A Theory of the Political Economy of Inclusive Rural Growth

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Abstract

Commentators on the "East Asian Miracle" of inclusive growth have often pointed toward shared rural growth policies (*e.g.*, investment in infrastructure, education and financial institutions) as a key to the miracle. But why were these policies chosen in East Asia and not elsewhere, and what can we learn from East Asia to understand the likelihood that shared growth policies will be chosen and sustained in parts of Africa and other regions that have yet to resolve the challenges of rural growth and poverty? To help answer these questions, this paper develops a political economy model in which agents are arrayed along a wealth continuum, from poor to rich. Agents live two periods and allocate their wealth between current consumption and investment in either a simple, subsistence technology, or in a more complex technology in which the productivity of private capital is complemented by the amount of public good investment. Because fixed costs are associated with the shift to more complex technologies, optimal investment strategies and choices of technology vary along the wealth continuum.

Each agent in the model is also endowed with one vote. We examine the structure of political competition between two parties that campaign based on promised levels of public goods (which must be financed with tax revenues). We assume that voters who use the subsistence technology are uninformed and probabilistically vote for the party that raises the most political contributions. Voters who use the complex technology are assumed to be informed and are not swayed by messages funded by political contributions. All voter have innate political leanings that are randomly distributed in the population. While standard models of political competition assume that fundraising is costly, we here take the political budget constraint seriously and explicitly model the micro-foundations of political budgets and consider each agent's maximum willingness to pay to support a particular public good/tax rate policy.

We then use this model to explore the impact of different initial wealth distributions. When initial asset inequality is high (as in Latin America), a policy that provides positive amounts of public goods is unlikely to garner the votes to defeat a zero public good policy. When initial asset inequality is low (as in East Asia), policies to provide public goods are more likely to succeed. Extensions of the model show that increasing production risk has a political economic impact akin to high inequality. Together, these insights suggest that certain kinds of interventions (risk reduction measures, modest asset redistributions) may have knock-on effects as they increase the likelihood that shared growth and growth-promoting policies will endogenously emerge and be sustained.

1 Introduction

Twenty years ago scholars and practitioners of economic development paused to consider the meaning of the 'East Asian Miracle' of rapid *and* inclusive economic growth. Standing in particularly sharp contrast to the miracle of East Asia was Latin America, described by some as mired in a vicious circle of modest and exclusionary growth. While much was learned about the shared growth policies that helped create inclusive development in East Asia, there was also a revisionist reminder that policymaking is not cookery, and that recipes that worked in one locale will not be replicated elsewhere by a set of disinterested chefs. In other words, the revisionist question was not what was done differently in East Asia, but why did East Asian political actors choose differently than those in Latin America.

This revisionist perspective retains its salience as we pause again, this time to consider the implications of the East Asian experience for for inclusive economic development in Africa. It remains important to know the recipes for the policies that work, but it is also important to consider the political economy behind the choices that are made. The goals of this paper are threefold. The first goal is to revisit the earlier debate on inclusive versus exclusionary growth in East Asia and Latin America, extracting from it a political economy model of policy choice. The second goal is to enrich that model to include key stylized features of the rural African economic landscape. The third and final goal is to use the model to identify a sustainable sequence of inclusive rural growth policies, meaning policies designed to promote and engage a political economy that will endogenously continue and deepen inclusive growth policies.

The political economy model that lies at the heart of our analysis is based on the idea that public goods complement the productivity of private investment, especially for small and marginal commercial producers. Government provision of these public goods not only increases growth (by crowding-in private investment), it reduces inequality by creating broadly based or inclusive growth, especially as it facilitates the transition of low wealth individuals from subsistence to more remunerative commercial production. However, because the benefit derived from public goods vary by asset level, so does the willingness to vote in favor of policies that fund public good provision through taxation. Using a model of political competition, we show that the equilibrium policy that emerges is sensitive to the initial distribution of wealth. Shared or inclusive growth policies are much more likely under lower inequality scenarios.

While this inequality-centric model captures much of the earlier debate about Latin America versus East Asia, we extend the model to show that agricultural risk–of the sort observed in large parts of Africa–operates much like inequality. Risk and isolation can trap large numbers of households at low levels of income, making them of little interest to both economic and political entrepreneurs. In this circumstance, the latter have little to gain from offering policies designed to appeal to the trapped population. In this circumstance, even economies with relatively modest levels of asset inequality may operate like high inequality Latin American economies, with politi-

cians eschewing investment in shared growth-promoting public goods in favor of other pathways to political power. Section 5 closes the paper by considering policies that might break or relax the poverty trap logic, thereby changing the political calculus in ways that would make inclusive growth policies more likely and self-sustaining.

The remainder of this paper is organized as follows. Section 2 revisits the earlier East Asian miracle debate. Section 3 then constructs a formal political economy model that attempts to codify some of the insights that emerged from that debate about the impact of initial asset inequality on endogenous policy choices. Section 4 then extends the model to consider the impact of isolation and risk on policy choices.

2 Vicious and Virtuous Circles of Economic Growth in East Asia and Latin America[1]

The observation that East Asian economies simultaneously experienced rapid growth with low and diminishing inequality provoked a rethinking of the linkages between growth and inequality. The World Bank's *The East Asian Miracle*, published in 1993, as well as the follow-up work reported in the Aoki, Kim and Okuno-Fujiwara volume (1997), played important roles in sparking this rethinking. The aptly named book, *Beyond Tradeoffs: Market Reform and Equitable Growth in Latin America*, (Birdsall, Graham and Sabot, 1998) emerged from this discussion and was intended to be a policy primer to enable Latin American governments to emulate the inclusive growth patterns observed in East Asia. As a prelude to thinking about the implications of the East Asian experience for contemporary Africa, this section looks back at this earlier discussion on growth and inequality in East Asia and Latin America. This section first briefly reviews some of the macro-econometric evidence that sheds light on these linkages. We then turn to consider the possible microfoundations for such linkages, using them as a springboard to launch a deeper exploration of the political economy of inclusive growth policies.

2.1 Macro-econometric Evidence of the Impact of Initial Inequality on Inclusive growth

In a particularly provocative paper, Birdsall et al. [1995] employed cross-country data and showed that controlling for the level of per-capita GDP, aggregate human capital accumulation is enhanced by greater income equality (and its implied higher absolute incomes for the least well off members of a society). In their interpretation, the rapid, inequality-reducing growth characteristic of the East Asian experience can be understood as the product of a process in which low initial levels of inequality do three things:

[1] This section draws on Carter and Coles [1998].

1. Enhance aggregate accumulation;

2. Increase the rate of economic growth; and,

3. Boost the relative capital accumulation of lower wealth households, further decreasing economic inequality.

In other words, low initial inequality creates a virtuous circle of inclusive growth. Conversely, high inequality would seem likely to create a vicious circle of exclusionary growth.[2]

The suggestion that the level of inequality conditions the income distribution consequences of economic growth received further support from studies of agricultural growth and inequality. A time series econometric study by de Janvry and Sadoulet [1996] finds that agrarian growth in Latin America is associated with sharply increasing rural inequality. While we know of no similar study of East Asian growth, a study by Ravallion and Datt [1995] of growth across Indian states provides an interesting and informative comparison with the de Janvry and Sadoulet results. Ravallion and Datt find that in India it is agrarian growth that is most strongly associated with reduced poverty and inequality. Interestingly, however, they also finds that growth in Bihar—the Indian state with sharp, near Latin American levels of land inequality—appears to contradict this general pattern. Perhaps the most troubling aspect of the de Janvry and Sadoulet result is that they find that the association between agrarian growth and increasing rural inequality has been even stronger in recent, post-liberalization growth spells than it was in earlier periods of growth. While the estimated increase in inequality is not so sharp as to increase rural poverty in the wake of agrarian growth, it has clearly blunted the potentially positive impact of growth on rural poverty, as de Janvry and Sadoulet analyze in some detail.

