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Reflections on the Foundations of Development Policy  
Analysis

By

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Abstract: There is a persistent tendency in economic development circles to jump to policy conclusions without entertaining more fundamental explanations of empirical patterns. After reviewing several examples in the field of agricultural development, I provide an alternative paradigm for understanding behavior and organization. Despite the increased sophistication and vast access to data, modern theories and empirical methods have yet to focus adequately on developing fundamental methods for advancing policy analysis through the *nature, causes and consequences* paradigm. This assessment points to promising avenues for future research. Two such areas singled out for further attention are black hole economics and the coevolution of specialization and economic development.

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# Reflections on the Foundations of Development Policy Analysis

James Roumasset

## 1. Introduction

Apart from an outstanding group of mentors, the main influence on my life as an economist has been collaboration with a diverse group of independent and courageous scholars, many of whom are contributors to this volume. Our overriding vision has been that designing institutions, including public policies, requires fundamental foundations for understanding behavior and organization. Yet development economics is replete with policy recommendations based on ad hoc models and empirical findings that leave room for alternative explanations. By understanding the fads and fancies of development economics, we are more likely to avoid repeated pitfalls and chart a productive research future.

In the sections that follow, I attempt to explain how non-fundamental development microeconomics has gone through stages of modernism and postmodernism. Modernism is associated with the social engineering paradigm of A.C. Pigou, Paul Samuelson, and Jan Tinbergen (McCloskey 1994, 1996, 1998). Post-modernism in development economics derives from the nihilism of non-convexities, multiple equilibria, and the inability of competitive equilibrium to reach even a constrained Pareto equilibrium (Greenwald and Stiglitz 1986). Non-fundamental models, characterized by misplaced exogeneity (Nozick 1974), proliferate. Subsidized social insurance and smart fertilizer subsidies, for example, are justified by exogenous risk preferences, arbitrarily assumed market failure, and presumed behavioral anomalies. Modern empirical applications including randomized design, natural experiments, and instrumentation for quasi-randomization often suffer from the similar problem of missing mechanisms. By focusing on market and behavioral failures, postmodern development economics often fails to deal with the central problems of economic development -- bad institutions, including bad economic policies.

There has been substantial progress in building more fundamental theories. Both New Classical Microeconomics and the New Institutional Economics are notable in this regard, but are still incomplete. What is needed in both cases is to marry the theories of social optimization with appropriate notions of equilibrium that will permit the consequences of alternative policy reforms to be assessed.

Prescribing policy reforms and other changes in institutional design requires understanding the nature, causes, and consequences of the institutions in place. An alternative paradigm -- *postmodern structuralism*, rooted in Coasean fundamentalism -- is described and illustrated in this chapter. Particular attention is devoted to agricultural development policy, e.g. by contrasting the misplaced exogeneity of the small-is-beautiful perspective with the fundamental theory of the

agricultural firm. Suggestions are offered for developing the fundamentalist paradigm further, particularly regarding institutional change, specialization, and sustainable development. The challenge of assessing development policy analysis also affords me the welcome opportunity to reflect on and synthesize a few of my own writings on the subject.

### 1.1 The four stages of research in development economics

Dilip Mookherjee (2005) has identified four stages of research and related them to the evolution of development economics. *Stage 1* consists of the identification of "empirical regularities that need to be explained by a suitable theory." *Stage 2* involves "the formulation of a relevant theory, including derivation of potentially observable (hence falsifiable) implications." *Stage 3* deals with "the testing and estimation of theories, a stage which may lead back to modification or replacement of the previous theories, in an iterative back and forth with *stage 2*." *Stage 4* "employs the least unsuccessful theory from the standpoint of empirical verification for purposes of prediction and policy evaluation."

Mookherjee describes classical development economics as "dealing with Stage 1 empirics (e.g. Kuznets, Myrdal, and Rostow) and *stage 2* theories, especially those of Rosenstein-Rodan, Hirschman, Leibenstein, Lewis, Nurkse, Scitovsky and Sen." He describes development economics in the 1970s and 80s as most notable for departing from the Walrasian paradigm (e.g. using agency and game theories) to explain the stylized facts of agrarian institutions.<sup>1</sup> But while Walrasian economics provided a unifying foundation, the new theories, based on arbitrary game theoretic and transaction cost specifications provided "an embarrassment of riches."

These *stage 2* theories were then said to prepare the way for *stage 3* empirics. But as the stage of testing and measurement progressed, the field became increasingly focused on removing econometric biases, leading in turn to the obsession with randomized experiments, both natural and controlled.

"Research papers tend to get evaluated almost exclusively in terms of their success in combating the econometric problems, often to the exclusion of the importance of the context or issues addressed by the analysis, the imaginativeness of the underlying hypotheses formulated or tested, or the importance of the findings from a wider standpoint...The research is consequently increasingly microscopic in character." (Mookherjee, 2005, p. 11).

A similar critique by Deaton (2010) concludes:

"As with IV methods, RCT-based evaluation of projects, without guidance from an understanding of underlying mechanisms, is unlikely to lead to scientific progress in the understanding of economic development."

Rather than rejecting experimental methods, Deaton prescribes returning to the four stages and applying modern empirical methods more to the evaluation of theories than to projects.

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<sup>1</sup> My own work in this genre includes Roumasset (1978), Roumasset and Uy (1980, 1987), and Roumasset (1994).

Nor is reaching stage 4 the end of the game. As Ben-Porath (1980) describes, the stage of testing and measurement gives rise to new theories to explain statistical patterns not consistent with existing theory (think of Krugman's 1979 new trade theory). A natural dialectic between theory and evidence should continue that produces new and better theories and an improved mapping between the domain of underlying conditions and appropriate theories. Instead, the current trend in development economics appears to have become somewhat fixated in stage 3.

Through the examples that follow, I argue that empirical testing should not be the only criterion for navigating what Keynes called the "slippery problem of passing from statistical description to inductive generalization" (Keynes, as cited in Mookherjee, p. 566),<sup>2</sup> especially when the theories are used as the basis for policy evaluation. Inasmuch as the dialectic interaction between stages 2 and 3 is an ongoing and never ending process, we must be suitably cautious when moving to stage 4 policy prescription. As noted by Coase (1994), economics as objective, logical positivism is what economists pretend to do, not what they actually do.<sup>3</sup> Additional criteria for evaluating theories may be appropriate, even if they are subjective. In development policy analysis, the researcher must decide whether the underlying model abstracts from reality in a useful and meaningful way or whether the policy prescription derives from an ad hoc assumption.

## 1.2 The nature-causes-consequences paradigm for development policy analysis

The *nature, causes and consequences* paradigm for policy analysis involves first describing policy according to its *economic nature* via summary statistics such as nominal protection rates or implicit tariffs.<sup>4</sup> Next the analyst assesses the consequences of a particular policy change according to its *consequences* in a particular modeling framework, e.g. using the distorted (but uniformly-priced) competitive equilibrium as the benchmark (Clarete and Roumasset 1987, Roumasset and Setboonsarng 1988, Gardner, 1988; Krueger et al., 1991). This paradigm abstracts from transaction costs and implicitly assumes well-functioning markets.

But surely a characteristic of developing countries is that markets are not well-developed. And the absence of well-functioning credit and insurance markets means that risk aversion may play a more important role in farm-household decisions than otherwise (Chetty and Looney, 2005 and 2006). Policy evaluation in developing agriculture therefore requires behavioral and organizational foundations that go beyond the conventional paradigm.

Inasmuch as policy analysis needs to be based on a positive theory that goes beyond the Walrasian paradigm, sections 2 and 3 are devoted to the behavioral and organizational foundations of agricultural development. In particular, section 2 explores progress and research needs regarding behavioral theories of the farm household. It begins with a comparison of traditional and ad hoc theories of farmer decision-making under uncertainty with the approach of *strong structuralism* (as in section 2.1). The section continues with a discussion of how the modern culture of economic

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<sup>2</sup> See also Wolpin (2013).

<sup>3</sup> See also McCloskey 1994 and Medema 1995.

<sup>4</sup> An improved measure is the nominal rate of assistance (Anderson et al., 2008 and chapter 18, this volume).

empiricism has become an end in itself, instead of contributing to a dialectic improvement of quantified conceptual models needed for policy evaluation. Section 3 also compares ad hoc and fundamental theories, this time about agricultural organization. I attempt to demonstrate how misplaced exogeneity has led to a regression of economic development thinking back to the defunct structure-conduct-performance paradigm. In contrast, the fundamental approach promotes a healthy respect for the diversity of institutions. Section 3 also includes suggestions for how lessons from agricultural institutions can contribute to a unified version of *the new institutional economics* that applies to industrial as well as agricultural organization. Inasmuch as policy recommendations need to be also based on an understanding of the existing political equilibrium, the unified perspective is extended to include the *causes* of public policy. Section 4 provides a brief critique of modern theories of institutional and market failure and the need to return to fundamental explanations. Section 5 is an inquiry into the evolution of specialization in the organization of agricultural labor and how the nature of the agricultural firm evolves to incentivize the specialized tasks of labor and management. Section 6 discusses *black hole* policy failures and the role of the economist in opposing them.

## 2. Behavioral Foundations for Agricultural Development Policy

For the last half century, the study of agricultural development has been overwhelmingly devoted to the problem of how, in Arthur Mosher's (1966) parlance, to *get agriculture moving*. As such, agricultural development is best seen as a problem of public economics. Public economics is an explicitly normative (prescriptive) discipline.<sup>5</sup> But just as surgery requires an understanding of anatomy, agricultural policy analysis requires a positive theory in order to evaluate the potential *consequences* of policy reform. A positive theory suitable for evaluating the consequences of rural development policy needs to include two central components – a theory of farm-household behavior and a theory of agricultural organization. The current section is devoted to the first of these; part 3 is concerned with the second.

### 2.1 Towards fundamental explanations of farm-household behavior

There is a long tradition in the economics of agricultural development that behavior and organization in developing countries are inefficient. Low income farmers were once thought not to be rational profit maximizers but tradition-bound, uninformed, and possibly indolent. But even when Theodore Schultz's *Transforming Traditional Agriculture* effectively showed that low-income farmers are privately efficient, numerous theories remained about the social inefficiency of traditional agriculture.

