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SOME INSIGHTS ON FOOD PRICE POLICY

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ABSTRACT

This paper concerns the objective alignment of individuals' material interests into groupings for collective action, and how these groupings vary with economic structure and in response to previous periods' policy choices. 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 the inherent inextricability of price policy from land, population, and technology policies in food agriculture. Moreover, coalition alignments on particular policy debates are path-dependent.
THE MICROECONOMICS OF COALITION ALIGNMENTS:
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This paper concerns the objective alignment of individuals' material interests into groupings for collective action, and how those groupings vary with economic structure and in response to previous periods' policy choices. 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 the inherent inextricability of price policy from land, population, and technology policies in food agriculture.¹ Moreover, coalition alignments on particular policy debates are path-dependent; i.e., they are in part the consequence of past choices on these same policies.

This paper is explicitly descriptive and implicitly prescriptive. Its positive contribution is an improved understanding of why the political environment surrounding food price policy differs so markedly across time within a given country as well as cross-sectionally among countries at any given time. By returning political economy analysis to microfoundations, a normative dimension emerges as well. The two earlier-mentioned characteristics of the model results—jointness and

¹This paper has benefitted from conversations with Michael Carter, Jean-Paul Chavas, Jay Coggins, Marcel Fafchamps and Peter Timmer, and from the comments of participants at seminars at Iowa State, Minnesota, Utah State, and Wisconsin. Remaining errors are mine entirely.

¹These other three policy sets are treated as exogenous in this paper, but a particularly promising line of research allows for jointness in policy determination. The importance of jointness in pricing and technology policies has been demonstrated by DeGorter, Nielson, and Rausser; DeJanvry, Sadoulet, and Fafchamps; Rausser (1982 and 1992), and most prominently in the theory of induced innovation (Binswanger and Ruttan). DeJanvry (1981) has developed the notion of jointness in pricing and land policies.
path-dependency — suggest how different policy choices can lead to important differences in resulting coalition alignments, with potentially significant implications for the political sustainability of agricultural development strategies.

Economic studies of government intervention in the production, marketing and pricing of agricultural commodities have flourished in recent years. This literature exhibits three distinct traditions, the first two of which are often labelled "political economy". The first, born of public choice theory (Buchanan and Tullock) and accelerated by pathbreaking work on interest group and bureaucratic behavior (Olson 1965; Krueger 1974; Bhagwati), emphasizes the non-neutrality of government, its manipulability by special interests, and the government failures that may result. Interest groups generally enter such studies exogenously as analysts explore the consequences of self-interested behavior by bureaucrats, politicians, and pressure groups. The second tradition descends from Pigouvian welfare economics and social choice theory, and manifests concern over the reconciliation of individual preferences in collective choice and resolution of market failures through government intervention (Arrow; Sen). In this genre, government, if modelled at all, tends to be a neutral medium, led by a benevolent social planner, and politics rarely appear *per se*. Despite considerable ideological and methodological differences, current practitioners from these

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2 Swinnen and van der Zee survey 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; Gibbard; Satterthwaite). Moore and Palfrey provide good surveys, and Coggins an application.
two traditions both aim to explain government policies determination. That is, they look at how economic factors influence political equilibria.

The third tradition draws on the normative classical and neoclassical literature to explore the economics of food price policies. These works build appealingly from microeconomic models of individual behavior. But because those are usually representative agent models, they generally ignore the conflicting preferences inherent to a heterogeneous society and the resulting contest between groups seeking to impose their preferred policy regime. 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 fifteen years.

A considerable gap exists between the economics of food price policy literature, which foreshadows but does not address the alignments of conflicting interests into political coalitions, and the political economy of food price traditions, which explore policy choices without providing a coherent theory to explain the underlying preferences which coalesce individuals in the debate. This paper helps to fill that void by breaking from those traditions in three significant ways. First, unlike the classical normative literature, it models a continuum of agents differentiated by endowments and considers explicitly the opposing, endogenous political support of distinct subpopulations for food price policies. Second, the paper goes only as far as modelling the material predisposition of

\[ \text{4 The classics here include: Preobrazhensky and the price-scissors debate centered around Soviet food policy; Lewis and the dual economy models that present agricultural prices as a lever for the transfer of surplus from a backward agricultural sector to a modern industrial sector; and Timmer, Falcon and Pearson, and Timmer, which returned economists' attention to more neoclassical, welfare-theoretic approaches.} \]
individual members of a polity to oppose or support particular policies. It does not concern itself with political equilibrium, for reasons discussed in the concluding section. In this way, this paper betrays a belief that the common desire to answer the big questions of government intervention tempts us economists to apply our analytical tools beyond their comparative advantage in social science, and to ignore logically antecedent issues — such as the microeconomics of coalition alignments — on which we can perhaps contribute relatively more. Finally, this analysis admits uncertainty, considering simultaneously agents' preferences regarding the mean and the variance of stochastic agricultural prices.