Finally, Carter [2004] employs mixed effects econometric methods to explore directly whether initial land ownership inequality shifts the relationship between aggregate economic growth and income distribution. Drawing on a standard decomposition of the Gini index, he shows that the impact of agrarian inequality should dissipate over time (as the agricultural economy shrinks in size) unless inequality has deeper structural effects on the income distribution consequences of growth. The econometric results show that indeed agrarian inequality has a surprising legacy effect that persists over time even as economies industrialize.

2.2 Microfoundations of Inclusive Growth

While this econometric evidence is telling, it does not identify the mechanisms that underlie the linkage between initial economic equality and inclusive growth. There is in fact no shortage of theoretical papers that establish foundations for that linkage. To pick one example that speaks directly to the Birdsall et al. [1995] results, Lunqvis [1994] explores how the absence of capital and

[2]Explain the vicious circle logic of high inequality a la Birdsall.

insurance markets leads poor people to underinvest in human capital. Holding per-capita income constant, an increase in inequality will push more people below the income threshold where human capital underinvestment begins.

Similarly, there is a large literature that shows that imperfect rural financial markets, which disadvantage low wealth producers, can create an economic dynamic that squeezes out these producers over time. For example, the dynamic stochastic programming analysis of Zimmerman and Carter [2003] shows how these missing markets can create exclusionary patterns in which initial asset inequality deepens over time. Work on agricultural growth booms in Latin America, summarized by Carter and Barham [1996], finds empirical evidence of many of these same patterns. Similar to Lunqvist's analysis, increases in asset inequality that push more individuals beyond the reach of financial markets implies a deepening patter of exclusion.[3]

From these theoretical perspectives, the sensitivity of the income distribution consequences of growth to initial inequality rests squarely on financial market failures. The theories of credit rationing[4] that explain these sorts of wealth biased financial market failures are essentially saying that low wealth agents are of no interest to the economic entrepreneurs on the supply side of financial markets. While this argument seems correct when examined from the perspective of the high inequality economies of Latin America, it overlooks the fact that in East Asia, governments undertook measures that bolstered the competitiveness of small farm sector. A quick review shows that agricultural policy in Japan, Taiwan and Korea shows a common emphasis on small farm credit, extension and price stabilization.[5] These shared growth policies reshaped markets in ways that enabled the small farm sector to flourish and underwrote an inclusive growth strategy.

These observations are consistent with those ofAoki et al. [1997] who took part in a broader review of the East Asian miracle of inclusive growth. Like others writing in this area, these authors note that East Asian governments engaged in a wide range of policies, which they describe as "market enhancing," meaning that the state carefully intervened in those realms where markets work least well (e.g., providing capital and insurance), and by so doing enabled markets to then effectively coordinate fundamental decisions of resource allocation and investment.

While others have noted this disciplined intervention of East Asian states, Aoki et al. [1997] suggest a material explanation for this state behavior, as opposed to a culturally-based explanation (e.g., a "Confucian ethic"). They argue that low levels of initial inequality (and a weak elite) in East Asia implied that the only viable constituency for a government seeking political support was a broadly-based one built around shared growth policies. Agricultural policy provides one of the clearest examples of the endogeneity of a broadly-based or shared growth strategy to low levels of initial inequality. Land reform in much of East Asia not only deeply redistributed land owner-

[3]The logic here is quite similar to more recent work on asset-based theories of poverty traps–see, for example, Carter and Barrett (2006) and Barrett and Carter (2013).

[4]See for example Stiglitz and Weiss (1982) for a general treatment of credit rationing, and Carter [1988] and Boucher et al. [2007] for extensions and applications to rural financial markets.

[5]Need to dredge up old notes on these policies based on Weiping's literature review.

ship rights, but also imposed land ownership ceilings of only a few hectares. Aoki et al. suggest that the absence of a strong rural elite deprived East Asian governments of a politically influential target group for the sorts of divisible and privately appropriable goods which governments so often provision to develop the rural sector (e.g., subsidized credit, machinery subsidies, investment credits, etc.). Instead, they argue, policy focused on discovering and providing the key indivisible, quasi-public goods that markets were ill-conditioned to offer (give examples here, including institutional innovations that open credit and insurance options). What other observers of East Asian agricultural policy have attributed to an (exogenous) strategic objective of shared growth (e.g., Tomich and b. Johnston [1995]) is, in the argument of Aoki et al., a product of low initial inequality operating through a political economy circuit.

While most academic discussion has long since moved away from understanding the East Asian miracle and the foundations for inclusive growth, the remainder of this paper is dedicated to taking seriously and fleshing out the suggestion that shared and inclusive growth requires that lower wealth agents be of interest to both economic and political entrepreneurs. The next section will model the political economy of shared growth policies, starting first the stylized contrast between low and high inequality economies that has typified the discussion of East Asia versus Latin America. We will then expand our modeling to bring in distinctive factors that distinguish large parts of rural Africa from both East Asia and Latin America.

3 Asset Inequality and the Political Economy of Shared Growth Policies

This section offers our core multi-period political economy model designed to shed light on the economic and political forces that determine whether governments choose to provide tax-financed public goods that complement the productivity of private investment, or whether they choose a low tax rate regime policy which allows individuals to enjoy more private goods. For simplicity's sake, we will refer to a policy that supplies a high level of public goods as a shared or inclusive growth policy. Under our model, the complementary value of public goods depends on the wealth level of each individual in the society. All agents will not in general have the same preference for the level of public good expenditures. In particular, public goods will be especially valuable for those whom they permit to make the transition from subsistence to commercial production. Because of the economic valuation of public goods varies across people, politics will matter for the choice of policy in potentially interesting ways.

To explore the politics of policy choice, we assume a two-party democratic political system. Some voters–those who invest and involved in the commercial economy–are informed and tend to vote their economic interest, while others (subsistence producers) are assumed to be uninformed as public goods are meaningless to them. Both types of voters receive a random political pref-

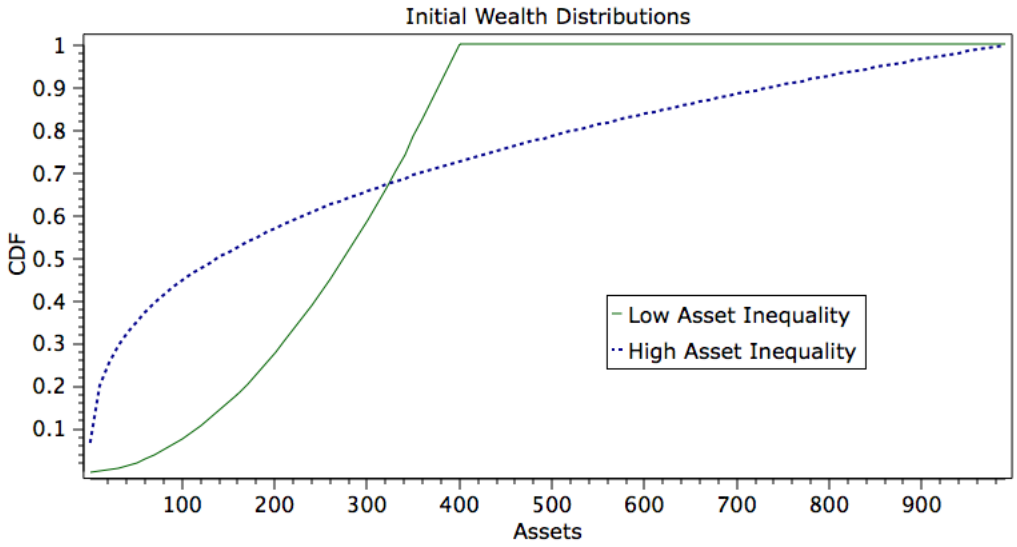
erence shock that makes them more likely to vote for one of the two competing political parties. Uninformed voters are further swayed by political expenditures made by the competing political parties. In our modeling, we pay particular attention to each agent's constrained willingness to pay (in the form of political contributions) for a particular policy. Using these core economic and political foundations, we then explore the suggestion of Aoki et al. [1997] that the extent of initial asset inequality will fundamentally shape whether the political-economic processes will result in the choice of shared growth policies.

