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The microeconomics of the developmental paradox: on the political economy of food price policy[1]

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Abstract

A longstanding puzzle in comparative economics is the 'developmental paradox', the tendency for government support for agriculture to increase with national income and to decrease with the proportion of economic activity and of the population in agriculture. This paper offers a microeconomic explanation for that puzzle. It establishes analytically the microeconomic basis for coalition alignments with respect to food price policy, then numerically simulates the comparative static effects of alternative food policies on coalition structure. A parsimonious household model applied to a heterogeneously endowed society demonstrates how variation in individual welfare effects might beget distinct coalitions in the debate over food price policy and how those policies are inextricably linked to land, population, and technology policies in food agriculture. Moreover, coalition alignments on particular policy debates are path-dependent. In particular, food price policy creates its own political support.

Keywords: Microeconomics; Developmental paradox; Food price policy

1. Introduction

The political environment surrounding food price policy differs markedly across time within a given country as well as cross-sectionally among countries at any given time. Examination of the microeconomic fundamentals of the political economy of food price policy clarifies the origin of many of these differences. The simple model presented in this paper offers some insight on the political sustainability of agricultural development strategies.

Economic studies of government intervention in the production, marketing and pricing of agricultural commodities can be classified into three distinct traditions, the first two of which are often labeled 'political economy'. The first, born of public choice theory (Buchanan and Tullock, 1962) and work on interest group and bureaucratic behavior (Olson, 1965; Krueger, 1974; Bhagwati, 1982), emphasizes the non-neutrality of government, its control by special interests, and resulting policy failures. Interest groups generally enter such studies exogenously as analysts explore the consequences of self-interested behavior by bureau-

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crats, politicians, and pressure groups[2]. The second tradition descends from Pigouvian welfare economics and social choice theory, and addresses the reconciliation of individual preferences in collective choice and resolution of market failures through government intervention (Arrow, 1963; Sen, 1986). In this genre, government, if modeled at all, tends to be a neutral medium, led by a benevolent social planner, and politics rarely appears per se[3]. Despite considerable ideological and methodological differences, both of these traditions examine how exogenous economic interests influence political equilibria.

The third tradition builds appealingly from microeconomic models of individual behavior to explore the economics of food price policies[4]. But because these are usually representative agent models, they generally ignore the conflicting preferences inherent to a heterogeneous society and the resulting contest between groups seeking to satisfy their divergent interests. The political feasibility of the resulting prescriptions is consequently indeterminate, a shortcoming vividly evident in the painful politics of structural adjustment in Africa and Latin America over the last 15 years.

A considerable gap exists between the latter literature, which fails to explore seriously the political struggle over food price policy, and the two political economy of food price traditions, which fail to explain the economic genesis of political coalitions. This paper addresses this gulf in three ways. First, unlike the classical normative literature, it models a continuum of agents differentiated by endowments and considers explicitly the endogenous political support of distinct subpopulations for food price policies. Second, most positive political economy studies incorporate policy demand and supply functions only implicitly. I explicitly model food price policy demand, that is, the material pre-disposition of individuals to oppose or support particular policies, or the basis for coalition alignments. (Political equilibrium is not considered, for reasons discussed in the concluding section.) Finally, this paper incorporates uncertainty by considering simultaneously agents' preferences regarding the mean and the variance of stochastic food prices.

The plan of the paper is as follows. Section 2 introduces a long-standing puzzle: why government price policy generally taxes food producers in low-income, agrarian economies but subsidizes producers in high-income, post-agrarian economies. Recent empirical studies confirm this stylized fact, but do not try to explain its roots in economic theory (Anderson and Hayami, 1986; David and Huang, 1996). Section 3 then models households' preferences over the first two moments of food price distributions (i.e. mean and variance), thereby establishing the microeconomic basis for coalition alignments (Section 4). This enables numerical simulation of the implications of development strategies for coalition alignments, and the consequences for food price policy (Section 5). Section 6 summarizes the findings.

2. The developmental paradox

The 'food price dilemma', as spelled out by Timmer, Falcon and Pearson, is that consumers want lower food prices and producers want higher food prices. Similar issues surround food price stabilization. Policymakers thus face conflicting pressures from different constituencies over the first two moments of stochastic food price distributions[5], subjecting economic policymaking to a potentially complex political economy process.

One approach scholars have taken to understanding the process is to study a long-standing puzzle of comparative economics, the tendency of agrarian, low-income economies to discriminate against food

[2] Swinnen and van der Zee (1993) surveyed this literature.

[3] Implementation is an important, emerging variant of this tradition. Implementation theory uses players' strategic interests to overcome the problem of truthful revelation of preferences so as to render feasible social choice correspondences that would otherwise be impossible in a non-dictatorial setting (Arrow, 1963; Gibbard, 1973; Satterthwaite, 1975). Moore (1992) and Palfrey (1992) provide good surveys.

[4] The classics here include: Preobrazhensky (1965) and the price-scissors debate centered around Soviet food policy; Lewis (1954) and the dual economy models that present agricultural prices as a lever for the transfer of surplus from a backward agricultural sector to a modern industrial sector; and Timmer et al. (1983), and Timmer (1986), which returned economists' attention to more neoclassical, welfare/theoretic approaches.