The plan of the paper is as follows. The first section introduces a long-standing puzzle of agricultural price policy and some prominent contributions to its resolution. The second section then models households' preferences over the first two moments of food price distributions (i.e., mean and variance) that are conditional on endowments. This establishes the microeconomic basis for coalition alignments and permits numerical simulation of the comparative static implications of different development strategies for coalition alignments, and the possible consequences for food price policy. A concluding section summarizes the findings and identifies some potentially fruitful extensions of this model.

The Developmental Paradox

The "food price dilemma", as spelled out by Timmer, Falcon and Pearson, is that consumers always want lower food prices and producers always want higher food prices. A related dilemma revolves around the issue of food price stability, as groups regularly agitate for and against government interventions to stabilize commodity prices. Policy makers thus face conflicting
pressures from different constituencies over the first two moments of stochastic food price distributions. How shall one understand the resulting political economy process and what implications does it have for economic policy design?

One approach scholars have taken in attempting to answer that question is to try to solve a long-standing puzzle of comparative economics. Why is it that overwhelmingly agrarian, low-income economies tend to discriminate against food producers, but as economies develop and agriculture shrinks relative to the rest of the economy, policies turn to favor farmers (Gardner; Krueger 1992; Lindert; Olson 1985; Timmer 1993b)? In the words of Lindert (p.29), "the more advanced the nation, the more its government favors agriculture." This empirical regularity, sometimes known as the "developmental paradox", has been frequently stated but infrequently explained in a consistent and general fashion.

There exist several parallel explanations for the developmental paradox. Anderson, Fulginiti and Shogren, Gardner (1987), Lindert and Olson (1965 and 1985) emphasize the characteristics of the competing groups. Farmers in agrarian societies lose out while farmers in post-agrarian societies benefit from agricultural policy because mobilization and compensation of a small group is more efficient than for a large group, due especially to free rider problems. The likelihood of successful collective action improves as well with group homogeneity, longevity and physical proximity. In its crudest form, this is an argument based on the demography of industrialization. Lindert and

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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 well-known methods for tackling the two subjects simultaneously.
Fulginiti and Shogren 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. In this view, it is perhaps not only the relative sizes of conflicting groups but also the intensity of the motivation of individual group members to push their interests vociferously. Others deemphasize issues of collective action and cite high-income populations' lower price elasticities of demand for food — resulting in lower deadweight losses from redistributive interventions (Tyers and Anderson) — or lower shares of food in consumer expenditures — weakening consumer resistance to higher food prices (Balisacan and Roumasset; Swinnen) — as a reason for the developmental paradox.

The existing literature on the developmental paradox offers insightful empiricism, elegant models of government and interest group behavior, and poses intriguing and logical hypotheses, but nonetheless lacks an integrating microanalytical foundation. It also considers exclusively average price levels, ignoring the equally ubiquitous question of food price stabilization. In these ways it is a microcosm of a broader literature on the political economy of food price policy. We turn now to model microeconomically the conditional heterogeneous patterns of individual preferences that permit the organization of into political coalitions.

A Household Modelling Approach to Determining Preferences Over Stochastic Prices

The dichotomous construction in the first sentence of the last section — of food consumers desiring low prices poised against food producers seeking high prices — is a fiction. After all, food

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*Bates (1981 and 1983); Rausser (1982 and 1992), and Rausser and Foster are important examples.*
producers everywhere also consume food. A more accurate construction than this functional classification is households' net exchange relations, i.e., 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.\footnote{7} A continuum of marketed surplus positions offers a more accurate classification scheme than the more common binary categorization. The distribution of a population along that continuum in turn depends on the spatial distribution of the population between agricultural and nonagricultural zones, the distribution of land and other productive assets (including farm management skills) among households located in agricultural zones, and the set of available food production technologies. This becomes the first building block 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 \textit{return}.