After laying out the core features of the model, Sections 3.1 and 3.2 will establish the optimal economic behavior and interests of the individuals who comprise the model. Section 3.3 below will consider the political preferences and voting behavior of individuals given their economic interests, while sections 3.4 and 3.5 will establish the behavior of political party and analyze the resulting political-economic equilibrium.

3.1 The Economic Model of Investment, Production and Consumption

We here consider a society comprised of a unit mass of individuals indexed by i. Individuals live two time periods. Politically, each individual is endowed with one vote. Economically, each individual enjoys an initial wealth endowment, A_i, where wealth is increasing with the index i. In the spirit of work such as Roemer [1984], Eswaran and Kotwal [1986] and Carter and Zimmerman [2000], we can represent a particular society as in Figure 1. The horizontal axis represents the wealth continuum along which the mass of individuals are distributed. The vertical axis represents the cumulative distribution of individuals. The solid line represents a society with a more egalitarian initial wealth distribution, while the dashed curve represents a society with a less egalitarian distribution, but with the same mean level of wealth. Before considering how the overall society operates, and how its operation is influenced by inequality, we need to first characterize the economic behavior and the political preferences of individuals at different places along the wealth continuum.

Figure 1: High and Low Inequality Asset Distributions



To generate income, each individual has access to two capital dependent technologies, a linear subsistence technology, and a higher yielding or commercial technology F that depends on both public and private capital. Wealth invested in the subsistence technology generate returns at a constant rate,r, generating an income flow of $B_i r$, where B_i is the amount of wealth allocated to the subsistence technology.

Wealth not allocated to the subsistence technology can be allocated to the commercial technology which generates an income stream given by:

$$F(K_i, \kappa_i) = \theta \left(K_i^{\alpha}/2 + \kappa_i^{\alpha}/2\right)^{1/\alpha} \qquad \text{with } \alpha, \theta \in (0,1),$$

where K_i is private productive capital, while and κ_i is a quasi-public capital good that is complementary to private capital in production. We assume that use of the commercial technology requires payment of a fixed, start-up cost of c_F. We additionally assume $\theta > 2^{1/\alpha} r$, so that once c_F is paid, investments K_i always dominate the subsistence technology.[6] As a quasi-public good, κ_i can be provided both publicly (P) and privately (P_i) such that individual i has access to:

$$\kappa_i = P + P_i.$$

Note, however, that private provision of the quasi-public good incurs payment of an additional fixed cost, c_P, reflecting the difficulty of private actors to both construct and 'fence in' these quasi-

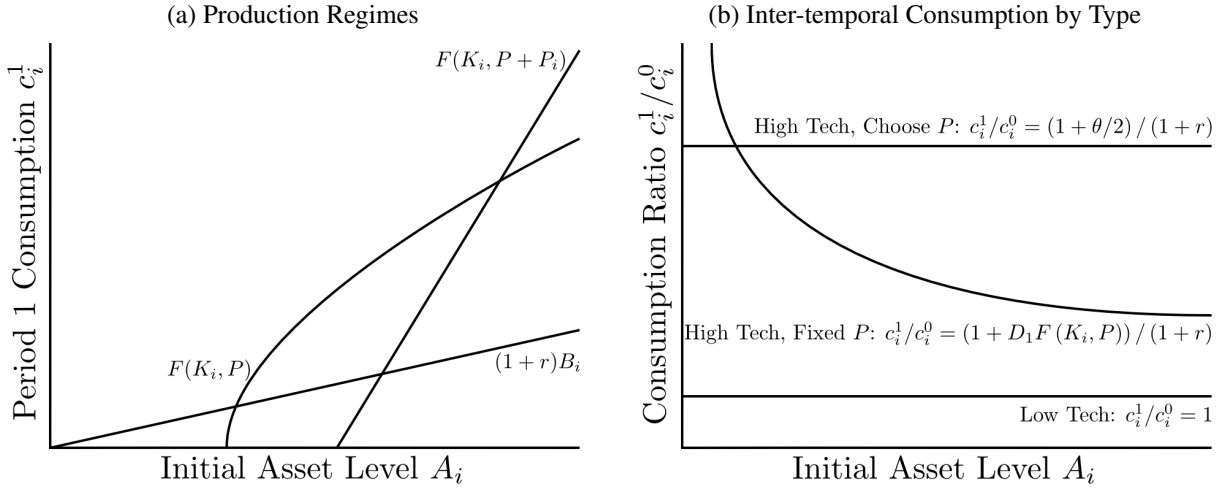
[6]To see this, note that the marginal investment product of F is

$$D_1 F(K_i, \kappa_i) = (\theta/2) K_i^{\alpha-1} \left(K_i^{\alpha}/2 + \kappa_i^{\alpha}/2\right)^{1/\alpha - 1} \geq \theta 2^{-1/\alpha} > r.$$

public goods.[7]

The solid lines in Figure 2a(a) illustrate these two different production technologies. Note that an individual must be able to mobilize at least $\hat{A}$ units of the asset to production before it is worthwhile to switch from the subsistence to the commercial technology. The $F(K_i, P)$ curve is drawn for a given level of the public good P, assuming that there is no private provisioning of this good ($P_i = 0$). Increases in P and the level of the public good will complement and increase the productivity of private capital, shifting backwards the technology switch-point $\hat{A}$. For this reason, later discussion will refer to the public provision of P as a shared or inclusive growth policy as investments in P not only boost the productivity of all individuals who employ the commercial technology, but also opens a door of upward mobility for some individuals who would otherwise find themselves using only the subsistence technology.

Figure 2: Production Technologies and Inter-temporal Trade-Offs



To simplify the analysis, we assume that agents who have paid c_F and c_P, and are thus totally unconstrained, are the sole participants in domestic financial markets. The resulting equilibrium interest rate of $\theta/2$ reflects that for these individuals, both investments and public goods yield a one period total return of $1+\theta/2$. Below, we will consider government borrowing which is enabled by domestic financial markets.

Given these production possibilities, we assume that agents make their production choices in order to maximize their stream of discounted two period utility. Specifically we assume that agents apply a discount factor $\beta = (1+r)^{-1}$ and act to maximize lifetime (two-period) utility given by:

$$U\left(c_i^0, c_i^1 | A_i, P\right) \equiv \left[\log\left(c_i^0\right) + \beta \log\left(c_i^1\right)\right] / (1+\beta). \tag{1}$$

[7] We assume c_P is big enough that voters reach 'capital saturation' (MPK $= r$) before optimally investing in public goods, and P is below the unconstrained optimum at capital saturation.