[5] The political economy literature tends to divorce questions of price levels (i.e. means) from those of price variability. This is a curious tendency given the untenable implied assumptions of complete contingency markets or universal risk neutrality and the existence of methods for tackling the two subjects simultaneously.

producers, but as economies develop and agriculture shrinks relative to the rest of the economy, policies then tend to favor farmers (Olson, 1985; Anderson and Hayami, 1986; Gardner, 1987; Lindert, 1991; Timmer, 1993b; David and Huang, 1996). As Lindert (1991) p. 29, notes, "the more advanced the nation, the more its government favors agriculture." Unraveling this 'developmental paradox' is central to a solid understanding of the political economy of food price policy.

There exist several parallel explanations for the developmental paradox. Olson (1965, 1985), Gardner (1987), Lindert (1991), Anderson (1992) and Fulginiti and Shogren (1992) emphasize that it is easier to mobilize and compensate the relatively small group of farmers in post-agrarian societies. The likelihood of successful collective action also improves with group homogeneity, longevity and physical proximity, all demographic changes associated with industrialization. Lindert (1991) and Fulginiti and Shogren (1992) further point to farmers' rising income sensitivity to prices, as incomes rise and they sell an increasing proportion of their gross output, as a force raising the influence of farmers. It is perhaps not only the relative sizes of conflicting groups but also the intensity of individual motivation to advance their interests. Other analysts note that the elasticity of demand for food and food's budget share fall as income rises, thereby lowering the deadweight losses associated with redistributive interventions (Tyers and Anderson, 1992) and weakening consumer resistance to higher food prices (Balisacan and Roumasset, 1987; Swinnen, 1994).

Existing studies of the developmental paradox offer intuitive arguments and models of government and interest group behavior, but they lack an integrating microanalytical foundation. Moreover, they consider only average price levels and ignore the equally vexing issue of food price stabilization. The next section introduces a simple microeconomic model that integrates these points.

3. A household modeling approach

All food producers are also food consumers. It is, therefore, appropriate to classify households by marketed surplus: the difference between gross sales and gross purchases. In high-income countries, most commercial farmers are net sellers of food, but in low-income countries, many full-time farmers purchase more food than they sell[6].A marketed surplus continuum is consequently more accurate and useful than a binary classification of households as either consumers or producers. The distribution of a population along that continuum depends on several factors, including the proportion of agriculturalists, the distribution of land and other productive assets (including farm management skills), and food production technologies. This heterogeneity is the first element of the model: there exists a distribution of marketed food surplus positions within a society, the exact shape of which is a function of several structural variables, a subject to which we will return.

The second building block is that food prices are uncertain, not just for producers who cannot know in the planting season what price a crop will fetch at harvest, but also for consumers who wish to eat in each period, while prices in (at least one) future period(s) are almost surely not known with certainty. All households make consumption, production, and labor allocation decisions over subjective probability distributions of food prices. From the resulting behavioral functions one can recover measures of households' preferences with respect to the moments of food price distributions, which necessarily vary along the marketed surplus continuum.

Assume that market surplus is strictly increasing in per capita land endowments, that is, net food sales increase with a household's agricultural landholdings. Also assume that each household exhibits Von Neumann–Morgenstern utility defined over consumption of leisure (L^1)[7] and two goods: a staple (S), and a nonstaple (N)[8]. The staple can either be produced or purchased; the nonstaple is available only through market purchase. The household has an endowment of land (T) and of labor time (L^0). Production is strictly

[6] Weber et al. (1988) offer data on net seller proportions among African agriculturalists. Ghai and Smith (1987) point out, conversely, that not all urban households are net consumers of food. These empirical studies establish that stylized binary divisions are often too crude to be relevant to policy analysis.

[7] Superscripts distinguish among goods, subscripts denote derivatives.

[8] Although this construction applies literally to monocultural regions only, if aggregability holds, S and N are food and nonfood quantity indexes, respectively, allowing generalization.

increasing in land and labor, and concave in labor. Effective labor used in production is a function of household labor (L^h) and hired labor (L^d). Labor markets are competitive but, to isolate the variables of interest, land and credit markets are assumed not to exist. Just as the household can hire labor in, so can it hire out its time (L^s) at a known exogenous wage (w). The household faces a time constraint, $L^s + L^l + L^h \leq L^0$. Its income comes from wage labor, agricultural production, and exogenous transfers (I).

This is a two-period model. All product prices are unknown when production decisions (i.e. labor allocation decisions) are made but are revealed before consumption decisions are made. The household's utility maximization problem can thus be expressed as

$$\begin{aligned} &\operatorname{Max} E\{\operatorname{Max} U(L^l, N, S)\}\ L^s, L^d, L^h, L^l, N, S \text{ are s.t.} \\ &P^s S + P^n N \leq Y^*, \\ &Y^* = w(L^s - L^d) + P^s F(L, T) + I \\ &L = e(L^d, L^h) \\ &\text{and } L^0 \geq L^h + L^l + L^s \end{aligned} \tag{1}$$

where E is the mathematical expectation operator, P^s the staple price, P^n the nonstaple price, and Y^* the endogenous income. An effective labor function, e(.), aggregates hired and family labor units into equivalent labor units. The household allocates labor conditional on ex post optimal choice of consumption quantities. Duality theory (Epstein, 1975) permits derivation of a variable indirect utility function, $V(L^l, P^n, P^s, Y^*)$. V(.) is homogeneous of degree zero in (Pn, P^s, Y^*) and, therefore, invariant to units of measurement. So set $P^n = 1$ and let $P = P^s/P^n$ and $Y = Y^*/P^n$ [9]. Since Y is itself a function of P, V(.) has multiple stochastic arguments. Finally, assume that the household exhibits Arrow–Pratt income risk aversion (i.e. $V_{YY} < 0$).