On the behavioral front, farmers are often assumed to be risk averse, and many economists have concluded that, in absence of government provided credit and social insurance programs, the

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<sup>5</sup> Indeed a standard graduate text (by Richard Tresch) is entitled, "Public Finance: A Normative Theory.

actions of even privately efficient farmers are socially inefficient. Hazell et al. (1986) sum up the conventional wisdom:

Yield and price risks induce farmers to allocate their resources conservatively. Farmers pursue more diversified cropping patterns than is socially optimal, and they are sometimes reluctant to adopt improved technologies because of the increased risks associated with their use.

Similarly Binswanger and Rosenzweig (1993) conclude that weather risk is a significant cause of inefficiency. This view has continued to the present time (e.g. World Bank 2008, Chetty and Looney 2006, Karlan et al. 2014).

The conventional wisdom has been questioned at several levels, however. The hypothesis that *risk aversion implies underinvestment* (RAUI) is based on the proposition that farmers have markedly concave utility functions of current period income, especially in the neighborhood of subsistence levels-of-living (e.g. Chetty and Looney 2006), and that modern techniques display greater variance than traditional ones. As reviewed in Roumasset (1978b, 1979a), however, logical problems with the RAUI hypothesis abound, including:

1. Rationality does not imply the existence of utility functions defined in current income (Spence and Zeckhauser, 1971).
2. Even if utility functions in current income exist, it is unlikely that they should be uniformly concave in the presence of transaction costs.
3. Aversion to risk should be based on a definition of risk, not on the second derivative of a contrived utility function, as in the rather backwards definition that risk is what risk averters will pay to avoid (e.g. Rothschild and Stiglitz 1970).
4. Closeness to "subsistence" (which is empirically elusive) may imply desperation rather than conservatism (see also Banerjee 2000).

One way of dealing with these issues is to directly model behavior as aversion to the chance of loss, where the loss threshold depends on the farm-household's asset liability position and then estimating the frequency distribution of farm-operator profits for different techniques. This provides the information to test the RAUI hypothesis vs. the null hypothesis that farmers maximize expected profits without additional regard to risk. When this comparison was done, the expected profit model outperformed the RAUI hypothesis (Roumasset 1976). This model also illustrates Mookherjee's four stages. Stage I is the discovery of the stylized fact that most farmers did not follow fertilizer recommendations. Stage II is the development of a suitable behavioral theory to test RAUI (appropriate behavioral model and methodology for measuring frequency distributions). Stage III was the test (hypothesis rejected), and Stage IV (policy implications) concluded that the *prima facie* case for crop insurance and fertilizer subsidies was likewise rejected and that more attention was needed on the diversity of agroclimatic, economic, and institutional settings of various farm households. Despite the lack of well-founded arguments to the contrary, however, the RAUI case for subsidies continues to be made (WDR 2008).<sup>6</sup>

The "Rice and Risk" procedure just described also illustrates what might be called "strong structuralism." Instead of using first order conditions to derive an appropriate statistical model and

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<sup>6</sup> Notably, Duflo, Kremer, and Robinson (2008) reject risk aversion as an explanation for underuse of fertilizer among Kenyan farmers however.

letting the data determine coefficients, strong structuralism requires the model to directly provide a numerical estimate of farmer choice, say the predicted amount of nitrogenous fertilizer per hectare. All that is left for regression analysis is to compare the goodness of fit of the alternative and null hypotheses. In order to capture the economic diversity of farmer-households, the structuralist approach can also be extended to capture individualized shadow prices as in Roumasset 1981, Roumasset and Smith 1981, Stiglitz 1984, and de Janvry et al. 1991. If the household is a net seller of grain, for example, the household shadow price is the market price minus the transportation and seller's transaction costs. Similar computations can be made according to whether the household hires out or hires labor, borrows or lends etc.<sup>7</sup> Incorporating idiosyncratic shadow prices into a strong structural explanation, we found that the expected profit model explains 91% of the variation in levels of mechanization among a sample of Nepalese farmers, even without allowing for an intercept different than zero or a slope coefficient different than one (Roumasset and Thapa 1984).

Even in cases where risk aversion does apparently impact decision making, one cannot conclude that market intervention, e.g. through mandates and subsidies is warranted. Firstly, much of what appears to be risk aversion (farmers hate to lose more than they love to gain) is the result of transaction costs, especially in credit and output markets. Since transaction-cost-induced risk aversion is idiosyncratic, efficiency cannot necessarily be enhanced by even costless risk-sharing mechanisms. Indeed government policies such as subsidized insurance that cause farmers to ignore transaction costs are likely to decrease not increase efficiency (Roumasset 1979a, 2010).

Secondly, the mere absence of markets (e.g. for products such as multi-peril crop insurance) does not imply inefficiency (Arrow 1969), notwithstanding the common characterization of missing and imperfect markets as “market failure” (e.g. World Bank 2008; de Janvry et al. 1991). If the private sector fails to offer some insurance products to some customers, it is largely because the residual moral hazard and adverse selection in the face of available private governance outweighs the corresponding benefits (see Wright’s chapter 23, this volume). Intervention requires a specific rationale for why government has a comparative advantage in promulgating alternative institutions. Fundamental models are needed that derive behavioral implications from dynamic optimization in the presence of inevitable transaction costs. Only then can the consequences of policies to relax credit and risk “constraints” (as termed by Karlan et al. 2014) be properly weighed against the costs.

## 2.2 Modern trends in empirical analysis

Recent trends in the fads and fancies of farm-household behavior have tended away from fundamental explanations. In particular, the search for data that allow for natural experiments or quasi-experimental methods via “clever instrumental variables” (Bardhan 2005) leads many analysts away from fundamental questions of dynamic decision making. While instruments may be external, they are typically not exogenous in the sense required by consistent statistical estimation (orthogonality).<sup>8</sup> Consider Deaton’s example of the effect of railroad construction on poverty

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<sup>7</sup> See Evenson and Roumasset 1986 for an empirical application of the transaction cost model to the explanation of rural fertility decline.

<sup>8</sup> See also Wolpin 2013.

reduction. Poverty and railroad construction clearly do not affect the presence of earthquakes (the instrument), and hence the instrument is external to the model. However, the propensity of earthquakes may well have an effect on poverty, in which case earthquakes would not be orthogonal to poverty (in the sense that earthquakes may affect poverty through channels other than railroad construction/destruction). Even randomized-control trials (RCTs) do not entirely escape selection problems and often suffer from problems of external validity.<sup>9</sup> It is easy to think that selection in RCTs involves only randomly dividing the sample into a treatment and control group, but in fact there are actually two stages of selection. In the first stage, researchers start with the whole population and choose a group in this population, for example one village out of all villages. The selected village is often done in consideration of other factors such as convenience or politics, which changes the representativeness of the village. While RCTs are lauded for their internal validity, i.e. the ability to tease out causality, the causal connection in one situation may not be appropriate in another situation such that replication may not necessarily lead to the same results. In the economics profession at least, Rodrik (2008) points out the lack of incentives for researchers to undertake these validation exercises. With all these attendant problems in mind, Deaton (2010) prescribes using RCT methods to better understand the causes ("mechanisms") of economic development in order to better guide policy prescription.

As if in answer to Deaton, Duflo, Kremer, and Robinson (DKR 2011) use RCTs to explore the causes of Kenyan farmers' failure to use fertilizer in economically optimal doses. DKR posit a model of stochastic impatience: Boundedly rational farmers "naively" put off the inconvenience of buying fertilizer after harvest, when they are patient. Then, if they turn out to be impatient in the last period that fertilizer investment is still profitable, they will fail to invest. The model predicts, and a RCT confirms, that many farmers will buy fertilizer vouchers at the end of the previous harvest, given a small subsidy to offset the convenience costs of buying fertilizer. The vouchers are said to serve as an effective commitment device for farmers who know that they may be impatient in the relevant period but underestimate the extent of their impatience.<sup>10</sup> This is an important example of Banerjee and Duflo's (2011) mission to establish the importance of *nudge economics* (from Thaler and Sunstein 2008) in development policy.

But DKR do not consider more fundamental explanations of why small Kenyan maize farmers are normally reluctant to use fertilizer but why many respond positively to free-delivery vouchers. DKR's estimate that applying half a teaspoon of nitrogenous fertilizer per corn plant yields a return of 15-27.2% may be somewhat optimistic. Farmers may have believed that the experimental years were better than average or (implicitly) that using a point estimate overestimates the optimal rate of fertilization -- not because of risk aversion (which the authors rejected in DKR 2008) but because of fundamental non-linearities in gains and losses due for example to transaction costs.

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<sup>9</sup> For a full discussion of these problems, see especially Deaton (2010), Ravallion (2011) and Rosenzweig (2012).

<sup>10</sup> Almost all subject farmers said that they planned to use fertilizer in future seasons, but few followed through. DKR conclude that this implies minimal learning by farmers about their own departures from full rationality.

Full rationality is an abstraction that, as Friedman (1953) explained, is meant to be useful but false. Once we enter the world of bounded rationality there are too many possible departures to test. Given that the absolute gains of the voucher program were small (in the neighborhood of \$10 as noted by Rosenzweig, 2012) small departures from full rationality could be decisive. Among these is the placebo effect (entertainment value, social benefit, or "warm glow") associated with going along with what the celebrity experimenters offered. These psychic phenomena provide an alternative explanation of why most farmers who purchased the vouchers did not use fertilizer in subsequent seasons. But the policy implications of alternative formulations of bounded rationality are different. Procrastination may imply the kind of small subsidies that DKR recommend. But if the novelty of the experiment was the inducement, one cannot expect that this would carry over to a government voucher program. (And even if it did, the administrative costs of the small-subsidy programs may be larger than the welfare benefits to farmers.) In other words, the policy implications of one particular formulation of bounded rationality are not robust with respect to other possible formulations. Moreover, bounded rationality explanations are subject to *Lucas critique* -- a change in policy may change the behavioral mechanism.<sup>11</sup>

A more promising approach is to develop the dynamic foundations of full rationality. Taking a one-period utility function as a characterization of farmer risk preferences is clearly ad hoc. One-period risk preferences, if they exist at all, may have more to do with transaction costs than they do with lifetime risk aversion. Indeed the one condition under which indirect utility functions can be derived as a function of current income is that the lifetime utility function is separable in utilities of different years.<sup>12</sup> But if the lifetime utility function is separable, then one cannot distinguish between the elasticity of substitution between consumption in different years and the degree of relative risk aversion (Epstein and Zin 1989). So one loses no generality by assuming that contemporaneous risk aversion is created by the degree of intertemporal substitution and transaction costs. Under plausible assumptions then, risk aversion is not a distinct characteristic of preferences but derivable from more fundamental preferences.

