality, location, and economic environment (Roumasset 1995). Intensification can also be driven by population pressure, demand growth, and rising land values. Not only does intensification warrant more specialized agricultural firms, but the organization of hired labor itself becomes increasingly specialized.

2. The Evolution of Lending Institutions

In applying the new institutional economics to credit markets, the first task is to rationalize the coexistence of the formal and informal sectors. It is natural to assume that the formal sector specializes in enforcement through the formal sector, e.g. through legal foreclosure procedures, and that the informal sector specializes in more personalized mechanisms such as repeated transactions, reputation, and idiosyncratic bonding devices.[16] Formal institutions such as rural banks concentrate on production loans. The informal sector lends to relatively poorer households for both production and consumption purposes and at high unsubsidized rates.

The widespread policy of usury laws and subsidized rural banks in Asia has perverse effects on both the formal and informal sectors from the perspective of the model just described. The natural evolution of banks will be directly jeopardized by subsidizing banks that charge low interest and compete for the same customers as banks that rely on savings mobilization, charge borrowers higher rates and aim for financial sustainability. Inasmuch as mobile factors such as loanable funds and skilled labor are drawn from the unprotected sector to the protected sector, subsidizing the formal sector also stunts the growth of the informal sector, instead of expanding it so as to access commercial credit (Hoff and Stiglitz 1998; Bose 1998). But instead of letting these failed programs die a natural death, donors have subsidized new programs, such as formalizing land titles, and justified new tranches of funds for directed lending, thereby inhibiting natural market development even longer.

Moreover the new loans are disproportionately given to those with previous dealings in the formal sector and displace informal loans whose enforce-ment depends on personalized information and repeated interactions. Thus the interventions tend to shrink the informal sector and its high shadow price of credit and expand the formal sector, which is characterized by a low shadow price.

Instead of artificially fragmenting credit markets and penalizing the informal sector, policies are needed that deepen credit markets by building on existing institutions. At any given level of market development, shadow prices of credit differ across both market lenders and borrowers. Institutional development occurs when the benefits of arbitraging across different shadow prices is greater than the additional governance costs of the new institutions.

3. The Nature of Economic Integration: Transaction Costs and Specialization

In modern parlance, the classical engine of growth

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[16] For example, moneylenders in Northern Thailand sometimes hold a borrower's land title, even though they have neither the ability nor the inclination to possess the land in question. But holding the title is of sufficient value to the borrower to incentivize repayment (Siamwalla et al. 1990). See Roumasset (1986) for further discussion of the credit model described.
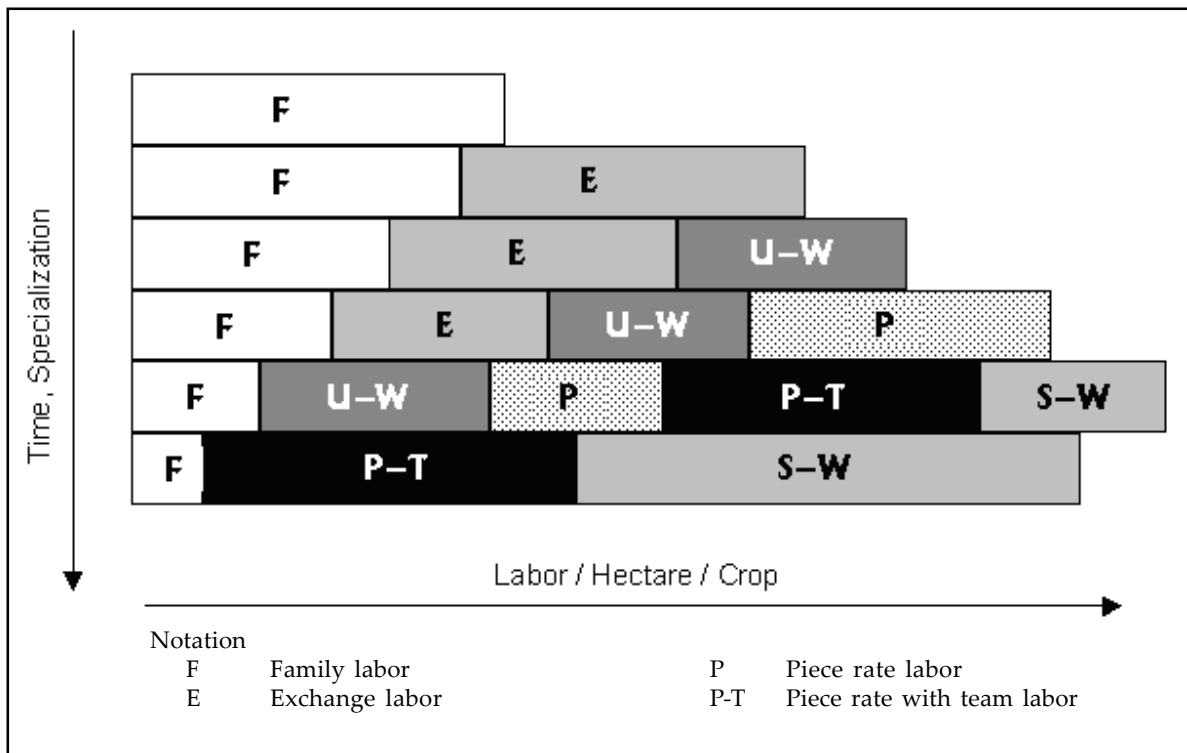
Fig. 6. Intensification and Specialization