The budget constraints faced by each voter across periods are given by

$$\begin{aligned} c_i^0 &\leq A_i - K_i - B_i - P_i - c_F \cdot \mathbf{1}_{K_i>0} - c_P \cdot \mathbf{1}_{P_i>0}, \\ c_i^1 &\leq F\left(K_i, \kappa_i\right) + K_i + P_i + (1+r) B_i, \end{aligned} \tag{2}$$

where $\mathbf{1}_{K_i>0}$ and $\mathbf{1}_{P_i>0}$ are the binary indicator variables that take the value of one when when the agent respectively invests in K_i and P_i and must pay the fixed costs c_F and c_P. Note that an individual's initial wealth endowment needs to be used to fund period 0 consumption plus fund the capital allocated to produce income for period 1. Period 1 consumption is then constrained to be no more than the income flows generated plus the value of assets not consumed in period 1. We also assume that agents cannot borrow (i.e., hold negative wealth), and hence impose the additional constraints that:

$$B_i, K_i, P_i \geq 0. \tag{3}$$

Letting $\widetilde{c}_i^0$ and $\widetilde{c}_i^1$ denote the values of consumption that maximize (1) subject to (2)-(3), we denote an agents welfare after making investment and consumption decisions as

$$U^*\left(A_i, P\right) \equiv \max_{c_i^0, c_i^1} U\left(c_i^0, c_i^1 | A_i, P\right) = \log \widetilde{c}_i^0 \left(\widetilde{c}_i^1 / \widetilde{c}_i^0\right)^{1/(2+r)}.$$

3.2 Economic Classes as Endowment-necessitated Behavior

The model outlined in the prior section leads to three possible livelihood strategies or potential economic classes defined by the inequality constraints in (3):[8]

1. **Subsistence Producers** ($B_i = 0, K_i, P_i = 0$). These individuals, whom we would expect to be at the bottom of the asset distribution, will not pay c_F nor c_P and optimally choose $B_i = \frac{1}{2+r} A_i$ and $\widetilde{c}_i^0 = \widetilde{c}_i^1 = \frac{1+r}{2+r} A_i$. The first order condition for B_i implies $c_i^1 = c_i^0$, so each voter's inter-temporal allocation of assets must satisfy

   $$(2+r) B_i = A_i.$$

   Consequently, the welfare of a Subsistence Producer, denoted $U_S\left(A_i, P\right)$, is given by

   $$U_S\left(A_i, P\right) = \log\left((1+r) A_i / (2+r)\right).$$

2. **Petty Commercial Producers** ($K_i > 0, B_i, P_i = 0$) rely on existing public goods (have not paid c_P). These agents pay c_F to produce, using investments K_i in the high productivity technology F. These voters lack assets to profitably provide public goods, so $P_i = 0$. The first

[8] Note that certain possible classes–e.g., $B_i, K_i > 0$–are ruled out by technology assumptions.

order condition for K_i implies each voter's inter-temporal allocation of assets must satisfy

$$\widetilde{c}_i^0 = A_i - K_i - c_F, \qquad \widetilde{c}_i^1 = F(K_i, P) + K_i, \qquad \widetilde{c}_i^1 / (1 + D_1 F(K_i, P)) = \widetilde{c}_i^0 / (1 + r). \quad (4)$$

Consequently, K_i is fixed by (4) and the welfare of a Producer, denoted $U_P(A_i, P)$, is

$$U_P(A_i, P) = \log(A_i - K_i - c_F) \left[(1 + D_1 F(K_i, P)) / (1 + r) \right]^{1/(2+r)}.$$

3. **Large Commercial Producers** ($K_i, P_i > 0, B_i = 0$) who can self-provide complementary production goods P_i. These individuals pay c_F and c_P and may freely invest and supplement public goods for their private use. Since these individuals choose P_i, they supplement existing public goods until the returns from investments and public goods are equated at $P_i^* = K_i^* - P$. The first order conditions for K_i and P_i imply each individual's inter-temporal allocation of assets must satisfy

$$\widetilde{c}_i^0 = A_i - 2K_i - P - c_F - c_P, \qquad \widetilde{c}_i^1 = (\theta + 2) K_i - P, \qquad \widetilde{c}_i^1 / (1 + \theta/2) = \widetilde{c}_i^0 / (1 + r).$$

This implies investments are fixed by

$$K_i = \left[(A_i - c_F - c_P)(1 + \theta/2) + (r - \theta/2) P \right] / (2 + r)(2 + \theta).$$

Under this investment rule, the Large Commercial Producer will always equalize marginal returns to investment in private and quasi-public capital. Under this allocation, returns to additional assets become linear as shown by the dashed line in Figure (**??**b). The welfare of a Large Commercial Producer, $U_L(A_i, P)$, is

$$U_L(A_i, P) = \log(A_i - K_i - P_i - c_F - c_P) \left[(1 + \theta/2) / (1 + r) \right]^{1/(2+r)}.$$

Below we return to the question as to whether all three of these classes exist and over which portion of the initial wealth continuum.

Looking across these three potential economic classes, we see that returns to wealth invested in production increase as we move from the Subsistence to the Petty Commercial to the Large Commercial strategies. The marginal returns provided by productive investments are summarized by the rate at which voters are willing to trade off present for future consumption. Comparing the three regimes, we see that inter-temporal consumption patterns satisfy the following:

$$\text{Subsistence}: \frac{\widetilde{c}_i^1}{\widetilde{c}_i^0} = 1, \qquad \text{Petty}: \frac{\widetilde{c}_i^1}{\widetilde{c}_i^0} = \frac{1 + D_1 F(K_i, P)}{1 + r}, \qquad \text{Large}: \frac{\widetilde{c}_i^1}{\widetilde{c}_i^0} = \frac{1 + \theta/2}{1 + r}. \quad (5)$$

Figure 2b graphs these marginal returns to investment for each class.

These inter-temporal trade-offs have a direct connection to the marginal welfare of assets. To see this, consider the welfare transformation $\exp\left(U^*\left(A_i,P\right)\right)$ and note that for $U=U_S,U_P$ or U_D,

$$\frac{d\exp\left(U\left(A_i,P\right)\right)}{dA_i}=\frac{dU}{dA_i}\cdot\exp\left(U\right)=\frac{1+r}{2+r}\frac{1}{\widetilde{c}_i^0}\left(\widetilde{c}_i^0\right)^{1-1/(2+r)}\left(\widetilde{c}_i^1\right)^{1/(2+r)}=\frac{1+r}{2+r}\left(\frac{\widetilde{c}_i^1}{\widetilde{c}_i^0}\right)^{1/(2+r)}. \quad (6)$$

where $dU/dA_i=(1+r)/(2+r)\,\widetilde{c}_i^0$ follows from the Envelope Theorem. Combining Equations (5) and (6) shows that the graphs of $\exp\left(U\left(A_i,P\right)\right)$ appear very much as Figure 2a

While all agents would in principal prefer the higher returns and welfare associated with the higher strategy classes, two forces block them. First, fixed costs prevent lower wealth individuals from self-financing the higher returning technologies. Second, borrowing constraints prevent those same low wealth individuals from using other's wealth to reach the larger scales required to reap the higher returns. These observations motivate the following proposition on the relationship between an individual's position in the endowment continuum and his or her constrained optimal choice of production strategy.

Proposition 1. *As assets A_i increase, voters progress from Subsistence Producer to Petty Commodity Producer ($A_i\geq\underline{A}_P$) to Large-scale Producer ($A_i\geq\underline{A}_L$) under the following assumptions:*

1. *No public good provision ($P=0$).*

2. *Becoming a Large-scale Producer is sufficiently costly:*

$$\frac{c_P}{c_F}\geq\left(\frac{1+r}{1+\theta/2}\right)^{1/(2+r)}\frac{(1+\theta/2)^{1/(2+r)}-\left(1+\theta 2^{-1/\alpha}\right)^{1/(2+r)}}{\left(1+\theta 2^{-1/\alpha}\right)^{1/(2+r)}-(1+r)^{1/(2+r)}}.$$

Proof. See Appendix. □

In summary, there are three endogenously determined groups of Subsistence, Petty Commodity and Large-scale producers with respective population shares

$$\sigma_{\text{Sub}}\equiv\mathbb{A}\left(\underline{A}_{\text{P}}\right),\quad \sigma_{\text{P}}\equiv\mathbb{A}\left(\underline{A}_{\text{L}}\right)-\mathbb{A}\left(\underline{A}_{\text{P}}\right),\quad \sigma_{\text{L}}\equiv 1-\mathbb{A}\left(\underline{A}_{\text{L}}\right).$$