As long as the marginal utility of income is positive, net buyers prefer low expected staple prices and net sellers prefer high expected staple prices[10]. Barrett (1996) shows that household preferences with respect to price risk can be represented by a unitless coefficient of absolute price risk aversion, A, defined as

$$A = \frac{-V_{PP}}{V_Y} = \frac{M[\beta(R - \eta) - \varepsilon]}{P} \tag{2}$$

where $M \equiv F - S$ is marketed surplus, β is the budget share of marketed surplus (MP/Y)[11], η is the income elasticity of marketed surplus, R the Arrow–Pratt coefficient of relative risk aversion ($R = -Y\ V_{YY}/V_Y$), and ε the price elasticity of marketed surplus. Price risk aversion, indicating that the household favors stable to variable prices, is characterized analogously to income risk aversion, by $V_{PP} < 0$ or $A > 0$. Quasi-convexity of the indirect utility function in prices generally renders these preferences ambiguous. $R > \eta + \varepsilon/\beta$ is necessary and sufficient for $A > 0$[12].

β is the key to price risk aversion. Empirically, R almost always exceeds η for staples, so the sign of A turns on the term ε/β. If a 'staple' is, in fact, not especially important in either expenditure or revenue terms (i.e. $\beta \approx 0$), then uncertainty surrounding its price is unlikely to concern a household significantly. Indeed, certain individuals or groups may be price risk lovers ($A < 0$) when staple price variability has little impact on their welfare. This is the case for virtually all commodities in the high-income world; only a small coalition of specialized producers have much at stake in a particular commodity price and they demonstrate significant price risk aversion. Hence, the common claim that commodity price stabilization is welfare reducing (Turnovsky et al., 1980; Newbery and Stiglitz, 1981), a belief that follows from the high-income economy context in which those analyses have taken place. No commodity is more than 5% or 10% of American and European consumers' budgets, that is, β is near zero. Newbery and Stiglitz (1981) implicitly recognize the importance of β when they note that price stabilization is more beneficial in monocultural than in diversified production systems. Indeed, if the crop is the key to the household's earnings (as $\beta \rightarrow 1$) or is heavily dominant in its diet (as $\beta \rightarrow -1$), variable prices heavily influence household welfare. House-

[9] Identical consumer and producer staple prices are assumed here, but the results hold for a proportional relationship between the two. If, however, households that both consume and produce the staple face consumer and producer prices only weakly correlated with one another, a more disaggregated analysis would be necessary.

[10] This follows directly from Roy's Identity: $V_Y\ M = V_P$, where $M = F - S$.

[11] This is the negative of Deaton's (1989) net consumption ratio, which represents the elasticity of the cost of living with respect to the staple price.

[12] See Barrett (1996) for a proof of this necessary and sufficient condition.

hold budget shares for staple commodities are quite high in low-income economies, often reaching 60–70% (Weber et al., 1988; Budd, 1993; Barrett and Dorosh, 1996). Just as food budget shares vary greatly with wealth, so do agents' preferences with respect to commodity price stability. Price risk aversion might exist among poor, food insecure populations even though it is generally thought unlikely among wealthier consumer populations. This variation can occur inter-temporally over the course of a country's economic growth or cross-sectionally between economies with considerably different income levels.

Within the agricultural sector, there usually exists a strong positive relationship between income and landholdings. If landholdings vary across households and the underlying parameters in Eq. (2) and marketed surplus quantity vary systematically with income and landholdings[13], so too might preferences with respect to the mean and variance of food prices. Thus, one can represent Eq. (2) as an implicit function of T and P[14].

$$A(P,T)=\frac{M(P,T)[\beta(P,T)(R(P,T)-\eta(P,T)-\varepsilon(P,T)]}{P} \tag{3}$$

Such structural variation in preferences over the mean and variance of the staple food price distribution lays the groundwork for opposing coalitions in food price policy deliberations.

4. Coalition formation among heterogeneous households

Most contemporary political economy studies take interest groups as given, and then explore how a political-economic equilibrium might emerge through group bargaining. The structural origin of these groups is too often left unexplained [15]. The preceding section offers a way to understand the microeconomic origin of coalition alignments, as well as to track their endogenous evolution in the wake of policy choices.

With income and marketed surplus strictly and positively related to land holdings, I simulated the preferences of 750 distinct land holding strata with respect to the mean and variance of the food price distribution. The simulation, based on common strata-specific parameter values, generates the preference functions found in Fig. 1(a,b) [16]. These two figures depict the budget share of marketed surplus (β) and the implicit function $A(P,T)$ of Eq. (3) in the land domain, that is, how preferences with respect to the mean and variance of food prices change with household landholdings per capita. In each figure, the vertical line labeled 'subsistence endowment' corresponds to $\beta=0$ and divides net buyers from net sellers and the horizontal line at $A=0$ separates price risk lovers from those who are price risk averse.