The second building block is that food prices are uncertain. They are uncertain not just for producers who cannot know in the planting season what price their crop will fetch at harvest, but also for consumers who wish to eat in each of several periods, while prices in (at least one) future period(s) are almost surely uncertain. All households make decisions regarding food consumption, production, or both, over subjective probability distributions of food prices. Households' preferences with respect to the moments of food price distributions may vary along the marketed

\footnote{7} Weber \textit{et al.} offer data on net seller proportions among African agriculturalists. Ghai and Smith point out, conversely, that not all urban households are net consumers of food. These empirical studies establish that stylized binary divisions are too crude to be of much relevance to policy analysis.
surplus continuum. If one assumes a strictly monotonic mapping from per capita land endowments to marketed surplus, in other words that net food sales increase with a household's agricultural land holdings, some interesting potential political cleavages emerge within the agricultural sector.

Assume a household exhibits Von Neumann-Morgenstern utility defined over consumption of leisure \(L^1\)\(^8\) and two goods: a staple (S), and a non-staple (N).\(^9\) 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 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, \(L^s + L^1 + L^h \leq L^0\). 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 thus can be expressed as

\[
\text{Max } \mathbb{E} \text{ Max } U(L^1, N, S) \\
\text{s.t. } P^s S + P^n N \leq Y^* \\
Y^* = w(L^s - L^d) + PF(L, T) + I \\
L = e(L^d, L^h) \\
L^0 \geq L^h + L^1 + L^s
\]

(1)

\(^8\) Superscripts distinguish among goods, subscripts denote derivatives.

\(^9\) Although this construction applies literally to monocultural regions only, if aggregability holds, S and N are food and non-food quantity indexes, respectively, allowing generalization.
where $E$ is the mathematical expectation operator, $P^s$ is the staple price, $P^n$ is the non-staple price, and $Y^*$ is 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) permits derivation of a variable indirect utility function, $V(L^1, P^s, P^n, Y^*)$. $V(.)$ is homogeneous of degree zero in $(P^n, P^s, Y^*)$ and, therefore, invariant to units of measurement. So set $P^n=1$ and let $P>P^n$ and $Y=Y^*/P^n$. 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. But what about preferences with respect to the variance of staple prices? To determine the household's aversion to price risk, as reflected in the sign of $V_{PP}$, i.e., in the curvature of indirect utility in prices, we generalize the findings of Turnovsky, Shalit and Schmitz and Newbery and Stiglitz. Exploitation of Roy's Identity provides the local result that

$$
\begin{align*}
V_{PP} &= V_{YP} M + V_Y \frac{\partial M}{\partial P} \\
V_{PY} &= V_{YY} M + V_Y \frac{\partial M}{\partial Y} = V_{YP} \quad \text{(by symmetry)} \\
V_{PP} &= M (V_{YY} M + V_Y \frac{\partial M}{\partial Y}) + V_Y \frac{\partial M}{\partial P} \\
V_{PP} &= MV_Y \left[\beta(\eta-R)+\epsilon\right] \div P
\end{align*}
$$

(2)

---

10 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.

11 This follows directly from Roy's Identity: $V_Y M = V_P$
where \( M = F - S \), is marketed surplus, \( \beta \) is the budget share of marketed surplus (MP/Y), \( \eta \) is the income elasticity of marketed surplus, \( R \) is the Arrow-Pratt coefficient of relative risk aversion (\( R = -Y V_{yy} / V_y \)), and \( \varepsilon \) is 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 \( V_{pp} < 0 \). Quasi-convexity of the indirect utility function in prices generally renders these preferences ambiguous. As (2) demonstrates, \( V_{pp} \) depends on the income and price elasticities of marketed surplus, the budget share of the marketed surplus and on the household's coefficient of relative risk aversion. The necessary and sufficient condition for \( V_{pp} < 0 \) is \( R > \eta + \varepsilon / \beta \).\(^{13}\)

Reduce the expression on the righthand side of (2) to readily estimable or observable variables, and one obtains a price risk analog to Pratt's coefficient of absolute income risk aversion. Let the coefficient of absolute price risk aversion, \( \alpha \), be defined as follows:

\[
(3) \quad \alpha = - V_{pp} / V_y = M[\beta (R - \eta) - \varepsilon] / P
\]

\( \alpha \) is a unitless measure. A positive coefficient of absolute price risk aversion, \( \alpha > 0 \), implies \( V_{pp} < 0 \), and thus is subject to the same necessary and sufficient condition.