ala Adam Smith is falling unit transaction costs, which facilitate ever-increasing transactions and specialization of economic organization (Yang and Ng 1993). This proposition emanated from the New Institutional Economics and was used to explain the role of labor specialization in agricultural development (Roumasset and Smith 1981). In Yang's (2003) formalization, unit transaction costs are driven down by the endogenous emergence of middlemen, whose specialization is warranted by the extent of the (growing) potential market. For example, the institution of piece rates with teams (Roumasset and Uy 1980) economized on labor recruiting and supervision costs by relying on direct contracting between the farm operator and the team leader, who maintained a reputation for reliability.

Figure 6 provides a stylized evolutionary pattern of labor contracts. During stage I, labor is provided by the farm household and exchange arrangements with residents in the same village. During stage II, the next three rows of Figure 6, hired labor emerges. At first labor is hired on a wage basis, and workers are not differentiated with respect to task. As horizontal specialization

increases, piece rate workers are hired for selected tasks (those which are relatively easy to monitor) and undifferentiated wage labor declines.

The third phase of stage II involves a further decrease in undifferentiated wage labor, a decline in individually-hired piece workers, and the advent of two new contracts. In "piece-rate with team labor," the farm operator contracts with a labor contractor who also served as team leader and supervisor. The other new form is for skilled laborers who specialized in particular tasks and were paid in wages. These new forms come to dominate the other forms of hired labor in stage III. Piece-rate with teams continued to replace individual piece-rate contracts, and specialized wage labor replaced undifferentiated wage labor and most of household labor.[17]

The explanation of the above dynamic pattern of labor contracts is similar to the agency theory explanation of the spectrum of agricultural firms

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[17] For statisical documentation and further discussion, see Setboonsarng (1991) and Roumasset et al. (1995).

(Figure 5). In both cases, the objective is to explain a spectrum of contracts ranked according to specialization. In the cross-section case, the same preconditions for production intensity (e.g. land quality) also predispose a more specialized organizational form. As the profit maximizing level of inputs increases, more production management is warranted, indicating an organizational form wherein the manager is rewarded with a larger share of the residual. That is, the agency costs associated with shirking of non-labor inputs increase, moving towards better quality land, and those costs are best economized by supervising labor and incentivizing managers (Roumasset 1995).

As farm production intensifies, labor inputs increase, until the last stage wherein capital-labor substitution overcomes input intensification. Labor contracts are increasingly specialized, eventually with labor contracts made on a task-by-task basis. Thus intensification and specialization are coevolutionary. The diagram also helps to resolve the fundamental paradox that total transaction costs increase as economic development proceeds (North and Wallis 1982). Lower unit costs of transportation and communication (*unit transaction costs*) are falling and improved institutions lower the agency costs (supervision plus residual shirking costs) per unit of labor hired. But because more labor is hired and because specialization increases the number of contracts (even normalized by yield per hectare), *transaction expenditures* increase.