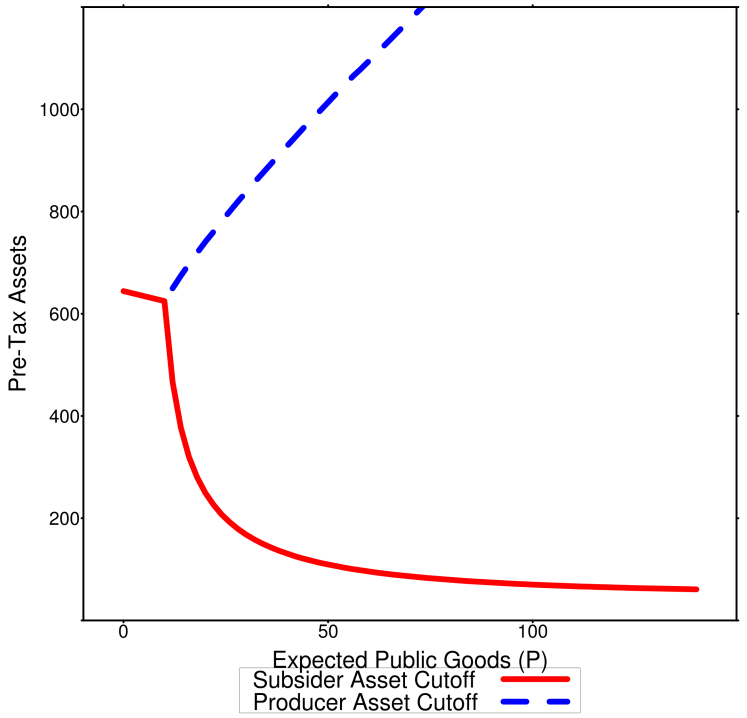
It is of course possible that there may be no members of any of these classes, as would happen, for example, if no agent enjoys wealth in excess of $\underline{A}_L$.

Using the numerical assumptions detailed in the appendix, Figure 3 illustrates the class boundaries for different levels of public goods.[9] Individuals whose initial wealth places them to the southwest of the solid red line will optimally choose to employ the subsistence technology. Those to the northwest of the dashed blue line will optimally invest in privately provisioned public goods

[9]The boundaries illustrated in the figure take into account the tax liability (described in the next section) that is attached to each level of public good provision.

and join the Large-scale Producer class. Finally, those between the solid and dashed lines will be in Petty Commercial Producer class. As can be seen, as the level of public goods increases, the initial wealth level needed to exit subsistence and join the petty commercial class drops off quickly. Looking back at Figure 1, we can see that in the absence of public goods ($P = 0$), in the high inequality economy approximately 80% of the population will be in the Subsistence class, with the remainder in the large producer class. However given the degree of asset inequality in this economy, more than 80% of all wealth will be controlled by the large producer class. In contrast, in the low inequality economy, in the absence of public goods, all individuals and all wealth will be in the subsistence class.

Figure 3: Public Goods and Class



3.3 Public Policy and Political Interests

We now consider individuals' preferences for government action. We restrict our attention to the relatively simple case in the government can either tax individuals and provide public goods, or not tax, thereby directly increasing individuals' private goods (consumption or investment). As mentioned above, the provision of public goods is a shared growth policy in the sense that it provides a benefit to all commercial producers. It is also an inclusive growth policy as it reduces the critical initial wealth threshold, $\underline{A}_p$, allowing more individuals to graduate from subsistence to petty commercial production.

While government provision of public goods provides a benefit to all commercial (or incipient

commercial) producers, a key political question is whether and for whom this benefit is worth the cost. To explore this question, we need to first specify a model of public finance that defines the government's budget constraint. While there are several ways to conceptualize this problem, within the confines of this two-period model, we will here assume that the government borrows money (at interest rate $\theta/2$) to purchase P units of the public good. We assume that each individual in the society receives an equal per-capita share of the total public goods provided (which is P as the society is comprised of a unit mass of individuals). To cover the interest rate on this debt, we assume that the government charges a flat tax rate τ levied against initial wealth such that the period 1 it has sufficient funds on hand to service the debt it incurred in period 0. Letting $\mathbb{A}(i)$ denote the distribution of wealth in period 0, this implies the level of public good provision must satisfy the inter-temporal budget constraint

$$\text{Government Budget Constraint}: \quad (1+\theta/2)\,\tau\mu = (1+\theta/2)\,P - P, \tag{7}$$

where $\mu \equiv \int A_i d\mathbb{A}(i)$ is the average wealth level in period 0. The budget constraint reflects the fact that the government can save collected taxes $\tau\mu$ for one period and use its total budget to pay the debt service. More complex tax and public good sharing provisions are conceivable, but we restrict our attention here to the simple case of a flat tax and equal sharing of the publicly provided capital.

We now consider the competing effects of taxation and public good provision on the economic well-being of the individuals in the different economic classes.[10] An increase in taxes τ decreases available assets at rate A_i, so for $U = U_S, U_P$ or U_D

$$\partial U/\partial\tau|_{P\text{ fixed}} = -A_i \cdot dU/dA_i,$$

so the impact of taxation is known from (6) above. Conversely, an increase in τ provides public goods to all voters at rate $(1+\theta/2)\,\mu/\theta/2 = P/\tau$, which implies

$$\partial U/\partial\tau|_{(1-\tau)A_i\text{ fixed}} = (P/\tau)\cdot dU/dP.$$

Considering the total effects of government policy then shows for $U = U_S, U_P$ or U_L

$$\frac{dU}{d\tau} = \frac{1}{\tau}\cdot\left(P\cdot\frac{dU}{dP} - \tau A_i\cdot\frac{dU}{dA_i}\right). \tag{8}$$

Equation (8) explicitly sets the beneficial effect of public good provision against the detrimental costs of taxation. Equation (8) can also be used to characterize the policy regime that each individual would support politically if they voted their selfish economic interest.

[10] At present, we consider the production regime of a particular voter as fixed, and will return to the endogenous formation of voter blocks below.

For Subsistence Producers, the lack of access to the production technology F implies $dU/dP = 0$, so they pay taxes with no hope of compensation and economically would prefer that no taxes are levied. In later analysis, we will however assume that the subsistence class is uninformed.

At the other extreme, members of the Large Commercial class are free to reduce P_i to offset increases in P, so they are immune to 'forced purchase' of public goods. Therefore a Large Commercial Producer's welfare increases in τ so long as the tax paid, τA_i is less than the discounted value of public goods provided in period 1. Formally,

$$\frac{dU_L}{dP} = \frac{1+\theta/2}{1+r} \cdot \frac{1}{\widetilde{c}_i^1} = \frac{1}{\widetilde{c}_i^0} = \frac{dU}{dA_i},$$

so Equation (8) becomes

$$\frac{dU_L}{d\tau} = \frac{1}{\tau} \cdot (P - \tau A_i) \cdot \frac{dU}{dA_i}.$$

So members of the Large Commercial class prefer higher taxes only when their assets are below the population average, reflecting the intuition that for this class, taxes are purely redistributive. As this class includes the wealthiest members of the society, some number of this class will strictly oppose the taxation needed for a shared growth policy.

Finally, Petty Commercial Producers benefit from Public goods, but they cannot adjust the level provided. In this case,

$$\frac{dU_P}{dP} = \frac{D_2F(K_i,P)}{1+r} \cdot \frac{1}{\widetilde{c}_i^1} = \frac{D_2F(K_i,P)}{1+D_1F(K_i,P)} \cdot \frac{1}{\widetilde{c}_i^0} = \frac{D_2F(K_i,P)}{1+D_1F(K_i,P)} \cdot \frac{dU}{dA_i},$$

so Equation (8) becomes

$$\frac{dU_P}{d\tau} = \frac{1}{\tau} \cdot \left(\frac{D_2F(K_i,P)}{1+D_1F(K_i,P)} P - \tau A_i \right) \cdot \frac{dU}{dA_i}.$$

This Equation shows that a Petty Producer prefers higher taxes so long as the discounted value of public goods, $D_2F(K_i,P)P/[1+D_1F(K_i,P)]$ is greater than taxes paid.