It should be apparent that \( \beta \) is the key to price risk aversion. \( R \) will almost always exceed \( \eta \) for staples, so the sign of \( \alpha \) turns on the term \( \varepsilon / \beta \). If a "staple" is, in fact, not especially important in either expenditure or revenue terms (\( i.e., \beta = 0 \)), then uncertainty surrounding its price is unlikely

\( ^{12} \) This is the negative of Deaton's net consumption ratio which represents the elasticity of the cost of living with respect to the staple price.

\( ^{13} \) The proof of the necessary and sufficient condition is available from the author on request.
to concern a household significantly. This is the case for virtually all commodities in the developed world; only a small coalition of specialized producers have much at stake in a particular commodity price and they demonstrate significant price risk aversion. This is the prevailing belief in the existing literature which thus generally finds commodity price stabilization to be welfare reducing (Turnovsky, Shalit and Schmitz; Newbery and Stiglitz; Behrman). That belief follows directly from the developed world context in which most of the analysis has taken place. No commodity is more than five or ten percent of American and European consumers' budgets, and few farmers even derive more than half their income from a single crop. Newbery and Stiglitz have implicitly recognized the importance of \( \beta \) when they make the point that price stabilization is more likely to be beneficial in monoculture than in diversified production systems. Indeed, if the crop is the key to the household's earnings (as \( \beta = 1 \)) or is heavily dominant in its diet (as \( \beta = -1 \)), variable prices may impinge seriously on household well-being. Household budget shares for staple commodities have been shown to be quite high in Sub-Saharan Africa, often reaching 60-70 percent (Weber et al.; Budd; Barrett and Dorosh). It should come as little surprise that agents' preferences with respect to commodity price stability can vary across radically different economic environments, i.e., that price risk aversion might exist among poor agrarian populations even though it is generally thought unlikely in wealthier, industrial countries. This variation can occur intertemporally as well, in the course of a country's economic growth.

Within the agricultural sector, it is reasonable to conjecture a strictly positive monotonic mapping from either income or wealth to land holdings, so land will be the asset endowment that
varies across households. If the underlying parameters and marketed surplus quantity vary systematically with land holdings, so too might preferences with respect to the mean and variance of food prices. Thus, one can represent (3) as an implicit function of T and P.

\[
A(P,T) = M(P,T) \left[ \beta(P,T) (R(P,T) - \eta(P,T)) - \epsilon(P,T) \right] / P
\]

Structural variation in preferences over the mean and variance of the staple food price distribution could thus have profound implications for the capacity of food consumers or producers to form coalitions capable of exerting influence in food price policy deliberations.

**Coalition Formation Among Heterogeneous Households**

Most contemporary political economy studies take interest group alignments as given, and then explore how a political-economic equilibrium might emerge through group bargaining. Structure, although central to such studies, is too often left unexplained. The preceding section

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14 A substantial empirical literature has demonstrated that the relevant parameters vary systematically with income and wealth (Antle; Binswanger; Pinstrup-Anderson and Caicedo; Pinstrup-Anderson, Londoño and Hoover; Pitt; Timmer (1981); Timmer and Alderman; Waterfield).

15 Although prices are assumed uniform across all land endowments here, DeJanvry's suggestion that prices might also vary with farm size would not affect the qualitative results.

16 Important exceptions to that rule include DeJanvry (1983) and DeJanvry, Sadoulet and Fafchamps.
offers a way to understand the source of coalition alignments, as well as to track the endogenous evolution of coalition alignments in the wake of policy choices. In what follows, the above results are interpreted in coalitional terms and tied to the state of agricultural technology and the underlying land and population distributions in different societies. As the substantial political economy literature demonstrates, these endogenous patterns of coalition formation then substantially influence the political economy of food price policy.