Fig. 1(a) depicts the preferences one would expect to find in a stylized high-income, post-agrarian economy like those of the OECD countries. Pure consumers and 'garden farmers', that is, those who farm but remain net buyers, may favor low but variable prices, while big farmers favor high and stable prices. Fig. 1(a) thus illustrates that the present framework nests within it both the consumer-oriented risk analyses of Newbery and Stiglitz (1981) and Turnovsky et al. (1980) and the producer-oriented risk results of Sandmo (1971). Net food buyers comprise 90–95% of the total population. Available technologies render the subsistence endowment relatively small; the vast majority of agricultural households have ample land-

[13] A substantial empirical literature has demonstrated that the relevant parameters vary systematically with income and wealth (Pinstrup-Anderson et al., 1976; Pinstrup-Anderson and Caicedo, 1978; Timmer and Alderman, 1979; Binswanger, 1980; Timmer, 1981; Pitt, 1983; Waterfield, 1985; Antle, 1987; Barrett, 1996).

[14] Although prices are assumed uniform across all land endowments here, De Janvry (1981) suggestion that prices might also vary with farm size would not affect the qualitative results.

[15] Important exceptions to that rule include De Janvry (1983) and De Janvry et al. (1989).

[16] The simulation is based on representative parameter values from the published empirical literature on demand, marketed surplus, and risk. A uniform distribution of 750 representative households across land endowment space was created, with the relevant parameters varying with income at the rates found in earlier cited studies. These fictive households are representative of their land endowment, so the population represented by each of the 750 households may vary across the distribution as well as across societies. The Appendix contains a table illustrating the stylized parameter values underlying these two figures. Finally, it should be noted that the $A(P,T)$ function is in fact discontinuous where $M(P,T)=0$, but its left-hand and right-hand limits both equal zero, so the curve appears smooth in these figures.

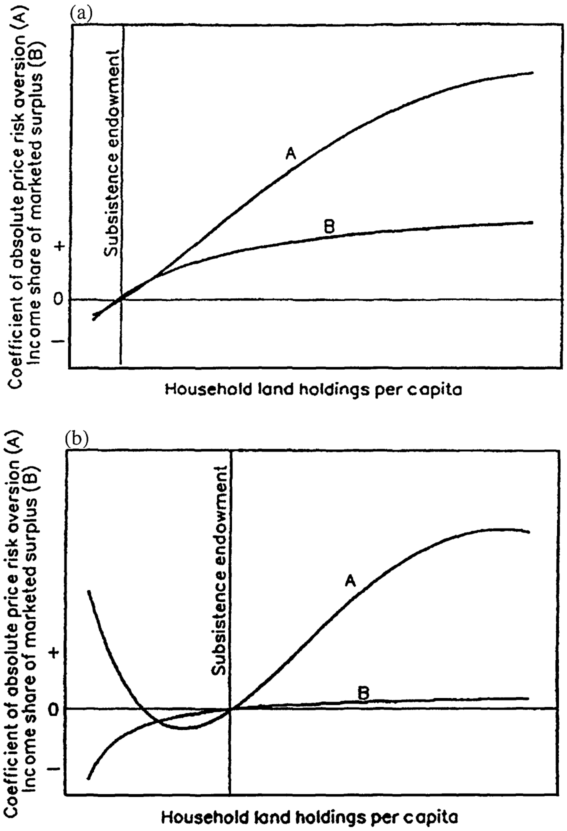

Fig. 1. Endowment-dependent price preferences. (a) High-income post-agrarian economy. (b) Low-income agrarian economy.

holdings per capita to generate a positive marketed surplus. A small but cohesive agriculture community emerges.

This microanalytical approach generalizes not only along the marketed surplus continuum but also across economic structures. By changing the underlying parameter values in Eq. (3) to account for changes in income, tastes, or technologies, one has the foundation for comparative political economy analysis, either in time series within a particular economy or in cross-section across countries. Fig. 1(b) illustrates this potential with a parallel depiction of the preferences in a stylized low-income agrarian economy. Unlike Fig. 1(a), net buyers represent a much larger interval of the land distribution due to a less productive portfolio of feasible technologies. Furthermore, the poverty of small farmers who are net buyers induces a high budget share for staples and, thus price risk aversion. This implies that, unlike in the high-income post-agrarian economy case, there are more than two coalitions. There are net buyers who favor low and stable prices, net buyers who prefer low and variable prices, and net sellers who favor high and stable prices[17]. This suggests that the political process of food price policy determination in low-income agrarian economies generally has higher-order dimensionality than the usually bilateral food price policy contests of high-income post-agrarian economies. For example, 'urban bias' manifest in low food prices (Bates, 1981, 1983; Lipton, 1977) may well reflect an alliance among net food buyers both outside and within agriculture. Food price stabilization simultaneously evident in many such economies (Krueger et al., 1988) meanwhile results from a somewhat different alliance among large farmers and the poor. The general point to be made is that the food production sector is far less cohesive than is commonly assumed[18], for instance in empirical studies that employ sectoral indicators as explanatory variables (e.g. in estimating political preference function weights) or in theoretical works that identify interest groups by their product.

The layout of Fig. 1(a,b) reveals a general policy preference matrix that groups households according to their joint preferences over the expectation and variance of the staple price distribution (Fig. 2). The groups identified in the matrix corresponds to the partitioning of households into net buyers and sellers and as price risk-averse or price risk-loving. All non-agricultural households clearly prefer low prices since they are all net buyers. But non-agricultural households can exhibit either $A > 0$ or $A < 0$, so theory only allows their restriction to the left column of the policy preference matrix. The distribution of the non-agricultural population over the two cells in the left column will depend especially upon the overall stan-

[17]Together, these figures echo Finkelshtain and Chalfant's (1991) seminal point that agricultural producers are not all price risk averse. At least a subset of producing net buyers in each of the two stylized economies depicted exhibit $A > 0$, while all the net sellers exhibit $A < 0$. So, while Sandmo's (1971) results apply over a wide range of producers, they are not perfectly general. Barrett (1996) demonstrates this empirically.