Nonetheless the view of risk aversion as a *primitive* persists in modern development economics as does the presumption that risk aversion constrains development. Theory and evidence that insurance programs for low income households have high costs relative to benefits (e.g. Cole et al. 2013) have simply resulted in calls for modifying insurance products to lower costs, including bundling them with microfinance (e.g. ILO 2013). Ironically, empirical findings that bundling actually detracts from insurance demand (Banerjee et al. 2014) and thereby decreases the present value of such programs have apparently not swayed the modern school from its priors. Instead, the *nudge school* of development economics (Banerjee and Duflo 2011) rationalizes lack of insurance demand as a departure from full rationality, even in the face of their own finding that households' unwillingness to accept health insurance was "correct *ex post*" because of implementation failures (Banerjee et. al. 2014). Instead of calling for an inquiry into the fundamental causes of risk aversion

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<sup>11</sup> One resolution of this dilemma is to provide a full optimality theory with behavioral foundations such as lexicographic safety first (Roumasset 1976, ch. 2).

<sup>12</sup> Roumasset, 1979a.

and whether that undermines the case for subsidized insurance, the authors seem to feel that natural experiments and RCTs are an end in themselves.

### 3. Organizational Foundations for Development Policy Analysis: The New Institutional Economics

#### 3.1 Examples of non-fundamental explanations

Traditional development economics abounds with theories of market failure and the need for government intervention. Possibly the most pervasive of these is the theory of dualism between the agricultural sector and the “modern” sector. The theory was spawned by the (*stage 1*) stylized fact that the relative size of the industrial to the agricultural labor force is correlated with per capita income. The (*stage 2*) theory of dualistic economic growth that Fei and Ranis (1964) developed to explain the correlation presumed that wages in the industrial sector were set exogenously by institutional factors and that the marginal product of labor in agriculture was zero. This exemplifies the problem of misplaced exogeneity: The very thing that matters for policy is assumed, not derived. The FR model was discredited by Jorgenson (1969), who not only provided a fundamental model to explain the stylized fact in question but showed that his model provided a superior explanation of the empirics regarding the changing labor-force composition between the agricultural and industrial sectors. In spite of this, the theory of dualistic development remains popular to the present day, possibly because of its ideological appeal.

A variant of the dualism model has been used to explain the stylized fact that there is an inverse relationship between farm size and productivity (IRSP). Again, the wage in the modern (commercial) agricultural sector was said to be exogenously set by “institutional” factors and the wage in the agricultural sector was assumed to be substantially lower, implying a lower marginal product and a higher intensity of cultivation (Sen 1962, 1966; Mazumdar 1965; Berry and Cline 1979). This *small-is-beautiful* theory has often been used to advocate land-to-the-tiller reforms (World Bank 2008, Lipton 2009). Again we have misplaced exogeneity. The policy implications are in effect assumed, not derived.

Recent empirical tests of IRSP have several flaws. For example, World Bank (2009) concludes that such a relationship exists for Philippine rice and corn farms, following similar methodology from Feder (1985), Binswanger et al. (1995) and Benjamin (1995).<sup>13</sup> These studies regress farm profits on farm size in the presence of several “controls,” e.g. for land quality and tenure status. The problem is that farm size is endogenous (Roumasset and James 1979). The correct conceptual definition of land quality is potential rent per hectare. So if farm size were exogenous, one had an exact measure of land quality, and if farmers maximized profits,  $P$ , the relationship between  $P$  and land quality is an identity. And when one attempts to estimate an identity, the estimated coefficients are simply a reflection of measurement error.

The same dualism is said to underpin the advantage of a *unimodal* development strategy (Johnston and Kilby 1975, World Bank 2008). Land distribution and farm size in many Latin American countries has been described as “bimodal”, i.e. the mode of the farm size distribution is small but the mode of

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<sup>13</sup> See Ali and Deininger (2014) for a more recent example.

the land distribution is large.<sup>14</sup> Concentrated landownership, the argument goes, leads to agricultural development being focused on capital intensive technology which is anti-poor. In unimodal economies, however, technical change is more likely to be capital saving and labor using, i.e. pro-poor. Again the idea is that large landowners face different factor prices than small farmers. The key is explaining why this is the case. If it is transaction costs, pursuing an agricultural strategy that ignored those costs is unlikely to be efficient. And if transaction costs can be reduced, e.g. through land reform, then the benefits of reducing those costs should be compared with the costs of the reform program. Moreover, the reform program may inadvertently increase other transaction costs, especially in credit, marketing, and downstream coordination.

Another example of a non-fundamental explanation is provided by Stiglitz's (1974, 1993) model of share tenancy.<sup>15</sup> This time the stylized fact to be explained is the mere existence of share contracts. Stiglitz's canonical explanation holds that share tenancy is privately efficient but socially inefficient since, by transferring the land to the tenants, the government could remove the perverse labor incentives that share tenancy confers. As discussed in more detail below, this model mischaracterizes farmers as workers and share tenancy as a labor contract instead of as a partnership. Before turning to the task of providing a fundamental theory of the agricultural firm, and how share tenancy fits in, we need to consider the nature of a fundamental explanation of institutional change due to Ronald Coase, including his colleagues and descendents.

### 3.2 From the Coase Theorem to Fundamental Explanations of Agrarian Contracts

The "UCLA equivalence version" of the Coase theorem is that absent contracting costs, competitive contracting is equivalent to universal, competitive markets which are equivalent in turn to markets with Pigouvian corrections (Roumasset 1979). The upshot of this equivalence is that institutional evaluation must rest on a comparison of transaction costs. In Demsetz's (1967) famous example, European contact with North America raised the implicit price of beaver pelts to the point where the benefits of private property rights became greater than the transaction costs of enforcement. In the case of bison hides however, the price increase was insufficient to induce institutional change because the potential enforcement costs of private property would have been too high in the case of roaming herds.

The Demsetz proposition is that: "Property rights develop to internalize externalities when the gains of that internalization become larger than the costs of internalization" (Demsetz 1967, p. 350). This was further clarified by Anderson and Hill (1975, 1990) who argued that the advent of barbed wire in the American West sufficiently lowered the cost of property enforcement to render the costs of private property less than the benefits.<sup>16</sup> The thesis can also be seen as underlying "the idea that the common law evolves toward efficient rules" (Merrill 2002) and the *New Economic History*,

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<sup>14</sup> This is not optimal semantics inasmuch as each of the two separate distributions is thought to have a unimodal distribution.

<sup>15</sup> See Hayami and Otsuka (1993) for an intuitive exposition of the Stiglitz model.

<sup>16</sup> As discussed by Hornbeck (2010) the property law was already in place. Barbed-wire provided feasible enforceability that completed "the bundle of property rights."

wherein the English Enclosures were said to evolve in response to the benefits vs. the costs of private property (North and Thomas 1973).

The efficiency view has been used successfully in explaining share tenancy “as an understandable market response” (Reid 1973, 1976). With the advent of agency theory (Jensen and Meckling, 1976), the efficiency view was further developed to explain pervasive patterns of agricultural contracts in the Philippines using the methodology of *The New Institutional Economics of Agricultural Organization* (Roumasset 1978). The version of the NIE that we used in the Philippines was inspired by Coase and Demsetz but was more explicit in developing first and second-best theories.

The first-best theory stems from the Cheung-Coase proposition that absent transaction costs a contracting equilibrium provides a perfect substitute for a universal market solution (including a market for spillover effects) and a Pigouvian corrective mechanism. The competitive contracting equilibrium of a share tenancy economy is equivalent to the solution obtained by landlords hiring workers from a competitive labor market and to lessees renting from a competitive land market. The competitive contracting equilibrium in an apple-honey economy is likewise equivalent to the competitive market solution, including a market for pollination services and to a solution with Pigouvian pollination subsidies. The Cheung-Coase proposition can be proved by showing that the core of a bilateral contracting economy (whether landlords and tenants or interdependent apple and honey producers) shrinks to a competitive equilibrium (Roumasset 1979, Johansson and Roumasset 2002).

The first-best theory can be used to explain statistical patterns regarding the terms of agricultural contracts. For example, higher quality land is organized in smaller family farms with higher landlord shares than medium quality land (Roumasset and James, 1979). Landlord shares also vary according to crop, high for capital intensive crops such as coconut and low for labor intensive crops such as abaca (Roumasset, 1986). By endogenizing the terms of contracts, the first-best theory reveals that the inverse relationship between farm size and yield per hectare and the mere existence of share tenancy do not constitute *prima facie* evidence of inefficiency.

As Dixit (1998) explains, second-best theories examine the efficiency of economic organization in the face of transaction costs. In the Philippine version of the NIE, we use positive agency theory (Jensen 1983) to explain for example why piece rate contracts are favored over wages when the intermediate output of a specific task is readily observable (Roumasset and Uy 1980). Agency theory is also used to explain the relative advantages of share tenancy to owner managed and fixed lease arrangements due to difficulties of mitigating the labor shirking of wage workers and “land-shirking” of renters (Roumasset and Uy 1987, Roumasset 1995).