Concentrating on any single food crop, or on food as a composite commodity, it is but a mild oversimplification to claim a monotonically increasing relation between a household's land holdings and its expected marketed surplus. This creates a continuum along which naturally arise groupings of individuals according to their preferences with respect to the mean and variance of the food price distribution. Numerical simulation based on common strata-specific parameter values generates the basic pattern found in Figures 1a and 1b. These two figures depict the implicit function $A(P,T)$. 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 and the relevant parameters were varied 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 lefthand and righthand limits both equal zero, so the curve appears smooth in these figures.
of equation (4) and the budget share of marketed surplus ($\beta$) in the land domain, i.e., how preferences with respect to the mean and variance of food prices change with household land holdings per capita. In each figure, the vertical line labelled "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 the price risk averse.

Figure 1a depicts the pattern of 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," i.e., those who farm but remain net buyers, favor low but volatile prices, while big farmers favor high and stable prices. Available technologies render the subsistence endowment relatively small; the vast majority of landowning households have ample land holdings per capita to provide for their subsistence needs. Figure 1a demonstrates that the present framework nests within it both the consumer-oriented risk analyses of Newbery and Stiglitz and Turnovsky, Shalit and Schmitz and the producer-oriented results of Sandmo.

A further virtue of the present microanalytical approach is that it generalizes not just along the marketed surplus continuum, but across economic structures. By changing the underlying parameter values in (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. To illustrate the cross-sectional potential, Figure 1b presents a parallel depiction of the price preference patterns simulated in a stylized low-income agrarian economy. The results clearly differ from those in Figure 1a. Net buyers represent a much larger interval of the land distribution due to a less productive portfolio of feasible technologies.
Furthermore, the net buyers with the smallest land endowments per capita exhibit 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. 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 and 1983; Lipton) may well reflect an alliance among net food buyers both outside and within agriculture. Food price stabilization simultaneously evident in many such economies (Krueger, Schiff and Valdés) meanwhile results from a somewhat different alliance among large farmers and the poor. The general point to be made is that the agricultural sector may be far less cohesive than is commonly assumed, for instance by empirical studies that employ sectoral indicators as explanatory variables (e.g., in estimating political preference function weights).

Examination of the layout of Figures 1a and 1b, abstracting from the plots themselves, one can see a general policy preference matrix that groups households according to their preferences over the expectation and variance of the staple price distribution (Figure 2). The groups identified

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18 Together, these figures echo Finkelshtain and Chalfant's 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 results apply over a wide range of producers, they are not perfectly general.

19 Skålnes and Bratton demonstrate this vividly in this case of Zimbabwe.
in the matrix correspond to the partitioning of households into net buyers and sellers and into price risk averse or price risk loving. Non-agricultural households clearly all 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 nonagricultural population over the two cells in the left column will depend especially upon the overall standard of living and the distribution of (especially urban) incomes.\(^{20}\)

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). As is apparent from Figures 1a and 1b, however, range 3 is likely to be lightly populated given most reasonable parameter estimates.\(^{21}\)

The policy preference matrix presents four groupings of households, each of which is

\(^{20}\) 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).

\(^{21}\) The figures depict conditional expectation functions. Clearly there is a distribution of household incomes for any given value of land holdings per capita. Those income differences affect the parameters in (4), thereby yielding distributions of $A$ conditional on values of land holdings per capita. Households on the upper tail of those distributions for range 4 values of land holdings per capita would constitute range 3.
distinguished from the others by its binary preferences over the first two moments of the food price
distribution. Several structural factors substantially influence the distribution of a population
across the four cells of 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 $M=0$, given
technology. As Figures 1a and 1b depict, $T^0$ separates the small peasant-urban lower (SPUL) and
medium peasant-urban upper (MPUU) classes from agro-industrialist (AI) and commercial farmer
(CF) classes. Assume there exists a function $G(.)$ relating $T^0$ to household size ($POP$), per capita
energy requirements as determined by the intensity and duration of labor ($ER$), and the productivity
of the land ($TECH$), as determined by both available production, processing and storage
technologies and natural resource variable such as soils and hydrology. As these structural variables
change, so too does $T^0$ as follows:

$$T^0 = G(ER, POP, TECH)$$

with $\frac{\partial T^0}{\partial TECH} < 0$
and $\frac{\partial T^0}{\partial ER}, \frac{\partial T^0}{\partial POP} > 0$

Increasing land productivity, decreasing farm family size, and lower per capita energy requirements
shift the subsistence endowment to the left from Figure 1b to Figure 1a. This narrows the land
interval falling 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

22 Note this simplistic presentation is only binary although one could readily extend this to
capture the relative intensity of preferences.