Until now, we have taken the level of public good provision, P, as exogenous. We now model the level of public goods as the outcome of a political contest between parties who promise to provide public goods through income taxation.

3.4 Political Parties and Electoral Competition

In this section, we lay out the elements for a model of electoral competition. Since the level of taxation determines public good provision through (7), we refer to platforms only in terms of the tax rates proposed. We assume that there are two political parties, the Reds (denoted by R) and

the Greens (G). We assume that both parties are office motivated and offer platforms (τ_R, P_R) and (τ_G, P_G) composed of a flat income tax τ which is used to finance public goods P. Parties choose platforms in order to maximize their probability of being elected.

All voters have idiosyncratic preferences δ_i in favor of party R, distributed uniformly over $[-1/2\psi, 1/2\psi]$. Petty and Large-scale Commercial producers are assumed to be informed voters who vote on the basis of economic policy. The welfare of an informed voter i under a platform with tax rate τ_j

$$U^*\left(A_i, \tau_j\right) + \delta_i \cdot \mathbf{1}_{j \text{ elected}}.$$

Therefore informed voters will vote for Red party in preference to Green whenever

$$U^*\left(A_i, \tau_R\right) + \delta_i \geq U^*\left(A_i, \tau_G\right).$$

Subsistence producers are assumed to be uninformed voters who are influenced by campaign contributions C_R and C_G, and vote for the Red party whenever

$$C_R + \delta_i \geq C_G.$$

Given party platforms and campaign contributions, the probability that Red party is elected (ρ) is:

$$\rho = \frac{1}{2} + \psi \int_{A_i \geq \underline{A}_{\text{Pro}}} \left[U^*\left(A_i, \tau_R\right) - U^*\left(A_i, \tau_G\right)\right] d\mathbb{A}\left(i\right) + \psi \int_{A_i < \underline{A}_{\text{Pro}}} \left[C_R - C_G\right] d\mathbb{A}\left(i\right).$$

With these building blocks, we could take a fairly standard approach and model the behavior of class-based lobbies, where each lobby maximize the welfare of its constituency less a quadratic loss function associated with the costs of raising political contributions from its members.[11] As is well known in this setting, (see Persson and Tabellini [2000]), in equilibrium each party selects the same platform and in equilibrium no contributions are made. Aside from its non-credible prediction of zero campaign contributions, this approach makes it easy to overlook the political budget constraint. That is, political contributions must compete for other uses of the individual's wealth (in this model, period 0 consumption, investment and tax payments). As a first step to more deeply probing the political economy of inequality, the next section looks more carefully at the political budget constraint.

[11] For example, the lobby for the Large Commercial class would pick a contribution level to maximize

$$\int_{A_i \geq \underline{A}_{\text{L}}} \left[\rho U^*\left(A_i, \tau_R\right) + \left(1 - \rho\right) U^*\left(A_i, \tau_G\right) - \left(\left(C_R + C_G\right) \sigma_{\text{Sub}} / \sigma_{\text{L}}\right)^2 / 2\right] d\mathbb{A}\left(i\right)$$

in the case that the Red party's platform offered higher expected benefits than the Green Party's platform.

3.5 Political Budget Constraints: Willingness to Pay for Public Policy

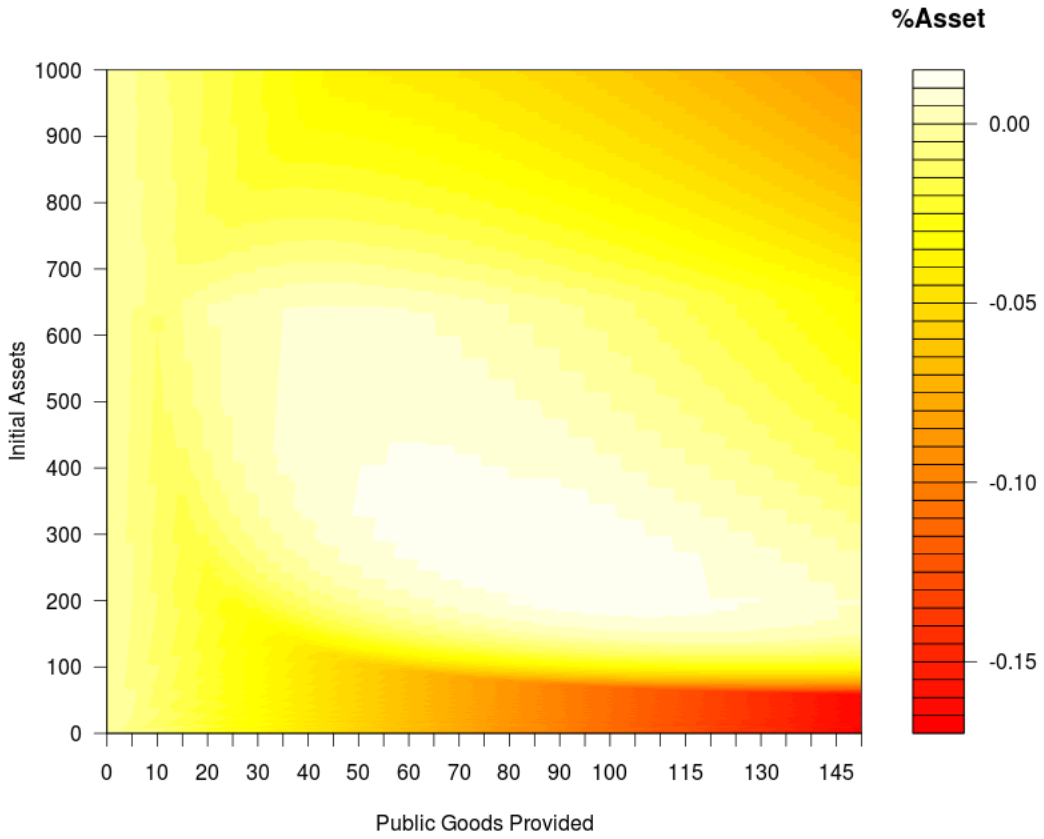
In an effort to understand agent's potential budget-constrained willingness to make political contributions, we perform the following thought experiment:

- We assume that the Red party offers a status quo of $\tau_R = P = 0$.
- The Green party the considers how much money could be raised to support (or oppose) a continuum of reform policies with $\tau_G = P > 0$.
- For each possible reform policy, the Green party accountants calculate how much initial wealth each agent in the economy would be willing to give up in order to obtain the reform policy (with probability one) or how much wealth the individual would be willing to give up in order to preserve the status quo.

These amounts calculated can be considered as upper bound estimates of the amount of political contributions the reformist Green party could collect. While individuals would likely contribute less than this upper-bound estimate (given electoral uncertainty, among other things), these estimates do provide a window into the interaction between politics and economics.

Figure 4 displays the percentage of initial wealth that an individual could pay to their preferred political party without making themselves worse off compared to their situation under the policy of their non-preferred party. For example, an individual willing to contribute 5% of their wealth to a reform promise of 50 units of public goods (financed by taxation) would be indifferent between the status quo ($P = 0$) and the situation in which (i) the individual makes the 5% contribution and (ii) the reform party wins and implements a policy of $P = 50$. Asset positions that show negative amounts means that the individual could contribute that amount to secure a status quo, Red Party win and be now worse off than he or she would be under a reform party victory.