[18]Skålnes (1993) and Bratton (1994) demonstrate this vividly in this case of Zimbabwe.

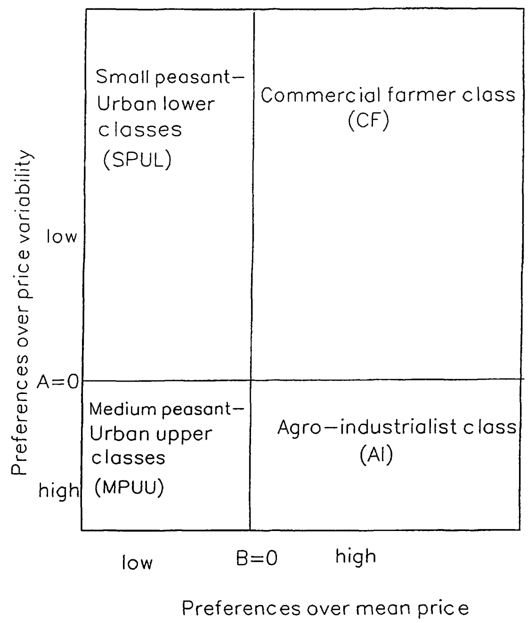

Fig. 2. Policy preference matrix.

dards of living and the distribution of (especially urban) incomes[19].

Agricultural producer households cannot be restricted on the basis of theory to any column or row of the matrix. Net buyer producer households prefer low mean prices while net seller producer households prefer high expected prices, and agricultural producer preferences for low or high variability are indeterminate in general (Finkelshtain and Chalfant, 1991; Barrett, 1996)[20]. As is apparent from Fig. 1(a,b), however, the southeastern quadrant is likely to be lightly populated given most reasonable parameter estimates[21].

The policy preference matrix presents four stylized groups distinguished by their binary preferences over the first two moments of the food price distribution[22]. Several structural factors influence the distribution of a population over the policy preference matrix. First, one can define a subsistence agricultural land endowment, T^0, at which $F(L,T^0) = S$, in other words, a land endowment yielding $M = \beta = 0$, given technology. As Fig. 2 depicts, T^0 separates the small peasant/urban lower (SPUL) and medium peasant/urban upper (MPUU) classes from the agro-industrialist (AI) and commercial farmer (CF) classes. Assume the subsistence land endowment, T^0, is a function, G(.), of household size (POP), per capita energy requirements (ER), as determined by the intensity and duration of labor, and the productivity of the land (TECH), as determined both by available production, processing, and storage technologies and by natural resource variables such as soils and hydrology. As these structural variables change, so too does T^0 as follows:

$$T^0 = G(\mathrm{ER}, \mathrm{POP}, \mathrm{TECH}) \text{ with } \partial T^0/\partial \mathrm{TECH} < 0 \text{ and } \partial T^0/\partial \mathrm{ER}, \partial T^0/\partial \mathrm{POP} > 0$$

Increasing land productivity, decreasing farm family size, and lower per capita energy requirements shift the subsistence endowment to the left from Fig. 1(b) to (a)[23]. This narrows the land interval failing into the SPUL and MPUU groups of the policy preference matrix. If one then overlays a mapping of land distributions onto the figures, the seeds of an explanation of the developmental paradox begin to appear. As average farm size increases and land productivity increases with consolidation and mechanization, the number of noncommercial farming agricultural households decreases. Moreover, mechanization decreases the energy requirements of farming populations and increasing incomes associated with increasing farm size are generally associated with decreasing average household size, so agricultural household food requirements are falling as well, reinforcing the emerging dominance of CF households within the agricultural sector. The farm

[19]The broader the non-agricultural income distribution, the more likely it becomes that the net buyer subpopulation fractures along class lines between the relatively poor (SPUL classes) and the relatively wealthy (MPUU classes).

[20]There is an important seasonal dimension omitted here. Net buyer farming households often want high post-harvest prices when they sell, and lower, stabilized prices pre-harvest, when they buy food. Indeed, most developing country food price stabilization programs begin as seasonal schemes.

[21]The figures depict conditional expectation functions and thus mask a distribution of household incomes for any given value of landholdings per capita. Those income differences affect the parameters in (Eq. (3)), thereby yielding distributions of A conditional on values of landholdings per capita.

[22]One could readily extend this simplistic presentation to capture the relative intensity of preferences.

[23]By the definition of $M \equiv F - S$, where F is (technically efficient) production, technological change already affects β, ε, η, and R.

sector begins to speak with a unified voice in favor of relatively high and stable commodity prices. Moreover, this simple conceptual model captures the inherent jointness of agricultural pricing, technology, land, population, and nutrition policies.

The central points of the existing explanations of the developmental paradox are imbedded within this model. Emphasized changes in food price elasticities, consumer expenditure shares, and farmers' income sensitivity to prices are merely observations about the correlation of M, η, β, and ε with income and land endowments. Olsonian explanations centering on sector size and its effects on organization for collective action turn on the secular movements in T^0 and the distribution of households across cells of the policy preference matrix. The present model, thus nests within its existing explanations of the developmental paradox.