23 It should be noted that by the definition of $M=F-S$, where $F$ is (technically efficient)
production, technological change affects $\beta$, $\varepsilon$, $\eta$, and $R$ already.
developmental paradox begin to appear. As average farm size increases and land productivity increases with consolidation and mechanization, the number of non-commercial 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 sector begins to speak with a unified voice in favor of relatively high and stable commodity prices. Moreover, this plainly demonstrates the inherent jointness of agricultural pricing, technology, land, population and nutrition policies.

The central points of the existing explanations of the developmental paradox, as already reviewed, are imbedded within the current model. Emphasized changes in food price elasticities, consumer expenditure shares, and farmers' income sensitivity to prices are, in effect, observations on the correlation of $M, \eta, \beta$ and $e$ 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 the subsistence endowment and the distribution of households across cells of the policy preference matrix. Thus the present model nests within it several popular existing explanations of the developmental paradox.

Moreover, the above construction reintroduces the important issue of 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, Schiff and Valdés demonstrate empirically that most low-
income countries have followed regimes of low mean and variance in agricultural prices. However, by portraying this approach as "Pareto-inferior and evidently irrational" (Krueger 1992, p.2) because of the deleterious effect on producer incentives as represented by mean farmgate prices, they ignore 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), will benefit some subpopulations and harm others (Barrett and Carter). Whether it is politically feasible or an optimal social choice is analytically indeterminate.

Summarizing, economic development is usually characterized by structural changes that induce shifts in individuals' material interests regarding policies affecting stochastic food prices. Increasing farm productivity, less physically taxing labor, small 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, $\beta$, and the distribution of the population, especially the farming population, across the policy preference matrix.

### 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 changing 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, when a polity agrees to and implements a particular
agricultural development strategy, how does enactment of that policy impact on the political structure undergirding subsequent periods' policy debates? As quickly becomes apparent, coalition alignments in food price policy are path-dependent.

Among the basic strategies that have been pursued by developing countries in an effort to stimulate food production, manipulation of prices through direct (e.g., price controls) or indirect (e.g., exchange rates, tariffs) means, and the development and dissemination of improved production technologies (e.g., hybrid seeds, extension services) stand out as two of the most common. Especially in the heyday of the Green Revolution, agricultural technology improvements were deemed central to food policy. More recently, especially in the context of economic reform and structural adjustment programs, pricing policies have attracted greater attention, and the efficiency of border pricing has been broadly proclaimed.

The crude numerical simulation exercise that generated Figures 1a and 1b was repeated under two different partial equilibrium scenarios in order to explore what, if any, implications these two different strategic approaches have for the coalition alignments that undergird food price policy. In the first scenario, food prices in the low-income agrarian economy of Figure 1b are increased 25 percent, to a hypothetical border parity. This is a stylization of the experiences of a great 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

24 The substitution effects dominate the income effects on marketed surplus.
equation (4) for many of the 750 representative households. The consequences for representative households' two-moment preferences, on which coalition alignments are based, is depicted in Figure 3a. The curve from Figure 1b is reproduced in Figure 3a 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. Two developments are especially interesting. First, the marginal net buyer subpopulation that positively values variable food prices shrinks markedly, with most becoming net sellers. Second, the intensity with which net sellers desire stable commodity prices increases substantially following a price increase.

The political implications are apparent. First, higher food prices augment latent demand for price stabilization, both at the extensive and intensive margins, while decreasing resistance to price stabilization, again 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) toward 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

25 Back in the 1970s, Harriss made this observation regarding food price policy in the
The more intense struggle for price stabilization among net sellers in high-income high-price countries (e.g., France) is also consistent with these results, as are hybrid food pricing policies commonly found in the developing world.

In the second scenario, technological improvements in food production in the low-income agrarian economy of Figure 1b lead to a 15 percent 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 Figure 3b. 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,

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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).

Jayne notes that infrastructural improvements may have many of the same effects as technological improvements. By reducing transactions costs and perhaps improving the competitiveness of agricultural marketing channels, farmers' enjoy enhanced ability to exchange their crop for some less expensive nutrient source.
as represented by the redistribution of land-space across the policy preference matrix.