These Stage 2 theories were followed by explicit comparisons of the efficiency model with the Stiglitz inefficiency model. Using data on agricultural contracts in the U.S., Allen and Lueck (2003) reject the Stiglitz risk-aversion model in favor of an efficiency model with double moral hazard

regarding both land and labor shirking. (The Coasean influence in both Allen and Lueck's "The Nature of the Farm" and my "The Nature of the Agricultural Firm," 1995, is unmistakable.) Deweaver and Roumasset (2002) reject Stiglitz's canonical model on both conceptual and empirical grounds. For parameters obtained from Philippine data, the Stiglitz model predicts that tenant shares should decrease from 100% to 80% and then increase back to 100% (fixed lease) as the tenant's risk aversion increases, contradicting Stiglitz's central theoretical finding that optimal tenant shares are declining in risk aversion. Moreover, since actual tenant shares are predominantly clustered around one-half and two-thirds, there must be one or more disadvantages of fixed lease contracts that the canonical model neglects

Stiglitz implicitly assumes that the more tenants work, the more is at risk. But much of labor is precautionary, e.g. pest control. By incentivizing labor, rent contracts also incentivize precaution. Moreover, hard work under rent contracts reduces the chance of loss, simply by moving the distribution of profits to the right. Accordingly, rent contracts afford two advantages – mitigation of labor-shirking and partial mitigation of risk. If share and fixed lease contracts were really alternatives to wage labor as Stiglitz assumes, then they would be almost non-existent. In contrast, the theory of the agricultural firm -- wherein rent contracts have the additional disadvantage of land shirking and share tenancy incentivizes tenant management as well as labor -- is consistent with evidence from the Philippines, Nepal, and the U.S. (Roumasset 1995, Allen and Lueck 2003).

### 3.3 Assumptions, levels of analysis, and categorical vs. non-categorical theories

The Philippine version of the New Institutional Economics proffers three levels of analysis. As just discussed, both of the first two levels use efficiency models – first-best efficiency in the absence of transaction costs and second-best efficiency in the presence of transaction costs, particularly agency costs. The third level of analysis admits inefficiency via rent-seeking. Dixit (1998) identifies third-best with "endogenous coalition formation." In *positive* third-best analysis, the goal is to explain the *causes* of public policy. For example, Balisacan and Roumasset (1987) explain the pervasive statistical correlation between agricultural protection and per capita income by modeling investment in political influence as a public good within each coalition. Coalitions endogenously form for investing for and against agricultural protection according to the group benefits vs. the coalition costs (affected by the number of potential beneficiaries, individual stakes, group homogeneity, and other public choice variables). These considerations determine reaction functions, and agricultural protection is determined as a Nash equilibrium (see also Gardner 1988, ch 12). In *normative* third-best economics, the understanding of the causes of rent-seeking is focused in turn on issues of constitutional design (section 3.6 below).

Levels of analysis are then chosen according to the problem at hand. For each level of analysis there is a non-categorical theory (theoretical framework). In the literature discussed above, the first-best theory is used to explain the terms of agricultural contracts. The second-best theory (minimum agency cost) is used to explain the forms of contracts and firms. The third-best theory is used to

explain the *causes* of economic policies. Non-categorical theories are irrefutable. In application, restrictive assumptions convert the non-categorical theories into categorical theories. For example, the results that landlord shares are increasing in land quality and rent/wage factor prices require the restrictive assumptions of Ricardian land quality and land/labor elasticity of substitution being less than one (Roumasset and James, 1979). When categorical theories are rejected, the implication is that the theory does not fit the situation described by the data. The theory may still apply in a different situation.<sup>17</sup>

As a further example, consider the theory of induced technical change. Hayami and Ruttan (1985) assert that agricultural innovations in the U.S. were predominantly labor-saving in face of the high and rising relative price of labor to land but predominantly land-saving in Japan when the opposite was true. By providing examples of labor-saving innovations that occurred when agricultural land prices were rising faster than wages, Olmstead and Rhode (O-R, 1993) claimed to have refuted Hayami and Ruttan's theory of induced technical change. But since the theory of induced institutional change is an irrefutable, non-categorical theory, what they have implicitly done is to refute a categorical theory. The problem is that neither H-R or O-R have formally provided conditions under which changing factor prices will induce factor-biased technical change and when they won't.

Here is a sketch of a categorical theory that fills the Hayami-Ruttan requirements. Let agricultural output be a nested production function of augmented land and labor, where capital can be used to augment land, labor, or both. Assume that existing knowledge of production technology is represented by a "meta-isoquant" in the augmented land and labor plane that displays a unitary elasticity of substitution between augmented labor and capital. Now consider a potential meta-isoquant obtained by shifting all points of the original one a fixed distance towards the origin, where the distance corresponds to a fixed level of R&D expenditures. However, each point on the new isoquant corresponds to a particular composition of R&D expenditures, i.e. only one point on the new isoquant can be attained by directing research expenditures in a particular factor-saving manner. We can now show that R&D will be optimally deployed along the ray to the origin determined by the new relative prices of land and labor. The non-categorical theory here is the framework of optimal R&D expenditures.<sup>18</sup> All the other assumptions, about elasticity and uniformity of innovation ease, render the theory a categorical one. Those restrictive assumptions may be false; in particular it may be less costly to invent a labor saving technique than a land-saving one and the predictions of the theory may be found not to accord with the predictions, which explains the O-R rejection of the non-categorical theory, but only for a particular domain. The non-categorical theory remains intact. Indeed Acemoglu's (2002) theory of directed technical change can be seen as a much less restrictive, but still categorical, application of induced technical change that possibly could survive the O-R critique.

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<sup>17</sup> For a further discussion of categorical and non-categorical theories in economics, see Walsh (1987).

<sup>18</sup> For a version of this theory with exogenous R&D, as well as a categorical application, see de Janvry et al. 1989.

While categorical theories rest on restrictive assumptions that are meant to be true for a particular domain, non-categorical theories rest on abstracting assumptions that are meant to be useful but false. When we abstract from transaction costs for example, it is not because they don't exist but because of our (subjective) belief that we can explain phenomena such as contractual terms without them and that the potential improvement from a more complicated explanation is not worth the cost. Thus the agenda following the Omstead and Rhode findings (see also O-R, 2008 on biological innovations) is to go back to the drawing board and combine induced innovation theory with different restrictive assumptions, such as those of Acemoglu's theory of directed technical change, that have some grounding in reality and which provide explanations of the elusive phenomena at hand.

The distinction between categorical and non-categorical theories also helps make sense out of Coase's (1994) perspective on economics as rhetoric and his proposition that methodologies are at least partly chosen on the grounds of what is likely to convince other economists. Indeed the wise economist practices both the art of deciding what to abstract from, by subjectively choosing a non-categorical theory according to the problem at hand, as well as the science of deriving, testing, and parameterizing categorical theories.

#### 3.4 Toward a Unified Version of the New Institutional Economics

Williamson's New Institutional Economics (e.g. 1985) is founded on the pillars of bounded rationality and opportunism. Because of bounded rationality, contracts are assumed to be incomplete in the face of uncertainty. And because of opportunism and the knowledge that agents may behave strategically, parties to an agreement will seek mechanisms of governance (Williamson, 1998). However, Baumol (1986) and Samuelson (1983) have criticized the Williamsonian NIE as being non-operational, by which they meant that hypotheses were only suggested, not derived.

In contrast, the efficiency version of NIE (at the first and second-best levels) has provided theoretically sound explanations of the terms and forms of agricultural contracts and firms without the contrivances of bounded rationality and opportunism. In agriculture, terms tend to be set according to the competitive shadow prices of factors, and organizational forms are determined in accordance with their comparative abilities to minimize agency costs.

The efficiency version has also been usefully employed to advance comparative institutional analysis of resource management. This literature has been unfortunately concentrated on the study of "common property resources," but this label obscures the fundamental research agenda of comparing resource management by private property, common property, no property, government control or some combination of these. The four resources of central attention by the International Association for the Study of Common Property, the group that launched Elinor Ostrom to fame, were all renewables – forests, fish, water, and land – yet until fairly recently resource economics was rarely part of the discussion. Ostrom (1990) set the stage for institutional analysis of resource management by showing that private property and governmental control were not the "only ways"

to manage resources and that common property (not to be confused with open access) was often a highly effective institution. She then identified supply-side factors, such as group homogeneity, that helped explain the success of common property institutions.

Copeland and Taylor (2009) and Roumasset and Tarui (2010) explicitly combined the efficiency version of institutional analysis with renewable resource economics to obtain theories of which resources will be better served by which institutions and how institutions will optimally change in response to increasing resource scarcity. While the efficiency theories explicitly included governance costs, the primary emphasis was on demand-side factors such as changes in resource price.

But why should we have separate NIEs, one for agriculture and natural resources and another for industrial organization? I believe that the starting point for a reconciliation is being explicit about different levels of analysis. While agricultural production in small-farm Asian economies is competitive, the same cannot be said for industry. Thus the first best level can be appropriately extended to allow for market power. At the second-best level, the Williamson and efficiency versions of the NIE are closer than appearances indicate. Williamson (1985) notes that the economic function of institutions is to “economize on transaction costs.” Inasmuch as “economize” and “transaction costs” are somewhat vague, the efficiency version stipulates that economic institutions evolve to minimize contracting and agency costs, much as firm behavior evolves to approximate profit maximization (Alchian, 1950).<sup>19</sup> This proposition is in line with Coase's (1937) theory of when the producer of an intermediate product, such as Fisher Body, should be left as an independent contractor or be integrated into the firm as a division (of General Motors). Coase's idea was that the profit-maximizing firm would choose to integrate if and when the costs of internal organization (what we now call "agency costs") became less than the costs of dealing with the independent contractor (which we might call "contracting costs"). In other words, the profit-maximizing firm chooses the organizational architecture that minimizes the sum of agency and contracting costs.<sup>20</sup>

The Coasean theory of the firm can serve as a starting point for a synthesized version of the NIE. Instead of starting with behavioral departures from full rationality and strategic interaction of

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<sup>19</sup> Oliver Williamson and I were on the same panel at the January 1975 meetings of the Public Choice Society. He presented a version of what became chapter 1 of Williamson (1975), wherein he coined the term, *The New Institutional Economics*. I presented “Induced Institutional Change, Welfare Economics, and the Science of Public Policy,” originally written for Vernon Ruttan's 1974 conference on Induced Institutional Change. In my 1974 paper, I stated that institutions evolve to “economize on transaction costs.” At the time, I was aware of the ambiguity of this expression, but (as Jensen and Meckling had not yet invented positive agency theory) I was content to leave clarification to future research. When Williamson later used the same expression (e.g. Williamson, 1985), it is not clear whether he understood that the ambiguity was a barrier to formalization. In Roumasset (1995), I show that minimizing agency costs, in the Jensen-Meckling sense, is equivalent to maximizing profits, inclusive of monitoring and bonding costs.