Moreover, the above construction reintroduces the important issue of food price stabilization. Since agents' preferences over means and variances of price distributions cannot be separated, there is an inherent simultaneity between these two distinct policy sets, a simultaneity not previously addressed in the literature. Krueger et al. (1988) demonstrate empirically that most low-income countries have followed regimes of low mean and variance in agricultural prices. However, their emphasis on the adverse partial incentive effects of low mean farmgate prices ignores the indivisibility of preferences over the multiple moments of a stochastic price distribution and the complex social choice process that necessarily ensues. This may have significant implications for the design of economic adjustment programs. Decontrolling prices, if it permits both means and variances to rise (Barrett, 1997) will benefit some subpopulations and harm others (Barrett and Carter, 1999). Whether such change is politically feasible or an optimal social choice is analytically indeterminate.

In summary, economic development involves structural changes that induce endogenous shifts in individuals' material interests regarding policies affecting stochastic food prices. Increasing farm productivity, less physically taxing labor, smaller household sizes, farm consolidation, increasingly specialized crop production, and incomes rising faster than food consumption all lead to shifts in the subsistence endowment of land, the budget share of marketed surplus, preferences with respect to price risk, and the distribution of the population, across the food price policy preference matrix.

5. Comparative statics of alternative food policies

An important shortcoming of the existing literature on food price policy–this paper included–is the static theoretical approach employed. Policies evolve and so too do the coalition alignments underlying collective choice. Although the model presented here is not a dynamic one, it does allow for suggestive investigation of the comparative statics of coalition alignment as policy changes. That is, how does policy change make an impact on the political structure undergirding subsequent periods' policy debates? As quickly becomes apparent, coalition alignments in food price policy are path-dependent.

Two of the most common strategies employed by developing countries in an effort to stimulate food production concern price policy, including both direct (e.g. price controls) and indirect (e.g. exchange rates, tariffs) means, and technology policy (e.g. hybrid or transgenic seeds, extension services). Agricultural technology improvements were central to food policy in the heyday of the Green Revolution, while pricing policies have attracted greater attention in the context of recent economic reform programs.

The numerical simulation underlying Fig. 1(a, b) was repeated under two different partial equilibrium scenarios in order to explore the implications of these two different strategic approaches for the coalition alignments about food price policy. In the first scenario, food prices increase 25% in the low-income agrarian economy of Fig. 1(b) to a hypothetical border parity. This is a stylization of the experience of many African and Latin American economies over the past decade or so. Marketed surplus then increases for all households as higher prices induce lower demand and higher supply. Income effects on marketed surplus vary; net seller households enjoy increased real income, while net buyer households face diminished real income[24]. Income changes induce some shifts in the parameters in Eq. (3). The consequences for repre-

[24]The substitution effects dominate the income effects on marketed surplus.

sentative households' preferences is depicted in Fig. 3(a). The curve from Fig. 1(b) is reproduced in Fig. 3(a) to facilitate comparison. Because higher prices induce more intensive cultivation, lower consumption, and a higher marketed surplus per unit land, the subsistence endowment moves leftward and more households become net sellers. The marginal net buyer subpopulation that positively values variable food prices shrinks markedly, with most becoming net sellers. Also, the intensity of net sellers' desire for stable commodity prices increases following a price rise.