Table 1 demonstrates that because technology or infrastructural 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, 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 and infrastructural 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 cannot be diagrammed in the same fashion. Regardless, the logic should be clear that if land reform replaces a broad bimodal distribution of cultivable lands with a compressed unimodal distribution centered above the subsistence endowment,\(^{27}\) this shifts people to the commercial farming class. Indeed, the developing world's most successful price

\(^{27}\)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.
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, and Green Revolution technologies subsequently reinforced the dominance of commercial farmers within the agricultural sector. If one subscribes 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.

Conclusions

The nub of the approach presented here is that individual households are not identically endowed with land and perceive prices as nondegenerate stochastic distributions. Those who expect to be net food sellers prefer a high expected price, and those who expect to be net food buyers, a low one. Preferences with respect to price variability depend on the curvature of household's indirect utility in prices. This curvature measure is a straightforward function of commonly estimated parameters, and can be captured in a coefficient analogous to Pratt's coefficient of absolute (income) risk aversion. Household preferences with respect to the mean and variance of stochastic food prices evolve predictably with changes in agricultural technology, land and population distribution. Although not new, these tools are strikingly underemployed in political economy arguments. When exploited, the results yield coalition alignments with striking structural variability.
This paper follows the economic choice-theoretic approach commonly found in the political
economy literature.\textsuperscript{28} However, it confines analysis to the determination of coalition alignments,
eschewing direct explanation of agricultural price policy determination, which has preoccupied
contemporary political economists. This restraint results from a belief that economists' tools are
ultimately unsatisfactory to explaining political processes satisfactorily.\textsuperscript{29} The problem is that our
models admit no role for charisma, conscience, cultural affinity, ideology, language, or nostalgia.
Such elements are as essential to a proper, generalized theory of policy determination as is economic
self-interest. The literature on farm politics in history, political science and sociology is rich with
compelling accounts of the importance of these 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, the "coalitions" developed in this paper
really require the modifier "latent" to reflect the fact that the objective, material predisposition of
individuals (which I sometimes code as "classes") may not be fully reflected in expressed, subjective
interest groupings. Non-material forces may prompt defections from materially-defined interest
groups or produce markedly different levels of activism across coalitions. This leaves economists
on somewhat shaky ground for attempting convincing explanations of political decision-making.
Our tools are far better suited to developing the differentiated material interests that substantially

\textsuperscript{28} It is also class-based, in the spirit of Roemer.

\textsuperscript{29} Bullock offers a quite different, technical critique of the methods most commonly
employed in political economy studies.
undergird coalition alignments, although such exploration has been absent until now.

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 (DeGorter, Nielson and Rausser; DeJanvry 1981; DeJanvry, Sadoulet and Fafchamps; Mellor, Delgado and Blackie; 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, and technology policy was similarly married to price policy in India, Indonesia and Pakistan (APO, Sicular). 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). 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

Figures 1a and 1b 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 below. 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 \beta can result from relatively fine changes within a range of structural and behavioral parameter values commonly reported in the literature.

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<th>Y</th>
<th>M</th>
<th>V_y</th>
<th>\beta</th>
<th>\eta</th>
<th>R</th>
<th>e^{Hicksian}</th>
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High-Income Post-Agrarian Economy Stylization

Starting Value:  
10,000  -200  15.00  -0.02  -0.71  2.50  -0.58  -0.59  
10,050  -190  14.99  -0.02  -0.71  2.51  -0.57  -0.59  
10,100  -180  14.98  -0.02  -0.71  2.52  -0.57  -0.59  
...  ...  ...  ...  ...  ...  ...  ...  
25,100  2,820  11.98  0.11  0.41  3.69  -0.35  -0.39  
25,150  2,830  11.97  0.11  0.41  3.69  -0.35  -0.39  
25,200  2,840  11.96  0.11  0.41  3.69  -0.35  -0.39  
...  ...  ...  ...  ...  ...  ...  ...  
47,400  7,280  7.52  0.15  0.20  3.63  -0.01  -0.04  
47,450  7,290  7.51  0.15  0.20  3.63  -0.01  -0.04  

Ending Value:  
47,500  7,300  7.50  0.15  0.20  3.63  -0.01  -0.04  

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<td>0.22</td>
<td>3.14</td>
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**Ending Value:**

|                | 4,050  | 500    | 29.63  | 0.12   | 0.22   | 3.14  | -0.02  | -0.05  |
Endowment—Dependent Price Preferences