<sup>20</sup> This idea has been extended and formalized by Oliver Hart and co-authors (e.g. Grossman and Hart 1986, and Hart and Moore 1990).

agents due to opportunism, we posit that efficient organization forms are those that minimize the sum of contracting and agency costs. As discussed above, this second-best theory goes a long way in explaining statistical patterns about agricultural organization in competitive settings. Departures from the efficiency benchmark may then be explained by either departures from full rationality due to information and decision costs or forces that block cooperation such as opportunism. These require, in turn, mechanisms of governance. At the second-best level of analysis, we take the relationship between expenditures on governance (monitoring, bonding, etc.) and shirking (departures from first-best performance) as given. The constitutional-design aspect of determining those relationships takes place at the third-best level.

### 3.5 More on big vs. small farms

On the other side of the spectrum from the small-is-beautiful perspective reviewed in section 3.1 above, we have the proponents of large-farm commercial agriculture. The latter contend that large farms have advantages in management, technology, specialization, mechanization, marketing and credit (e.g. Collier 2012). For purposes of their empirical investigation, Ali and Deininger (2014) have summarized this debate by saying that *either* small farms are efficient and that policy should focus on value chains *or* that they are inefficient and policy should focus on consolidation.

But why should it be either/or? Ay, there's the rub. If farm size were exogenous, it might make sense to investigate whether small or large farms were more efficient. But as reviewed in section 3.1, farm size is decidedly *endogenous*. The size of family farms depends largely on the size of the family and land quality (Roumasset and James 1979) as well as shadow prices of credit as a determinant of the degree of mechanization (Roumasset and Thapa 1984). The determinants of commercial farm size may also depend on land quality and shadow prices but in a very different way. For example, Uy (1979) finds an inverse relation between land quality and farm size for family farms but a direct relationship for commercial farms!

Indeed, in an efficient contracting environment, but with diverse land and water resources and idiosyncratic shadow prices, there is no conceptual reason to expect the evolution of contracts to favor *either* small or large farms. Rather we should expect that diverse conditions would lead to diverse farm sizes, the coexistence of which provides no evidence of inefficiency whatsoever.

And if diversity is the natural order of things, agricultural policies should be formulated to increase productivity on large as well as small farms. Given the huge amount of fallow land in Africa, Uy (chapter 10, this volume) reviews the potential for private investment in large farm agriculture. Inasmuch as many early attempts were beset by land grabs, speculation instead of investment, and displacement of smallholders, she lays out a strategy for avoiding those mistakes: Temporally space sales in phases, prequalify investors, agree on business plans and monitoring procedures, and involve the local community in both the planning and the enterprises themselves. For example, Ghana has had notable success in nuclear farming, an arrangement whereby a commercial enterprise leases and manages a large tract of land, and provides planting materials and marketing

for surrounding small-holders. This allows the large commercial enterprise to pursue their comparative advantage in enterprise design, finance, and marketing, and the smallholders to specialize in labor intensive aspects of cultivation and in helping to provide security against outside interference. Senegal and Mozambique provide additional examples of creative engagement of local communities in contract design.

### 3.6 The Economics of the Third-Best: A Constitutional Approach to Governing Rent-Seeking

As in the perspective of Vincent and Elinor Ostrom, the constitution is not necessarily a written document but the set of rules establishing membership, rights and responsibilities, decision-making procedures, and penalties/rewards for compliance and performance. The constitutional perspective is suggestive of an expanded view of the third-best level of analysis. From a positive perspective, third-best models seek to explain how individuals seek to appropriate extra-efficiency rents and the mechanisms that arise to combat this rent-seeking. For the case discussed above about coalitions for and against agricultural protection, one can imagine constitutional limits on levels of protection that would decrease rent-seeking. As it happens, these limits are effected largely at the international level, through institutions such as the WTO. The rent-seeking perspective also applies to contracting parties and individuals within firms as the firm entrepreneur seeks a constitutional architecture that provides the largest value added. The nature of the firm literature (e.g. Coase 1937, Grossman and Hart 1986, Hart and Moore 1990, Roumasset 1995) can be usefully viewed from this perspective.

The efficiency gains that can be garnered by institutions such private property can be considered as demand-side factors and analyzed at the second-best level. But institutional change does not happen spontaneously; there are political costs to be paid. North and Thomas (1973) and Davis and North (1970) implicitly recognized these in their reference to a "political action group" (Dixit's "endogenous coalition") that must supply the effort and resources to change an institution, e.g. to lobby the English Parliament to pass an act of enclosure on a specific tract of land. There is likely to be some opposition, and passage can be viewed as the outcome of a non-cooperative game (*ala* Becker 1983). In Demsetz's beaver example, demand-side factors include the high price of beaver pelts induced by European contact as well as the enforcement costs. But acceptance of what Demsetz calls private property was presumably facilitated by the implicit tribal constitution that provided a mechanism for changing the rules. Similarly, private property in the American West that Anderson and Hill associate with the advent of cheap fencing (barbed wire) was facilitated by the supply-side fact that legal property rights were already in place and that only enforcement was needed to complete "the bundle of property rights" (Hornbeck 2010). This helps to reconcile the Demsetz view that institutional change will evolve when the benefits exceed the costs of enforcement with the view of "the new economic history" (North and Thomas 1973) that change will happen when the net benefits exceed the political costs of change.

The third-best perspective also provides a promising approach to explaining the resource curse. Discovery of exportables, e.g. minerals, tourism, plantation agriculture and other sources of foreign exchange, confer two potentially negative effects on growth. First, the booming sector draws resources away from other sectors, which may have greater growth externalities. Secondly, the potential boom stimulates the formation of a coalition to promote a particular exportable. In Hawaii, this took the form of a primary action group, led by prospective pineapple and sugar planters, to first lobby for private property and then for annexation as a U.S. territory. The export boom in turn stimulates import competition, and the dominant coalition joins with domestic commercial interests to seek import protection (Ravago and Roumasset, this volume). The “resource curse” is that the loss of growth externalities and rent-seeking shrink the economy relative to its potential. To the extent that rent-seeking coalitions persist, it is possible that lower growth rates persist into the future. What is needed is to develop a dynamic theory of the resource curse and appropriately confront it with data, ideally regarding the size of excess burden over time. Timing of the resource boom is also critical. European discoverers of Latin America found mineral abundance and designed extractive political institutions (Acemoglu and Robinson 2012). These were not possible in North America, and by the time that gold was discovered in California, political institutions were already firmly in place.

At the normative (policy) level, governments should seek constitutional arrangements that limit rent-seeking. That is, given that individuals and groups are seeking to enlarge their share of income, even at the expense of shrinking the economic pie, government can seek arrangements that reduce such efficiency losses. I believe this is what the late Armen Alchian was getting at when he proclaimed that economics is the study of efficiency but that there are different levels of efficiency to be understood.<sup>21</sup> The problem of infrastructure, specifically irrigation projects, is instructive. Irrigation, especially in developing countries, is notoriously inefficient. Project location, design, operation and maintenance are susceptible to the iron triangle (Lowi 1969) of rent-seeking comprised of politicians, bureaucrats, and special interests. Projects end up being too capital intensive with a mismatch between design and operation such that farmers in the tail of the system are underserved. Projects are under-maintained and delivered water declines over time. Irrigation fees are low and under-enforced (Repetto 1986, Roumasset, 1987). The same paradigm can be used to analyze policy failures in general. For example, renewable energy subsidies may be the result of a strong coalition of environmentalists and special interests in the energy sector vs. many ill-informed taxpayer/consumers facing relatively small individual stakes and high coalition costs (Olson 1965).

In their theories of “just taxation,” Wicksell and Lindahl argued that the key to reducing rent-seeking is benefit taxation. This idea can be extended to the fiscal constitution of irrigation design, operation, and finance (Roumasset 1989). The centerpiece of the fiscal architecture is the water-user association, which chooses the irrigation design and operates the irrigation system. Direct beneficiaries (farmers) are charged according to their individual benefits, which are only a

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<sup>21</sup> Remarks by Armen Alchian during a 1977 training program for “promising” young professors.

proportion of total benefits rendering full-cost recovery inappropriate. To the extent that benefit taxation of indirect beneficiaries (consumers, downstream suppliers, and commercial interests that benefit from increased demand) is administratively infeasible, their share of benefits can be financed out of general taxation under the auspices of the ministry of finance or treasury. The national irrigation association provides menus of irrigation design and consulting services of engineers. Federations of water user associations may also be appropriate. The incentives for rent-seeking are greatly reduced. Contractors are not overpaid because the water-user association economizes on costs. The political-patronage benefits to politicians are reduced both by the reduced rents to contractors and the fact that farmers are paying their fair share. And decentralization of design authority limits the power of central bureaucracies. This exemplifies the normative side of third-best analysis.

#### 4. Modern theories of market and institutional failure: shocks, traps, nets and ladders

As represented in the World Development Report 2008, theories abound regarding reasons that markets and institutions in developing countries are inadequate for efficiency and that government intervention is therefore required. Possibly the most far reaching argument is the Greenwald-Stiglitz theorem, according to which government can "almost always" improve on the market allocation (Stiglitz 1991, 1996). This formulation commits a sophisticated version of the *Nirvana Fallacy* (Demsetz 1969) by portraying market equilibrium as a straw man and implicitly assuming that only *the government* can do governance. Private governance structures and multilateral contracting are not allowed.