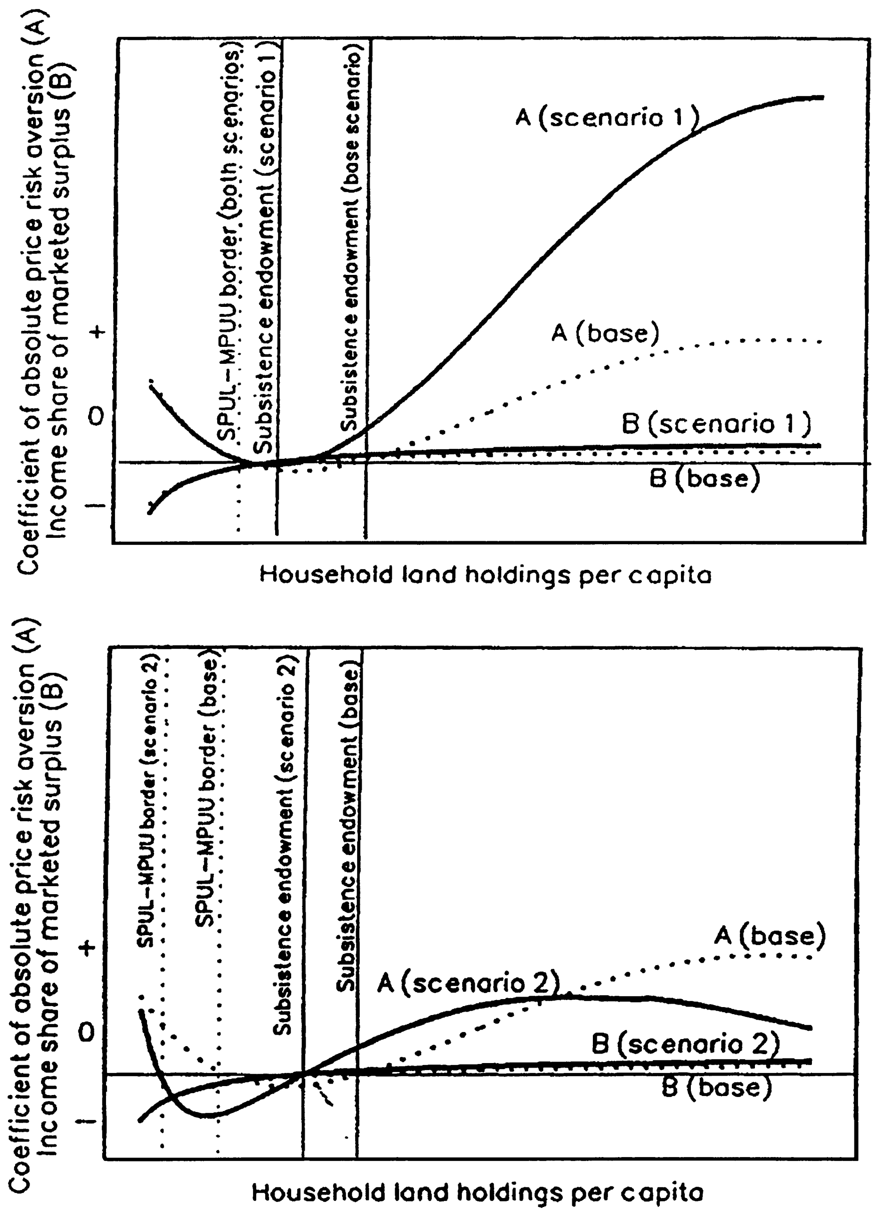

Fig. 3. Comparative statics of price preferences (base scenario in dots, alternates in solids). (a) 25% price increase scenario. (b) 15% yield increase scenario.

Table 1
Distribution of representative households by coalition and scenario

	Base scenario (Fig. 1(b)) (%)	Scenario (Fig. 3(a)) (%)	Scenario 2 (Fig. 3(b)) (%)
Range 1 (risk-averse net buyers)	13	13	3
Range 2 (risk-loving net buyers)	20	12	22
Range 4 (risk-averse net sellers)	67	75	75

The political implications are several. First, higher food prices augment latent demand for price stabilization, both at the extensive and intensive margins, while decreasing resistance to price stabilization at both margins. This may help explain why agricultural price liberalization leading to higher prices has led to heightened political attention paid to price variability in many developing countries. Second, price policy creates its own political support. Increased prices redistribute households (as well as income) towards those cells in the policy preference matrix advocating higher food prices. The process works in reverse, too. Administratively suppressed food prices bolster the coalitions favoring continued low (or still lower) prices by inducing lower marketed surpluses and a higher subsistence endowment, adding to the strength of the SPUL and MPUU classes in the policy preference matrix. Food riots and other acts of political resistance to price increases following a long-standing low-price regime are consistent with this observation[25], as is the intense struggle for price stabilization among net sellers in high-income high-price countries (e.g. France).

In the second scenario, technological improvements in food production in the low-income agrarian economy of Fig. 1(b) lead to a 15% increase in yields. This increases output, income, and consumption for all the fictive households. The underlying budget share, elasticity, and relative risk aversion parameters change accordingly. The ramifications of a food output stimulus strategy based on technological enhancements can be seen in Fig. 3(b). The percentage yield increase was chosen so as to generate an identical shift in subsistence endowments, so the identical expansion of the net seller subpopulation is only an artifice of the simulation. The interesting coalition developments of agricultural technology improvements are the sharp shrinkage of the risk-averse net buyer subpopulation (the SPUL class) and the muting of the intensity of large (net seller) farmer preferences for price stability. These are precisely the opposite effects from Scenario 1. Table 1 illustrates the very different comparative static effects on coalition alignment of these two policies, as represented by the redistribution of land space across the policy preference matrix.

Table 1 demonstrates that because technology improvements reduce the per capita subsistence endowment of land, there is an inherent microeconomic complementarity between price and non-price agricultural development initiatives. This complementarity carries over into the politics of agricultural policy. Timmer (1993a, b) p. 4) explains that in Indonesia, "food security was implemented in the short run through policies that stabilized rice prices. But these policies would have been impossible to sustain without rising productivity in the domestic rice economy." Technological improvements have gone hand-in-hand with policies to stabilize food prices around or above the prevailing international market price in the successful rice economies of East and Southeast Asia. The analysis here suggests that these policies were mutually reinforcing in political economy terms as well.

Note that land and population policy likewise have substantial effects on the coalition alignment in food price policy. Because the figures in this paper are based on simulations employing representative households for each land endowment stratum, a reallocation of people across the land, or of land across the people,

[25]Harriss (1979) made this observation regarding food price policy in the Sahel: "The impoverished nature of the increasing number of producers who are (net) consumers reinforces the very same cheap food policy that is causing their poverty in the first place since it is not in their interests to pay out higher prices for food" (p. 377).

cannot be diagramed in the same fashion. Regardless, if land reform replaces a broad bimodal distribution of cultivable lands with a compressed unimodal distribution centered above the subsistence endowment[26], this shifts people to the commercial farming class. Indeed, the developing world's most successful price stabilization schemes have been in East and Southeast Asia where radical land redistribution created a remarkably concentrated, unimodal distribution of land centered above the subsistence endowment, with Green Revolution technologies subsequently reinforcing commercial farmer dominance within the agricultural sector. According to the Olsonian logic of collective action, agriculturalists may then speak with a more unified and powerful voice in food price policy debates. By contrast, unimodal land distributions that are centered on the subsistence endowment by virtue of a low state of farm technology, as in much of Africa, or sharply bimodal land distributions, as in much of Latin America, create a fractured agricultural sector without any clear, dominant set of food price preferences. Historically, land reform has been closely linked to food price stabilization, and this connection drops out of the present model quite cleanly.