Figure 1a: High-Income Post–Agrarian Economy

Figure 1b: Low-Income Agrarian Economy
Figure 2: Policy Preference Matrix

Preferences over mean price

Small peasant-Urban lower classes (SPUL)                  Commercial farmer class (CF)

Preferences over price variability

A=0

Medium peasant-Urban upper classes (MPUU)                 Agro-industrialist class (AI)

low       B=0       high

Preferences over mean price
Coefficient of absolute price risk aversion (A)
Income share of marketed surplus (B)
Household land holdings per capita

Figure 3b: I5% Yield Increase Scenario

Figure 3a: 25% Price Increase Scenario

Comparative Statics of Price Preferences
<table>
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<tr>
<th>Range Description</th>
<th>Base Scenario (Figure 1b)</th>
<th>Scenario 1 (Figure 3a)</th>
<th>Scenario 2 (Figure 3b)</th>
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<td>13%</td>
<td>3%</td>
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<tr>
<td>Range 2 (risk-loving net buyers)</td>
<td>20%</td>
<td>12%</td>
<td>22%</td>
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<tr>
<td>Range 4 (risk-averse net sellers)</td>
<td>67%</td>
<td>75%</td>
<td>75%</td>
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</table>
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THE MICROECONOMICS OF COALITION ALIGNMENTS:
SOME INSIGHTS ON FOOD PRICE POLICY*

Christopher B. Barrett

* Christopher Barrett is an assistant professor of economics at Utah State University. This paper has benefited from conversations with Michael Carter, Jean-Paul Chavas, Jay Coggins, Marcel Fafchamps and Peter Timmer, and from the comments of participants at seminars at Iowa State, Minnesota, Utah State and Wisconsin. Remaining errors are mine entirely.
The Microeconomics of Coalition Alignments: Some Insights on Food Price Policy

This paper concerns the objective alignment of individuals' material interests into groupings for collective action, and how those groupings vary with economic structure and in response to previous periods' policy choices. 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 the inherent inextricability of price policy from land, population, and technology policies in food agriculture. Moreover, coalition alignments on particular policy debates are path-dependent; i.e., they are in part the consequence of past choices on these same policies.

This paper is explicitly descriptive and implicitly prescriptive. Its positive contribution is an improved understanding of why the political environment surrounding food price policy differs so markedly across time within a given country as well as cross-sectionally among countries at any given time. By returning political economy analysis to microfoundations, a normative dimension emerges as well. The two earlier-mentioned characteristics of the model results — jointness and

1 These other three policy sets are treated as exogenous in this paper, but a particularly promising line of research allows for jointness in policy determination. The importance of jointness in pricing and technology policies has been demonstrated by DeGorter, Nielson and Rausser; DeJanvry, Sadoulet and Fafchamps; Rausser (1982 and 1992), and most prominently in the theory of induced innovation (Binswanger and Ruttan). DeJanvry (1981) has developed the notion of jointness in pricing and land policies.
path-dependency — suggest how different policy choices can lead to important differences in resulting coalition alignments, with potentially significant implications for the political sustainability of agricultural development strategies.

Economic studies of government intervention in the production, marketing and pricing of agricultural commodities have flourished in recent years. This literature exhibits three distinct traditions, the first two of which are often labelled "political economy". The first, born of public choice theory (Buchanan and Tullock) and accelerated by pathbreaking work on interest group and bureaucratic behavior (Olson 1965; Krueger 1974; Bhagwati), emphasizes the non-neutrality of government, its manipulability by special interests, and the government failures that may result. Interest groups generally enter such studies exogenously as analysts explore the consequences of self-interested behavior by bureaucrats, politicians, and pressure groups. The second tradition descends from Pigouvian welfare economics and social choice theory, and manifests concern over the reconciliation of individual preferences in collective choice and resolution of market failures through government intervention (Arrow; Sen). In this genre, government, if modelled at all, tends to be a neutral medium, led by a benevolent social planner, and politics rarely appear per se. Despite considerable ideological and methodological differences, current practitioners from these

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2 Swinnen and van der Zee survey 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; Gibbard; Satterthwaite). Moore and Palfrey provide good surveys, and Coggins an application.