Chetty and Looney (2005, 2006) have taken this line of argument to a new level. They begin by reviewing arguments by Townsend (1994) and Morduch (1995, 1999) who conclude that, inasmuch as the coefficients of variation of consumption are similar in developed and developing countries, poor households are equally good at smoothing consumption as higher income households. C-L correctly point out that this conclusion does not follow. It is logically possible that poor households are highly risk-averse (have low elasticities of intertemporal substitution) and make extreme sacrifices in order to smooth consumption. The similar coefficients of variation could logically result from higher risk aversion in developing countries combined with higher cost of smoothing or from developing countries having the same levels of risk aversion and smoothing costs as developed countries. Since the latter is unlikely, C-L conclude that this provides a *prima facie* case for government investment in social insurance.

But this is another case of misplaced exogeneity. While C-L's argument establishes that it is *plausible* that there are substantial benefits to social insurance, many steps remain before concluding that particular forms of social insurance are warranted. In particular, the ease of smoothing consumption depends on transaction costs. Without transaction costs, borrowing and lending costs would be equal, credit constraints would be equal to total household wealth, and the only impediment to perfect smoothing would be shocks larger than wealth. Shocks would only

matter according to the amount by which they decrease wealth. Because of moral hazard, the benefits of social insurance in this transaction-costless world would be negative. Meanwhile, the costs of crop and other insurance programs are likely to be high because of counter measures against moral hazard and adverse selection as well as means-testing and other administrative procedures (Roumasset 1978, 1979a). Even in the U.S., the costs of crop insurance can be as much as 3.5 times premia.<sup>22</sup>

To the extent that social insurance programs are likely to have benefits less than costs, a direct assault on transaction costs may be a more suitable approach. Inasmuch as transaction costs are the source of the problem, programs that reduce them (e.g. through physical and legal infrastructure) will facilitate greater private smoothing. Poverty can also be addressed through subsidies of basic needs, e.g. through conditional cash transfers. The conceptual justification of basic-need supports has little to do with shocks and theoretically-sophisticated "poverty traps," but rather is founded on the principle of consumption externalities, i.e. that non-poor taxpayers are made better off by increased food, shelter, health, and education of the poor (Harberger 1978, 1984). We do not have to know whether the benevolence of the taxpayer comes from his altruism or self interest (e.g. less slums to breed crime). Either case is appropriately represented as a consumption externality. Accordingly basic needs consumed by poor households are public goods and can be efficiently provided according to the Lindahl equilibrium, which also satisfies the equity criterion of benefit taxation.<sup>23</sup>

The rural poor are often characterized as trapped in poverty by non-convexities (e.g. Banerjee and Duflo 2011).<sup>24</sup> But these arguments often overlook the availability of institutional ladders for climbing out. For example, James and Roumasset (1984) document non-convexities in the return-to-investment function facing migrants to newly settled areas of the Philippines. The highest rate of return accrued to those with adequate capital to fund the establishment of their own homesteads. But institutions were also available for low-asset migrants. Those without savings could begin as share tenants. After typically five years these migrants had established homesteads. Despite earning a lower rate of return they became middle-class households. An intermediate rate-of-return arrangement called "land borrowing" was available for migrants with an intermediate amount of savings. After typically three years farming and improving borrowed land, these migrants were able to return the use rights to the owner and farm their own homesteads. That is, despite non-convexities, each group had a path to a higher socio-economic position.

The ability of contracts to provide an agricultural ladder has also been documented for alternative tenancy contracts in Philippine rice production (Roumasset and Smith 1981, Hayami and Otsuka 1993). Future farmers may start as agricultural workers, become share tenants, advance to

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<sup>22</sup> Conference presentation by Brian Wright.

<sup>23</sup> See the discussion of "the Lindahl Voucher" in Roumasset (1993).

<sup>24</sup> This is a relatively new expression of an old idea. As Billie Holiday put it, "*Them that's got shall get, them that don't shall lose, so the Bible says, and it still is news.*"

leaseholders or part owners and may eventually become owners. When these institutions are available, there is little reason to believe the non-convexity imperative -- that non convexities automatically create a trap. Ironically, well-intentioned government actions such as outlawing share tenancy and land-to-the-tiller reforms may have the unintended effect of removing institutions from the agricultural ladder, possibly trapping individuals on a low rung of the ladder.

Another possible source of agricultural stagnation is the lack of market outlets for inputs such as fertilizer. This has the appearance of a classic chicken-egg problem. Dealers don't sell fertilizer because of low farmer demand. But farmers must first learn the benefits of fertilizer. This coordination problem has led to the Pigouvian prescription of temporary subsidies to boost demand and/or supply. An alternative prescribed by the facilitation approach is for government to enter into public-private partnerships to supply fertilizer combined with extension efforts to teach the best composition, amount, and timing of fertilizer application for farmers in diverse agro-climatic and economic environments. But the "trap" may also be illusory. Fertilizer is commonly supplied by multi-purpose stores who cater to consumers as well as farmers and any indivisibilities in fertilizer delivery may be small. As reviewed in section 2.2, the claim that low-income farmers irrationally underuse fertilizer remains controversial.

## 5. The anatomy of specialization

While specialization is the engine of growth (Smith 1976, Young 1928, Lucas 2002), it remains largely confined to a black box. Agricultural specialization is a good laboratory because there are so many firms.

Consider the evolution of specialization in the agricultural labor markets of developing countries. In the induced innovation paradigm, the Asian green revolution in rice and wheat was motivated by land scarcity caused by population pressure. The new varieties were developed to warrant greater amounts of labor and especially chemicals per unit of land, which increased yields per hectare. The same population pressure and indivisibilities regarding smaller farm sizes led to a social bifurcation between the landed and landless and the rapid expansion of hired labor (Roumasset and Smith 1981). This initial specialization between management and labor was followed by horizontal specialization among different tasks and to further vertical specialization (e.g. teams of transplanting men headed by a team leader acting as both recruiter and supervisor; Roumasset and Uy 1981). The organization pyramid of the agricultural firm became both wider (increased horizontal specialization) and higher, with workers taking direction from supervisors taking direction from farm operators. The evolution of horizontal specialization over time is illustrated by the "specialization pyramid" (e.g. Roumasset and Lee 2007), where bars increase in width, reflecting

more labor per hectare as we descend the pyramid, and display ever new forms of specialization, going from family to exchange to wage labor and then to piece-rate and piece-rate-with-teams.<sup>25</sup>

The co-evolution of intensification and specialization stands in stark contrast to the neo-Marxian critique, whereby the new rice and wheat technologies spawned increased commercialization and immiserization of the peasantry. This view, embraced by a much publicized Asian Development Report in 1979, seemed to explain the negative correlation between adoption of the new high-yielding varieties and agricultural wages. This conclusion commits the fallacy of *post hoc ergo propter hoc*, a form of misplaced exogeneity. In the more fundamental induced-innovation paradigm (Binswanger and Ruttan 1978), the modern varieties were the endogenous response to increased land scarcity, which they helped to ameliorate. But since agricultural production with new varieties represented only a small part Asian economies, their positive effect on wages was swamped by the negative force of population pressure. Once we understand that the new varieties were induced by land scarcity and relatively falling wages, we can understand their positive effect.

Agricultural specialization has also been prominent in output markets. The *supermarket revolution* (Reardon and Timmer) describes the advent of vertical coordination between farmers and "big box" retailers, largely by means of specialized wholesalers who are dedicated to specific supermarket chains. This vertical coordination allows retailers to cater to specific product niches and to tailor farmer orders accordingly. This exemplifies how the expansion of Adam Smith's extent of the market begets vertical specialization and coordination, which begets more horizontal specialization, which increases the value added from agriculture via Dixit-Stiglitz preferences for variety and improved marketing efficiency (product transformation over space, time, and form).

Perhaps the most revealing inconsistency of the small-farm bias (sections 3.1 and 3.5) is ignoring the implications of the supermarket revolution for efficient farm size. For example, the World Development Report of 2008 uses the alleged transaction cost advantage of small farms (with their lower fractions of hired labor) to advocate policies that would further shrink average farm size. But the supermarket revolution places small farms at a transaction cost disadvantage in marketing (e.g. Lipton 2007, Roumasset 2010), further augmenting the disadvantage they already face in credit markets. Proponents of the small-is-beautiful view seem to overlook this advantage, believing instead that any advantage of small farms is "natural," but any advantage of large farms results from a "policy bias." In effect, the alleged political economy of Latin America (e.g. de Janvry, 1981; IFAD, 2001) has been presumed to be accurate for the world as a whole. This led the authors of WDR 2008 to advocate small farm subsidies, including public support of marketing and credit cooperatives

Again such policy implications are premature absent a fundamental explanation of behavior and organization in developing agriculture. Despite an abundant literature on the supermarket

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<sup>25</sup> In the 1980s, wages increased sufficiently to motivate labor-saving mechanization in Laguna, Philippines such that intensification continued, as evidence by higher yields per hectare, but labor per hectare began to decline.

revolution, the nature of specialization inherent in new agriculture has not, to my knowledge, been adequately explained. In the old marketing system, inevitable differences in products across space, time, and form were dealt with by wholesalers and others in the marketing chain, who sorted and processed products after production. A farmer would not know the destination of his product in advance and could not tailor it to the particular tastes of that niche market. In the new agriculture, the varieties, quality, and timing of farm products can be pre-arranged through a contracting process with particular farmers. In this way, vertical coordination begets horizontal specialization and produces external economies of the sort lauded by Lucas (2009).

Even leaving aside the transaction cost advantages of large farms regarding credit, marketing, and self-insurance, the alleged transaction cost disadvantages of hiring labor are countered by their advantages in facilitating specialization. As shown by the labor market pyramid (Roumasset and Lee 2007), more farm labor facilitates horizontal specialization by task within the farm and vertical specialization whereby worker teams or firms (especially for land preparation, planting, weeding, and harvesting) provide intermediate inputs. Because of these internal and external economies of specialization through which hired labor can increase productivity, it may well be that promoting small farm agriculture through regulations, confiscations, and subsidies will exacerbate pre-existing distortions that have rendered many farms smaller than efficiency would dictate.

A related omission is the extent to which misguided land reform policies have impeded the natural evolution of economic organization, for example economies of vertical integration and horizontal specialization of food markets. Surely some policies result from rent-seeking large farmers, but the potential inefficiencies of large-farm dissolution and the unseen prevention of consolidation are not typically considered.