6. Conclusions

Households are not identically endowed with land and they perceive and act on prices as non-degenerate stochastic distributions. These two basic factors lie at the heart of the simple model introduced here to explain the political economy of food price policy and the related developmental paradox. Net food sellers prefer a high expected price, while net food buyers want a low one. Preferences with respect to food price variability depend on commonly estimated parameters (Barrett, 1996), and do not automatically map one-to-one to preferences with respect to mean food prices. Moreover, household preferences with respect to the mean and variance of stochastic food prices evolve predictably with changes in agricultural technology, land, and population distribution. These tools add helpful insights to political economy analyses, which ultimately depend on the evolving microeconomic underpinnings of coalition alignments.

This paper nonetheless eschews direct explanation of agricultural price policy determination, a subject that has preoccupied contemporary political economists. This restraint results from a belief that economists' tools are ultimately unsatisfactory to explain political processes fully[27]. The problem is that choice-theoretic models, like the one developed here, admit no role for charisma, conscience, cultural affinity, ideology, language, or nostalgia. Such elements are as essential as economic self-interest to a generalized theory of policy determination. The literature on farm politics in history, political science, and sociology is rich with compelling accounts of the importance of such factors to the ultimate strength of political coalitions and the determination of policy. Imagery of family farms as cultural and ecological stewards, of food security at a national level, and of wasteful corporate farms are central to the competition about food policy but difficult, at best, to model formally. Indeed, this paper really identifies only latent coalitions based on the objective, material predisposition of individuals. Non-material forces may prompt defections from materially defined interest groups or produce markedly different levels of activism across coalitions. I believe economists' tools are better suited to exploring the differentiated material interests that substantially undergird coalition alignments than to explaining subsequent political events, hence the emphasis in this paper on the microeconomics of coalition alignments.

Although this paper treats land, population and technology policy as exogenous variables, in actuality these are most often determined simultaneously with the price regime. Loosening this artificial restriction appears an especially promising avenue for future research, with some noteworthy contributions already available (De Janvry, 1981; De Janvry et al., 1989; Mellor et al., 1987; De Gorter et al., 1992; Timmer, 1993a). Jointness in agricultural development policy formulation figures more and more in research on the successes of Asia. Land reform was central to the evolution of food price policy in Korea and Sri Lanka,

[26]Land reform movements invariably seek to create 'viable' (read: at least self-sufficient) farms through land reform, as is evident in the cross-national tendency to reduce the number of land reform beneficiaries rather than parcel size.

[27]Bullock (1994) offers a different, technical critique of the methods most commonly employed in political economy studies.

and technology policy was similarly married to price policy in India, Indonesia and Pakistan (Sicular, 1989; Asian Productivity Organization, 1992). The capacity of price policy innovations alone to generate sustainable increases in food production may be limited not just in economic or technical terms, but in political terms as well. Complementary agricultural research and extension programs, land reform efforts, rural health, and population programs might help establish a durable political base for sustainable incentives to increased production (Barrett and Carter, 1999). Conversely, there appears to be a sort of low-level equilibrium trap to which the recent orthodoxy of neoliberal development strategies appears quite susceptible.

Appendix

Fig. 1(a,b) are each based on stylized parameter values which vary over 750 values of M. A systematic sample of nine observations from each table is reproduced here. The magnitudes of Y, M, and V_Y clearly have no meaningful content; the sign of and change in those variables matter most. A constant unit price exists for all observations in both tables. This crude exercise is meant only to suggest how substantial variation in A and β can result from relatively fine changes within a range of structural and behavioral parameter values commonly reported in the literature.

	Y	M	V_Y	β	η	R	$\varepsilon^{\text{Hicksian}}$	ε
High-income post-agrarian economy stylization								
Starting value:	10000	−200	15.00	−0.02	−0.71	2.50	−0.58	−0.59
	10050	−190	14.99	−0.02	−0.71	2.51	−0.57	−0.59
	10100	−180	14.98	−0.02	−0.71	2.52	−0.57	−0.59
	25100	2820	11.98	0.11	0.41	3.69	−0.35	−0.39
	25150	2830	11.97	0.11	0.41	3.69	−0.35	−0.39
	25200	2840	11.96	0.11	0.41	3.69	−0.35	−0.39
	47400	7280	7.52	0.15	0.20	3.63	−0.01	−0.04
	47450	7290	7.51	0.15	0.20	3.63	−0.01	−0.04
Ending value:	47500	7300	7.50	0.15	0.20	3.63	−0.01	−0.04
Low-income agrarian economy stylization								
Starting value:	300	−250	30.00	−0.83	−0.93	1.50	−0.70	−1.48
	305	−249	30.00	−0.82	−0.93	1.52	−0.70	−1.46
	310	−248	30.00	−0.80	−0.92	1.54	−0.70	−1.44
	1820	54	29.85	0.03	0.44	4.27	−0.43	−0.44
	1825	55	29.85	0.03	0.43	4.27	−0.43	−0.44
	1830	56	29.85	0.03	0.43	4.28	−0.42	−0.44
	4040	498	29.63	0.12	0.22	3.15	−0.03	−0.05
	4045	499	29.63	0.12	0.22	3.14	−0.03	−0.05
Ending value:	4050	500	29.63	0.12	0.22	3.14	−0.02	−0.05

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