Note, however, that economic efficiency does not imply that shadow price differences across space and time disappear altogether. The efficiency condition is rather that such differences cannot exceed the cost of transport and storage, respectively (Kratz and Roumasset 2001). Econo-metric tests for market integration, using modern techniques of cointegration, appear to have failed to specify this integration hypothesis correctly. Moreover, shadow prices of inputs and outputs can vary across agents in the efficient solution according to the household wedge model discussed above.

4. Summary and Implications for Development Policy

Policy failures result from a combination of bad economics and rent-seeking behavior of politicians. Through *blackboard economics*, including misplaced exogeneity, analysts unwittingly assume inefficiency in order to conclude that market inefficiency exists but that government actions won't be plagued by the very transaction costs that limit markets. When donors and politicians alike are in denial about their failures and throw more money at the very problems they have exacerbated, band aid and blackhole cycles of ever-greater public spending and worsening distortions are promulgated.

The key to avoiding misplaced exogeneity is to capture the essence of institutions and to provide fundamental explanations thereof. The new institutional economics provides an explanatory framework with three levels of analysis. First-best analysis abstracts from transaction costs. Second-best analysis incorporates transaction costs. Third-best analysis incorporates the costs of political action and other elements of public choice. For example, the case for land-to-the-tiller reform, which is based on the inverse correlation between farm size and yield-per-hectare can be refuted at both the first and second-best levels. On the first-best level, it can be shown that efficient organization of family farming requires that good quality land be organized in larger farms than poorer quality land (Roumasset and James 1979) thereby revealing the fallacy in the inverse-relationship-implies-inefficiency thesis. On the second-best level, the wedge model can be used to show that smaller farms face higher shadow prices of labor (Sah 1986) such that second-best efficiency implies the inverse relationship, thereby undermining the interventionist logic again.

Third-best analysis is exemplified by the explanation of why agricultural protection increases with a country's per-capita income (Balisacan and Roumasset 1987). In this arena of public choice, one must explicitly consider the costs and benefits of coalitional investment in political influence in order to get the appropriate comparative-statics results.

One source of confusion regarding the NIE concerns the plethora of definitions of transaction costs. Transaction costs have been defined most broadly by Nobel Laureate Kenneth Arrow as costs of running the economic system and are the economic equivalent of friction in physical systems (Williamson 1985). Sublevels of transaction-like costs can also be distinguished. The first is unit transaction costs, e.g. the cost of one man-hour of

supervision. Another is agency cost, e.g. the unit cost of supervision times the man-hours of supervision plus the residual shirking cost. (This concept was illustrated in the agency diagrams.)

These distinctions make it possible to explain the essence of economic development as envisioned by Adam Smith in *The Nature and Causes of the Wealth of Nations*. As social capital (including infrastructure) increases, unit transaction costs fall, thereby facilitating greater specialization. In particular, the number of both final and intermediate goods increases as does the number of distinct labor tasks and opportunities for learning-by-doing. Thus economic specialization and integration are part of the same evolutionary process (Yang 2003). Total transaction costs, in the broadest sense, increase with efficient development, i.e. the income elasticity of transaction costs is greater than one. This means that economic organization gets more complex, and market deepening proceeds, faster than unit transaction costs decline.

However, natural market deepening is impeded by market-distorting interventions including trade restrictions, price interventions, shipping and other regulations, and failure to provide public infrastructure (including quality standards). Marketing regulations, such as parastatals, exemplify how government policy can stagnate the natural evolutionary process and stagnate an industry instead. Economic integration can be enhanced by removing these policy distortions and by focusing on facilitating actions such as agricultural research and the provision of transportation and communication infrastructure.[18]

The best stabilization program would be to abolish parastatals that monopolize international trade in grains and eliminate government-imposed barriers to entry. This policy would not only render the industry competitive, but it would create a rapid-response capability to import in times of unexpectedly high domestic prices by removing the elaborate contracting, procurement, bidding, and other administrative requirements that presently delay government purchases. It may also be appropriate for governments to assure the maintenance of a small strategic reserve for emergency purposes. But a maximum size should be established for the strategic reserve based on the conceivable number of regions that could be in deficit at the same time, the availability of rice in the local market, and the minimum delivery time of foreign-sourced grain. It is difficult to imagine how such considerations could justify stocks greater than 15 times the daily consumption rate.