The transaction cost wedge allegedly facing large farms is the centerpiece of both the case for land reform (“small farm entry”) and small-farm “competitiveness” subsidies for fertilizer, credit, insurance, and producer cooperatives. The support for these market interventions rests on the claim that existing equilibria are dualistic. Dualism, a resilient cockroach<sup>26</sup> from the 1960s and 70s, rests in turn on the notorious claim that the inverse relationship between farm size and yield per hectare is evidence of labor market duality, which has had a long life in agricultural development circles (see e.g. Sen 1962 and 1964, Berry and Cline 1979, World Bank 2008).

But ignoring all explanations for the inverse relationship except the one most suggestive of market failure is fallacious. There are at least three efficiency explanations. The first is that larger farm size on poorer quality land is a device for equalizing the marginal product of labor on family farms (Roumasset, 1976, Roumasset and James, 1979). The second is the transaction cost wedge whereby larger farms have a greater incidence of hired labor and therefore hire less labor per hectare, (e.g. Sah 1986). The third is endogenous occupation choice given heterogenous farm skills (Assuncao, J

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<sup>26</sup> As Krugman (1994) has noted, the role of economists is to flush bad ideas. But like New York cockroaches, he notes, the bad ideas just keep coming back.

and M. Ghatak. 2003). Thus on logical grounds alone, one cannot jump to the conclusion that the inverse relationship is prima facie evidence of inefficiency nor that corrective intervention is required. Assuncao and Braido (2007) find empirical support for the land quality hypothesis, but not for the other two. This does not imply that the second and third explanations are invalid. Rather, the measurement and specification problems, especially regarding transaction costs, may have rendered those relationships insignificant.

There are other logical problems with jumping to the conclusion that small farms are more efficient. First, small, productive farms in low-wage Asian economies often do hire labor at the margin (e.g. Roumasset and Smith, 1981; Hayami and Kikuchi 1982).<sup>27</sup> And labor turnover costs (Stiglitz, 1984), including recruiting, training, and negotiating costs are subject to economies of scale. This may put small farms that hire labor at a transaction cost disadvantage. And small farms that don't hire labor refrain not because family labor is cheaper but because they cannot capture the economies of scale, including those of specialization, that larger farms afford. Also as the relative cost of farm equipment declines relative to labor, the scale economies of farm mechanization drive the optimal farm size up. This does not mean that government should promote reverse land reform to encourage consolidation, but that biasing land policy to promote small farms may increase inefficiency and stagnation.

The economics of specialization, partly developed from the stylized facts of agricultural organization, can potentially provide more fundamental foundations for understanding the industrial revolution. For millennia, population and agriculture moved together such that per capita incomes increased over the long run at 0.1% or less and median incomes remained almost stagnant (Lucas, 1993). The few long swings of increasing per capita incomes were eventually overcome by Malthusian pressures until the 18<sup>th</sup> century, when wages began their secular increase until the present day. But why was this associated with industrialization? Agriculture also has numerous opportunities for specialization that can raise (at least temporarily) total factor productivity. But these "Boserup effects" are few and far between in agriculture (Boserup 1965, Roumasset, 2008). In contrast, the opportunities for specialization in industry are almost endless. While vertical specialization in agriculture is largely limited to specialized management and labor, manufacturing affords ever continuing layers of intermediate products and product differentiation. This greater density of specialization possibilities was a key driver of the growth acceleration that accompanied the rural to urban transition.

Economics is still struggling with the problem of embedding the co-evolution of institutions and specialization into dynamic, general equilibrium models. A promising path forward is suggested by the New Classical Economics (see especially Yang, 2003), which models the evolution of specialization as a response to falling unit transaction costs. Incorporating endogenous transaction

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<sup>27</sup> For example, the rapid emergence of the labor market for rice production in Laguna, Philippines during the 1970s was a small farm phenomenon.

costs into such models and combining them with an appropriate equilibrium concept is a major challenge that will require advanced mathematics, possibly borrowed from electrical engineering.<sup>28</sup>

## 6. Blackhole Economics

There is a family resemblance between policies to prohibit alcohol, drugs, prostitution abortion, illegal immigration, and guns. Enforcement in all cases is, was, or would be ineffective -- leading to a black hole of spiraling enforcement costs without necessarily improving results. This common problem may have the common solution of *high-fence, wide-gate*.

### 6.1 Prohibition of Alcohol and Drugs

Black-hole economics is perhaps best illustrated by the U.S. experience with alcohol prohibition. Prohibition initially cut alcohol consumption by two thirds, but by the end of Prohibition, consumption had more than doubled, even as enforcement expenditures multiplied more than six fold. The greater the enforcement expenditures, the greater the difference between the street price of alcohol and its cost of production. These potential rents stimulated technical and transactional (bribery) innovations and changes in market structure that lowered the risk of being punished for illegal activities, thus lowering the effective price and increasing consumption. These in turn stimulated new rounds of innovations and so on -- a black hole of expenditures that only made the problem worse, ending only with the repeal of Prohibition (Roumasset and Thaw, 1999).

The same inexorable dynamic renders the U.S. "war on drugs" counterproductive. Welfare economics suggests that the policy goal towards currently illicit drugs should be harm reduction, especially the externality of harm to others. Distinguishing between high-externality drugs (e.g. crystal meth, crack, and date rape drugs) and low-externality drugs such as marijuana and heroin<sup>29</sup> would allow a high-fence-wide-gate policy to be employed in drug enforcement. The set of legal drugs would be expanded, and the enforcement effort against illegal drugs would be increased. Legalization combined with revenue-maximizing taxation has been shown to be welfare increasing. By spending only 11% of revenues (in the case of cocaine) on treatment programs, drug use can be held constant, leaving 89% for welfare improvement, not even counting the benefits to treated addicts. By spending even more on demand reduction, legalization can be a pathway to reducing consumption (Johansson and Roumasset, 1997).

### 6.2 Illegal immigration

Immigration policy is another black-hole phenomenon in the sense that the laws are routinely violated. About half a million unauthorized immigrants were entering the U.S. prior to the Great Recession,<sup>30</sup> down from about 850,000 per year in the early 2000s.<sup>31</sup> Legal immigration has been **is**

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<sup>28</sup> See e.g. Kratz et al. 2001.

<sup>29</sup> Heroin is a low externality (addicts are non-violent) but high "internality" (highly addictive) drug. Intervention should be based on merit-good grounds, such as behavior modification via methadone. (See also: Gruber, "Smoking Internalities." *Regulation*, Winter, 2002-3, 52-57.)

<sup>30</sup> Michael Hofer, Nancy Rytina, and Christopher Campbell, "Estimates of the Unauthorized Immigrant Population Residing in the United States: January 2005" (Washington, D.C.: Department of Homeland Security, Office of Immigration Statistics, August 2006, cited in "Estimating the Undocumented Population", GAO Report #06-775, at page 17.

about double illegal immigration,<sup>32</sup> although that ratio may be falling. As suggested by Senator Chuck Schumer, "Americans are for legal immigration but against illegal immigration." There is some indication that this is good economics. Immigration does not need to be decreased, but its composition needs to be changed. Legal immigration may promote economic and wage growth because of the complementarity of the imported skills and entrepreneurship while illegal immigrants are more likely to retard wage growth, expand entitlement spending and increase negative externalities (crime).<sup>33</sup> To the extent that current enforcement efforts are not as effective as desired, a *high-fence, wide-gate* policy is promising. At the same time that illegal enforcement is enhanced by actual or metaphorical fences,<sup>34</sup> legal immigration controls could be relaxed, such that the high fence and the wide gate combine to discourage illegal immigration both by increasing its expected penalty and by elevating the prospects of the alternative. As illegal immigration is decreased, legal immigration is increased. As in the drug case, intermediate forms between legal and illegal immigration are under consideration, including faster pathways to citizenship for workers in high demand and guest worker programs. *High-fence, wide-gate* helps draw attention away from framing issues in a polarizing way -- drugs and immigrants must be good or bad -- and focuses instead on developing a screening mechanism to increase the benefits and decrease the harm.

Immigration has long been an important source of U.S. growth. Immigration has provided a supply of hard-working and creative labor that supports the growth engine of specialization. From the point of view of resource economics, we can further analyze this as an optimal control problem. Two control variables are required to regulate the additions to the two stocks, legal and illegal immigrants.

To the extent that border enforcement has been too lax (the metaphorical fence too low) and the barriers to legal immigration too stiff (gate too narrow), the current stock of legal immigrants is too small and that of illegals too large. This means that the control on legal immigrants should be temporarily even lower than its long run optimal level and the control on illegal immigrants higher (i.e. wider fence and higher gate in the interim). But even with these controls in place, it may take decades for levels of the two types of immigrants to reach their optimal levels. Accordingly, additional instruments are needed to deal with the stock of illegals that has accumulated, including a path to citizenship for those who fulfill appropriate conditions and a path to deportation for those who don't. Policies are also needed to allow greater market guidance in the selection of legal immigrants as opposed to selection committees. Guest worker programs may be a useful complement to immigration policies. These presume an adequate registration program for appropriate enforcement.

### 6.3 Abortion and Prostitution

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<sup>31</sup> Bahrapour, Tara (September 1, 2010). "Number of illegal immigrants in U.S. drops, report says". *The Washington Post*. Retrieved July 30, 2011. Immigrant Population at Record 40 Million in 2010.

<sup>32</sup> "Immigrant Population at Record 40 Million in 2010." Yahoo! News. October 6, 2011.

<sup>33</sup> See e.g. the mechanisms discussed by Williamson (1996). Perhaps because of data limitations, the growth effects of legal and illegal immigration have not been well-developed. One report attributes three out every four patents filed to first-generation immigrants ("Patent Pending: How Immigrants are Remaking the American Economy").

<sup>34</sup> For example, stiffer penalties for employers who hire illegals.