Figure 4: Upper Bound Estimates of Political Willingness to Pay



As can be appreciated in Figure 4, the strongest potential support for reform policies emerge from what might be termed the incipient petty commercial class. Note that at initial wealth levels of between 200 and 600, individuals optimally pursue the subsistence strategy. At those modest wealth levels, it never makes economic sense for them to provide their own public goods. However, if the government delivers roughly 20 units of public good or more, then individuals at this wealth level optimally transition to the petty commercial class. At low levels of government-provided public goods, this group would become informed and be able to contribute to positive, but modest amounts of their wealth to insure the election of a reform policy. The political willingness to pay of this group unambiguously increases up until public good levels of at least 70 units.

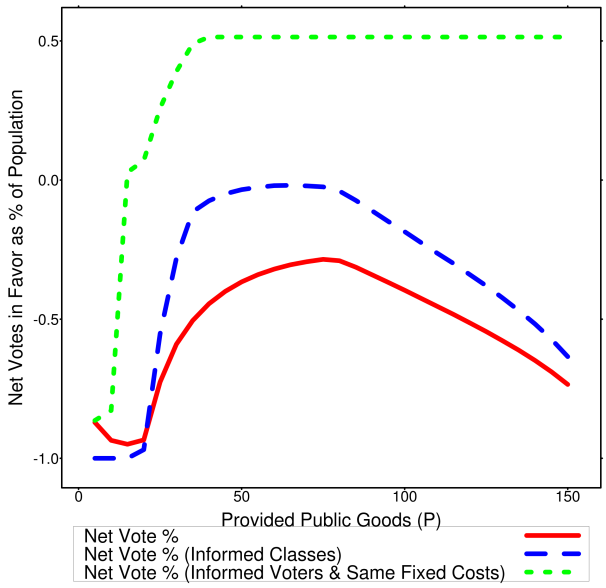
From an informed voter perspective, with $P = 0$, individuals with wealth in excess of about 600 units would provide their own public goods ($P_i > 0$), pursuing the large scale commercial strategy. However, because these individuals are all above the mean wealth level in the economy ($\mu = 260$ in the numerical example), they strictly lose from the implementation of a reform policy.

3.6 Expected Electoral Outcomes and Equilibrium Policy

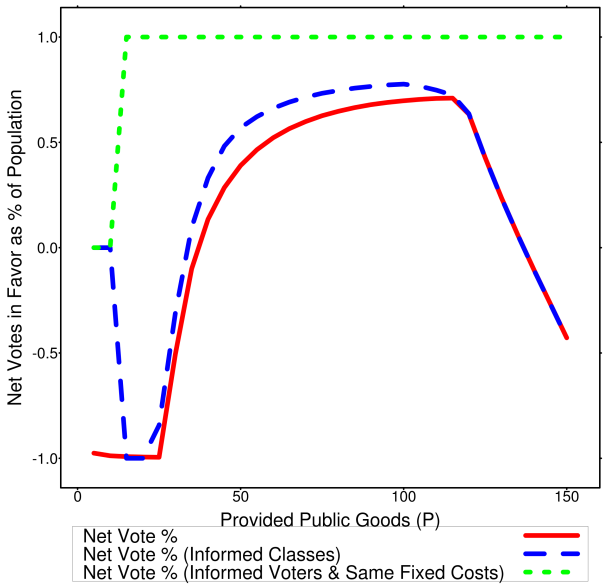
Given these economic fundamentals, how will electoral politics work? With apology to the reader for some incompletely resolved problems, Figure 5 shows the likely political fate of the reformist Green party discussed in the prior section for different public good platforms (shown on the horizontal axis) in opposition to a $P = 0$ status quo party. The solid (red) line shows expected net votes–votes for the Green Party minus votes for the Red Party–including both informed and uninformed voters, where the votes of the latter are swayed by the relative fundraising capacity of each party. The long-dashed (blue) lines shows the net voting preference of informed voters. All net vote percentages are displayed as a fraction of the overall population of the society.

Figure 5: Net Votes for Reform Party

(a) High inequality



(b) Low Inequality



We now consider politics and policy under the low and high inequality scenarios displayed above in Figure 1. The high inequality scenario approximates Latin American levels of agrarian inequality, with the wealthiest 20% of the population controlling 80% of the wealth. The low inequality scenario approximates an East Asian scenario in which an asset ownership ceiling has been imposed (akin to what happened in many East Asian economies during the World War II era). Under the high inequality scenario displayed in panel (a) of Figure 5, both informed and total net votes for the reform party are consistently negative, especially for small steps away from the $P = 0$ status quo. It is of course the money the informed voters (large scale commercial producers in this case) that drive the votes of the large mass of uninformed voters. Even if the reform party radically promises a policy of relatively high taxes and public good provision, net votes still remain negative. Wealth inequality in this case continues to drive politics even though more individuals

become informed and interested in supporting public good policies.

It is important stress here that politics are here being driven by the same liquidity constraints that drive production choices. Individuals must self-finance their own investment through reduced consumption. Similarly, the assumed borrowing constraint prevents voters from borrowing to finance the election of a party that would improve their economic well-being.

Panel b of Figure 5 displays expected electoral outcomes under the low initial inequality scenario. A programming problem appears to be plaguing at least the initial portion of that figure. Our to be confirmed intuition is that a reform party promise of modest amounts of public good will meet with neither support nor opposition by any informed group. Elections should thus be a toss-up. However, a reform party promise of more signification amounts of public goods ($P >\sim 30$) begins to garner some informed support and modest political contributions sufficient to sway uninformed voters. A promise of quite high levels of tax-financed public goods ($P > 100$) garners the greatest amount of informed and overall political support. While there are still taxpayers in the low inequality that will pay more in taxes then they receive in public goods, the returns to public goods are extraordinarily high for this class as voters as public capital augments the productivity of private capital. These groups thus find it in their interest to support reform parties and policies for relatively high public expenditure levels.

4 The Political Economy of Shared Growth Policies: The Role of Risk

The analysis in the prior section has in essence structured and confirmed some of the insights of Aoki et al. [1997] regarding the material as opposed to the cultural origins of the shared rural growth policies that lay at the base of the so-called East Asian miracle. We now speculate on the implications of our political economy framework for the likelihood that African polities might support and sustain shared growth policies.

Only a tiny fraction of agricultural land in sub-Saharan Africa is irrigated, in sharp contrast to other world regions.[12] While the absence of irrigation reduces productivity, it also has a large impact on the risk to which farmers are exposed. In an analysis of West Africa, Carter [1997] documents the magnitude of this risk, showing not only that is larger than other world regions, but also that if left unmanaged exposes households to huge consumption risk. Households of course do manage that risk, but often by avoiding higher yielding, but riskier and more expensive technologies.

Incorporation of risk into the model developed in the prior section will in general reduce investment incentives for all classes of producers, who will be tempted to consume more in the initial

[12]The 2008 World Development Report indicates that less than 5% of land is irrigated in Africa, compared to xx% to yy% in other world regions <check exact figures>>.

period rather than risking resources in investment projects which perhaps do not pay off. While we have not at the date of this writing completed the formal analysis, we believe that this effect will be largest for Petty Commodity Producers. As shown in Figure (2ab), it is this class that sacrifices the most to invest by having already precariously low period 0 consumption. In addition, as already demonstrated in dynamic poverty trap models (e.g., See Carter and Ikegami [2009]), an increase in risk pushes out the initial asset level at which individuals will attempt the transition from a low-level equilibrium strategy to a higher level equilibrium strategy. In the Carter and Ikegami framework, this impact appears as a shift out in what they call the Micawber Frontier. In our model, it will appear as rightward shift in A_P, the asset level at which individuals endogenously move from the subsistence class to the petty commodity class.[13]

These two fundamental changes brought by risk have important implications for the political economy model. For a given initial asset distribution, the rightward shift in A_p thins the ranks of those who support Government investment in public goods. In addition, for those who will still be in the class of Petty Commodity Producers, it reduces their material gain from policies that promote public good. Together, these two forces imply that for a broader class of wealth distributions will not be able to endogenously sustain inclusive growth policies. Put differently, office-seeking political entrepreneurs have little to gain from offering public goods to a population that will remain trapped at relatively low levels of economic well-being even after public goods are provided. Risk–especially at the levels observed across wide parts of rural Africa–not only discourages investment, but also fundamentally breaks the political-economic logic that could create and sustain shared or inclusive growth policies.