By considering specialization and institutional choice as endogenous, one can understand two beneficial effects that are often overlooked. First, inasmuch as institutional change is induced by changing factor prices (Ruttan 1978, 2003), e.g., falling wages relative to rents, it allows greater substitution of labor for land, thus partially ameliorating downward pressure on wages. Second, to the extent that institutional change facilitates specialization and the external economies associated therewith (Yang 2003), it may actually overcome the original downward pressure on wages (Roumasset and Van Assche 2003).[19]

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[18] Note, however, that statistical tests of "cointegration" do not provide a valid measure of market integration. The naive measures used presume that equality of shadow prices across space and across economic agents is the efficient benchmark. Even more sophisticated theory that equates shadow price differentials with transport costs is correct only for location pairs between which transportation of the good in question is non-zero. Moreover, it is misleading to separate space from time. For example, optimal trade and transportation of grain in the Philippines calls for exporting from the south following their peak harvest and importing to Manila preceding the wet season harvest on Luzon. During periods when efficient transportation is zero, shadow prices differentials can be less than transport costs.

[19] Econometric studies showing that hired labor is less productive than family labor fail to account for the specialization going on and for the fact that the farm operator's labor is considerably more valuable than the shadow price of hired labor. In other words, the inefficiency arguments ignore the principle of comparative advantage.

CONCLUSION: STOP, PUSH, AND FACILITATE

There has long been a tendency among economists and others to use statistical evidence and stylized facts to castigate behavior and organization in developing countries as sources of inefficiency and inequity, and to propose coercive mechanisms for reshaping the economy. These attempts illustrate that empirical analysis cannot be stronger than the underlying theory. Unless the theory accounts for the nature and causes of economic organization, econometric analysis can only deliver statistical patterns. It cannot be used as the basis of policy recommendations.

In relation to this, the assertion that government intervention can always improve efficiency is based on a straw man version of the market in which neither private governance, nor multilateral agreements are allowed. Even if such circum-scribed characterizations were accepted, the theory leads only to the claim that some kind efficiency-improving intervention exists. However, the nature of the theory and the available evidence make it infeasible to prescribe specific policy reforms or to determine their consequences (Besley 1994).

When a more fundamental approach is taken, one finds substantial evidence that institutional change evolves in much the same way as would be warranted by efficiency. A healthy respect for institutional evolution leads to the conclusion that governments should stop trying to engineer behavior and organization. Rather the focus should be on facilitating economic cooperation through the provision of information, a legal infrastructure, and opportunities for multilateral cooperation. The prerequisites for cooperation will render the time-honored strategy of pushing agricultural development through investments in research and infrastructure even more effective, especially if modern principles of public administration are employed (Laffont and Tirole 1999).

The first priority for policy reforms should be to roll back those regulations, excessive taxes, and subsidies that inhibit the normal evolution of rural institutions and markets. Beyond this, reforms should be focused on increasing entry and fostering market integration through appropriate contractual and physical infrastructure. The benefits of such facilitation derive from equilibrium differences in shadow prices that prevail, e.g. due to communication and transport costs and limitations in the rule of law. This does not mean, however, that developing countries should imitate the modern institutions of high-income economies, e.g. by spending vast sums on modern cadastral surveys and court proceedings in order to confer Western-style land titles before their benefits warrant their costs. Rather, appropriate rules of property and contracting should be allowed to evolve along with the increasing specialization and intensification of production.

The economics of rural organization with endogenous behavior and organization is in its infancy. There is a promising body of theory featuring specialization as the central pillar of economic organization (e.g. Yang 2003) and a rich tapestry of rural institutions waiting to be described and explained. Much remains to be done.

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