Applying the same principle to abortion policy suggests that the goal of abortion policy should be harm-reduction. The high fence in this case might be the ban on late term abortion as applied in many countries and most States of the U.S.<sup>35</sup> The gate can include not only legalization of less-harmful abortions but alternatives including birth control and adoption. The abortion policy analogy to the drug and immigration cases would be to legalize abortion but to tax it, not subsidize it through the health care system. Instead, it is the alternatives that should be subsidized (just as drug treatment programs).

Similarly, prostitution policy should begin with the recognition that all prostitution is not equal. Legalizing some forms of prostitution would also help focus enforcement expenditures on human trafficking for sexual exploitation, child prostitution and other harmful practices that naiveté prevents me from describing. Licensing and taxation provide both revenue and a means of regulation, e.g. regarding sexually transmitted diseases.

#### 6.4 Bans and subsidies: Parastatals, renewable energy, and sustainability

Prohibition sometimes goes hand in hand with subsidization. Consider grain-marketing parastatals that are justified on the grounds that price fluctuations ("shocks") are bad for consumers and producers, though it has not been established why. If the source of domestic price instability is international price variability, even costless stabilization is likely to be welfare reducing inasmuch as consumers gain more consumer surplus from low prices than they lose from high prices, and producers gain more from high prices than they gain from low ones. The analysis is different if the source of unstable prices is fluctuations in domestic supply. In this case, costless stabilization via stable international prices or an omniscient operator of an unlimited domestic buffer-stocking program would be welfare increasing but feasible acquisition and release strategies are likely to be welfare reducing due to the limited potential stabilization and high costs. Moreover, empirical evidence suggests that attempts to stabilize grain prices succeed only in raising prices (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 2005).

Nonetheless misguided critics of globalization justify price-stabilization programs on the grounds that consumers and producers should be insulated from "the vagaries" of international markets. This view legitimizes creation of grain parastatals and the banning of international trade in grain staples such as rice. These interventions have often led to large losses in consumer welfare by inducing consumer prices much higher than what would prevail under free trade. In the Philippine case, producer prices are also higher than what free trade would deliver but by much less than the consumer markup. Excess burden results from lost consumer surplus, excess production costs, tax friction and foregone revenue that could have been obtained with a system of tariffs and taxes that would have delivered the same prices. Remarkably, while the Philippine parastatal was buying low and selling high they actually lost money in the process necessitating substantial government subsidies. In 1999, these static losses amounted to more than a billion dollars for rice alone (Roumasset 2000). Black-hole subsidies increased in subsequent years as the National Food Authority program expanded to other crops and agricultural produce. Moreover, the static losses

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<sup>35</sup> Generally these bans allow exceptions when there is a threat to the life or health of the mother. See e.g. Guttmacher Institute. (2007). State Policies on Later-Term Abortions. *State Policies in Brief*.

hide a source of dynamic efficiency. When governments outlaw international trade, and engage in major transport and storage operations, investment in private marketing is curtailed and the patterns of production, trade, storage, and processing are disrupted. The very things that led to increasing specialization and rising value added in the supermarket revolution, which occurred primarily outside of government regulations, are curtailed.

In a recent review of "Why Government Fails so Often," Yuval Levin (2014) notes that the twin temptations of social science are nostalgia and utopianism. Nothing is more nostalgic and utopian than the quest for self-sufficiency. Due to public ignorance of the *gains from trade*, politicians are able to convince voters that letting money flow out of the domestic economy for imports will shrink the economy. Another bogeyman is the "exploitative middleman." Marcos and his cronies were able to monopolize coconut processing and trading under that pretense that ethnic Chinese traders were gouging both producers and consumers. But when the government took over, the wedge between producer and consumer prices increased dramatically (Clarete and Roumasset 1982).

But for most economies, such ideological imperatives (including stabilization of prices at pleasing levels for both consumers and producers, and the elimination of drugs, guns, abortion, and prostitution) are missions impossible. When such missions fail, the bureaucracies that have grown up to promote them inevitably clamor for more funding (Schuck 2014). In most cases, however, society will not tolerate the black hole economic costs that would be required. Instead the actual policies are illusory "rope-a-dope" programs meant to both curry favor with the public and transfer rents to special interests.<sup>36</sup>

The quest for self-sufficiency is confounded with popular (non-economic) conceptions of sustainable development. In Hawaii for example, the mantra of sustainability is used to support a plethora of prohibitions, mandates, and subsidies in the name of renewable energy. In the push for the goal of 40% renewable production of electricity by 2030, for example, Hawaii has embarked on a series of extremely costly policies. Non-renewable ventures such as the use of natural gas have been tacitly discouraged while a wide variety of renewable ventures have been promoted by tax credits, capital supports, and purchasing guarantees. The State has adopted a regulatory policy of decoupling utility revenues from sales, allegedly to promote renewables, that has resulted in electricity prices three times the national average (Endress 2013 and chapter 3, this volume). Now the State is about to launch a project of unknown feasibility and expense to connect the "outer islands" to the population center of Oahu. It's looking more and more like a black hole.

As Joseph Stiglitz pointed out in reference Hawaii's high electricity prices, (unnecessarily) "high prices shrink the economy."<sup>37</sup> This example of mandates and subsidies leading to high electricity prices in Hawaii illustrates another dimension of the black hole. Both the commercial sector and the general public forego large benefits due to prices far in excess of necessary costs. Remarkably, the mandates and subsidies in question are justified by the quest for sustainability.

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<sup>36</sup> Thanks to University of the Philippines Professor, Noel de Dios, for this insightful term.

<sup>37</sup> Remarks in his Stephen and Marylyn Pauley Seminar in Sustainability, University of Hawaii, Manoa, 2012.

Sustainability need not be a separate goal from optimality. Optimality is usually sustainable but not the other way around (Heal 2003). Heal concludes,

"Instead of proselytizing about sustainability as a social goal, perhaps environmental economists should work to refine the concept of optimality [such that it] includes an understanding of human dependence on environmental systems."

In other words, sustainability can be pursued through optimizing models. In order to incorporate the concerns of sustainable development, we need to include not only the interdependence between environmental-resource systems and the economy but also the social concern for intergenerational equity (Ravago et al. chapter 1 and Endress chapter 3, this volume. Far from these apparent burdens leading to a dismal outcome, the pursuit of optimality can provide a win-win path to abundance (Roumasset and Endress 1996).

In his review of Schuck (2014), Levin notes that the reason why government fails so often is that it is essentially impossible for centralized managers to consolidate information to the degree necessary to manage complex social systems, and bureaucracies respond to failure by demanding even more power. In contrast, government succeeds more often when it focuses on establishing the circumstances for success (as with the GI bill and the interstate highway system in the U.S.) instead of on prescribing specific institutions and behaviors. "Government's best practice is to set goals and arrange incentives so society's knowledge can be put to use by its dispersed possessors."

Moreover, it is not just bad policies that threaten economic resources from being pulled into a black hole, but the deadweight loss of the arm-race-like lobbying efforts (Magee et al. 1989). In chapter 9 (this volume), Majah Ravago and I discuss how a resource or other foreign-exchange boom may stimulate a rent-seeking coalition to garner a share of the new largesse. And rent-seeking begets more seeking through learning-by-doing and by stimulating retaliatory action by losers.

## 6.5 The role of the economist

The role of the economist in mitigating policy failures was famously anticipated by Adam Smith:

"People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." (Wealth of Nations, book I ch 10)

And as noted by Voltaire, government officials may be involved in the conspiracy: "In general, the art of government consists of taking as much money as possible from one class of citizens to give to another." Smith himself realized the potential for government involvement in the passage subsequent to the above: "But though the law cannot hinder people of the same trade from sometimes assembling together, it ought to do nothing to facilitate such assemblies; much less to render them necessary."

Later economists suggested the more general proposition that economic policies will tend to be biased towards relatively small coalitions with high potential per-member benefits relative to any potential blocking coalition. As Arrow (1969) puts it: "It is not the size of transaction [coalition] costs but their bias that is important." More specifically, Mancur Olson famously postulated: "...the larger the group, the less it will further its common interests" (Olson 2002: 36).

The first step to formalizing what has been called "Olson's Law" is to distinguish two forces at work. The first, called the "Hume Theorem," is that the Nash-equilibrium extent of public-good underprovision increases with the number of potential beneficiaries.<sup>38</sup> The second, more in the realm of cooperative games, is that the costs of collective action per member eventually rise as the group expands to include members with lower individual gains (Olson 2002: 50). Thus for heterogeneous groups, the marginal costs of cooperation as a function of group size increase for two reasons. First the required individual contributions compared to the non-cooperative solution increase with the number of group members. Second, additional members tend to have lower individual gains compared to the high-benefit members (who presumably are among the earlier members) and will thus be harder to entice into membership. On the benefit side, marginal benefits decrease with group size so long as members are ordered as indicated. This implies an optimal group size for collective action, which in turn provides a basis for reaction functions providing a Nash equilibrium determination of public policy (Becker 1983, Balisacan and Roumasset 1987, Gardner 1988).

But if policies are determined by factors such as optimal coalition sizes and benefits and costs of investing in political influence by members, this would seem to suggest a rather nihilistic result regarding the role of the economist. Perhaps as Blinder (1988) suggests, policy-makers (or coalitions) will simply select the economist who best defends their pre-determined position.<sup>39</sup> Nonetheless, many economists, including Blinder himself, strive mightily to correct what they see as policy mistakes. As Kenneth Arrow once told me, "it is natural in academic life to lean against the wind." And Milton Friedman observed that "only a crisis - actual or perceived - produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable."<sup>40</sup>

In terms of the political economy of public policy, by making the machinations of the iron triangle more transparent, the economist can change the rent-seeking calculus of politicians, bureaucrats, and special interests and of taxpayer/consumers in opposing them. A cadre of courageous economists, willing to speak to and for the general public and expose the nature, causes and consequences of policies and policy proposals, can act as an informal transparency agency that militates against efforts to plunder the general public.

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<sup>38</sup> Roumasset 1991.

<sup>39</sup> To his great credit, Blinder continues to ardently explain the organization of economic affairs and to draw out policy implications (e.g. Blinder 2013).

<sup>40</sup> From the 1982 preface, Friedman (2002).

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