5 Creating a Viable Producer Class as the Foundation for Sustainable Inclusive Growth Policies

While highly stylized, our political economy model implies that in the presence of high levels of risk, the kinds of shared growth policies that underwrote the rural foundations of the East Asian miracle are not politically viable, even in economies with modest levels of asset inequality. Before turning to consider what might be done to rectify that situation, it is important to recall that the model itself rests on an assumption of financial market failure. Formally, it is the inability of low wealth agents to borrow large amounts of resources that keep them from leapfrogging from the subsistence to the petty commercial class and higher rates of returns to the assets that they own.[14] While this assumption seems reasonable, it is essentially a statement that low wealth agents are of no more interest to economic entrepreneurs than they are to political entrepreneurs. As argued in

[13]Note that the core model here is a two-period poverty trap model. Subsistence Producers are trapped at a low level of well-being by the combination of their own initial asset level and their inability to borrow from others.

[14]Our model shares this characteristic with the general category of multiple equilibrium poverty trap models analyzed by Barrett and Carter [2013].

Carter [2008], risk plays an important part in explaining rural financial market failures.

Models, such as the one developed in this paper that indicates that initial conditions matter, are problematic in terms of their policy implications. The Peruvian economist, Adolfo Figueroa, once commented that Latin America needed a "refoundational shock" to reduce asset inequality so that it could start over with different initial conditions. While the desirability and certainly political feasibility of a refoundational shock are questionable, is it any more reasonable to think about changing the foundational ago-ecological conditions across parts of Africa that trap individuals in situations in which they are of little interest to both economic and political entrepreneurs?

Somewhat surprisingly, the answer to this question may be yes. Fueled in part by technological innovation in the area of remote sensing, recent years have seen an outpouring of efforts to index insurance contracts that transfer the correlated component of risk out of African agricultural systems.[15] While these efforts are still largely in the proof-of-concept stage, several of them reveal the potential power of the idea. In the remote pastoral regions of Northern Kenya, a satellite-based livestock mortality insurance contract successfully delivered payouts quickly, when and where warranted. Initial research reported in Janzen and Carter [2013] shows that the insurance payments have indeed served to guard family consumption standards and to protect families from further asset loss and decapitalization.

As described by McIntosh [2013], another such effort designed a weather index insurance contract targeted at low productivity Ethiopian grain farmers. Under cover of this contract, a large private bank agreed to open a loan portfolio for these farmers to provide the liquidity needed to adopt improved seeds and fertilizers. The hope is that this new source of liquidity, combined with the risk reduction of the insurance contract would crowd-in technology uptake and, in the language of the model here, create a transition from a subsistence to a petty commercial class.[16] Research is still underway to determine if in fact this risk transfer contract has these desired effects. But note that if it does, this intervention will have created a viable commercial farming class in an area heretofore characterized by technological stagnation and low income levels.

While it is premature to declare that these efforts have succeeded in fundamentally altering the political economic landscape in Kenya and Ethiopia, the approach taken in these and related projects is, if nothing else, novel. With modest public investment, these projects have tried to change the landscape for economic entrepreneurs, converting low wealth households into a bankable investment project. If these efforts can indeed succeed and sustain themselves, then the political economic calculus of the sort examined here may turn in change, creating a novel variant of the virtuous circle that underlay the East Asian Miracle a generation ago.

[15] Cite Carter (2012) and IFAD (2010) review

[16] Insurance is of course costly, and the key to this and other projects is the effort to interlink insurance with credit resources needed to simultaneously increase expected income. Carter, Chen and Sarris (2012) analyze this interlinkage in detail.

References

M. Aoki, K. Murdock, and M. Okuno-Fujiwara. *The role of government in East Asian economic development: comparative institutional analysis*, chapter Beyond the East Asian miracle: Introducing the market enhancing view. Oxford University Press, 1997.

Christopher B. Barrett and Michael R. Carter. "the economics of persistent poverty and poverty traps: Empirical and policy implications,. *Journal of Development Studies*, 2013.

N. Birdsall, D. Ross, and R. Sabot. Inequality and growth reconsidered: lessons from east asia. *The World Bank Economic Review*, 9(3):477–508, 1995. URL `http://wber.oxfordjournals.org/content/9/3/477.short`.

S. R. Boucher, M. R. Carter, and C. Guirkinger. Risk rationing and wealth effects in credit markets: Theory and implications for agricultural development. *American Journal of Agricultural Economics*, 90(2):409–423, 2007.

Michael R. Carter. Equilibrium credit rationing of small farm agriculture. *Journal of Development Economics*, 1988.

Michael R. Carter. Environment, technology and the social articulation of risk. *Economic Development and Cultural Change*, 1997.

Michael R. Carter. *Inequality, Poverty and Growth in an Era of Liberalization and Globalization*, chapter 3. Oxford University Press, 2004.

Michael R. Carter. "inducing innovation: Risk instruments for solving the conundrum of rural finance. In *6th Annual Conference of the Agence Française de Développement and The European Development Network*, 2008.

Michael R. Carter and Bradford Barham. Level playing fields and laaisez faire. *World Development*, 24(7):1133–1150, 1996.

Michael R. Carter and Menobu Ikegami. *Poverty dynamics: Interdisciplinary perspectives*, chapter Looking Forward: Theory Based Measures of Chronic Poverty and Vulnerability. Oxford University Press, 2009.

Michael R. Carter and F. J. Zimmerman. The dynamic cost and persistence of asset inequality in an agrarian economy. *Journal of Development Economics*, 63(2):265–302, 2000.

M.R. Carter and J. Coles. Inequality-reducing growth in agriculture: a market-friendly policy agenda. *Beyond tradeoffs: market reforms and equitable growth in Latin America*, pages 147–182, 1998.

Alain de Janvry and Elisabeth Sadoulet. Growth, inequality and poverty in latin america: A causal analysis,. 1996.

Mukesh Eswaran and Ashok Kotwal. Access to capital and agrarian class structure. *Economic Journal*, 1986.

Sarah Janzen and Michael R. Carter. The impact of microinsurance on asset accumulation and human capital investments: Evidence from a drought in kenya. 2013.

Lars Lunqvis. Economic underdevelopment: The case of a missing market for human capital. *Journal of Development Economics*, 40(2):219–239, 1994.

A. Sarris F. Papadopoulos McIntosh, C. Productivity, credit, risk and the demand for weather index insurance in smallholder agriculture in ethiopia. *Agricultural Economics*, 2013.

Torsten Persson and Guido Tabellini. *Political Economics: Explaining Economic Policy*. MIT Press, 2000.

Martin Ravallion and G. Datt. Growth and poverty in india. *World Bank Economic Review*, 1995.

John E. Roemer. *A general theory of exploitation and class*. Cambridge University Press, 1984.

P. Kilby Tomich, T. and b. Johnston. *Transforming agrarian econmies: Opportunities seized, opportunities missed*. Cornell University Press, 1995.

F. J. Zimmerman and M. R. Carter. Asset smoothing, consumption smoothing and the reproduction of inequality under risk and subsistence constraints. *Journal of Development Economics*, 71(2): 233–60, 2003.