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INSTITUTIONS AND ECONOMIC INEQUALITY

Sam Bowles

Santa Fe Institute

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ECOLE D'ECONOMIE DE PARIS
PARIS SCHOOL OF ECONOMICS

UNIVERSITÉ DE NAMUR

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Abstract

This survey is motivated by three facts about the relationship between institutions (both formal and informal) and economic inequality, namely: first, most inequality in the standard of living is between rather than within political-economic entities; second, rare "institution shocks" provide an unusual lens for the study of the causal relationship between institutions and inequality; and, third, differences in inequality of living standards throughout history and today are due in important measure to differences in institutions governing redistribution of income flows from highly unequal material wealth. These facts motivate the following focus areas.

- *The persistence of informal and formal institutional differences accounting for between group inequalities.* A proposed interdisciplinary working group will explore conditions under which economic integration (e.g trade liberalization) supports divergence (rather than convergence as is generally supposed) in both formal and informal institutions leading to growing or at least persistent between-group economic inequalities. Historical case studies will be informed by a common evolutionary model of this process.
- *Institution shocks and inequality.* A proposed (small) working group will select two or more historical changes in institutions that are sufficiently exogenous to allow the identification of causal impacts of institutional change on economic inequality. Examples are the abolition of slavery during the U.S. Civil War, and the taxation and other policies adopted by the Japanese state in the buildup to and during the Second World War. The project will critically evaluate the econometric literature on the causal impacts of institutional differences on inequality.
- *The political economy of redistribution: Rule of law, democracy, and state effectiveness.* I will develop a new model of the state elite as rent seeker (not a public spirited and democratically accountable redistributor), exploring the effect of rule of law, democracy and state effectiveness in determining the level of provision of public goods essential to the living standards of low income people. The project will address some empirical puzzles in the literature including the seemingly weak relationship between democracy as measured in cross national studies and equality.

The research strategy informing this project, based on my experience at the Santa Fe Institute, is to support collaborative work on focused inquiries that can benefit from

contributions by scholars with a diversity of skills (and in some cases, differing disciplinary training).

Note: Presented at the End of Inception Year Conference of the Economic Development and Institutions (EDI) Project. I would like to thank the Project for providing helpful suggestions for the content of this paper, and for supporting this research, as well as the ongoing support of the Dynamics of Wealth Inequality Project of the Behavioral Sciences Program at the Santa Fe Institute.

I. Introduction

In what follows I survey the field and identify some priority research areas on the ways in which both formal and informal institutions affect the degree of economic inequality, following the suggestion of the EDI project that I focus on (here, quoting from project's email communication to me of 15.2.2016): " i) the role of institutions for the redistribution of the returns to material wealth; ii) the complementarities between informal and formal institutions and how they might account for the persistence of development retarding cultural-institutional environments and iii) role of institutions shocks for distribution."

To provide a conceptual architecture in which these three research areas that I will propose can be located and connected, I begin by presenting a schematic model of the stationary distribution of living standards under the influence of institutions, technologies, and wealth shocks. I then take up the three research areas in turn, reviewing relevant literature and proposing research to be carried out by the EDI project.

II. The distribution of economic well being in the long run

To clarify the possible channels by which institutions may affect economic inequality I present a reduced form dynamic model that identifies four causal mechanisms affecting the stationary distribution of living standard. The model provides an overview of the possible ways that institutions may contribute to sustaining economic disparity in a population and the manner in which public policy might alter these processes so as to reduce disparities. To do this its scope necessarily extends beyond the standard theories that typically address some partial aspect of distribution such as factor pricing or the distribution or the distribution of factor ownership. And it is dynamic in encompassing the intergenerational aspects of inequality and its evolution.

I first identify two proximate determinants of the stationary distribution of wealth, and then two (also proximate) determinants of the extent to which wealth inequalities result in inequality of the flow of the goods and services making up the living standard.

I refer to consumption units (for example, households) as individuals. There are two kinds of wealth, one of which is held equally and from which the flow of services is equal across households. (I could consider the different wealth types separately and in the aggregate, but this would add little to the insights of this exercise.) The wealth that may be unequal ("wealth" hereinafter) is held in positive amounts by all members of the population, and is transmitted from

parents to offspring to a degree which will vary according to demographic structure, type of wealth, and inheritance practices (including bequest taxation and cultural transmission across generations).

Borgerhoff Mulder, Bowles et al. 2009 provide evidence on the variation in the degree of intergenerational wealth transmission by type of wealth, societal institutions and technologies including hunting and gathering, herding and farming. The role of cultural and biological mechanisms in the process of intergenerational transmission is surveyed in Bowles and Gintis 2002, Bowles, Gintis et al. 2005.

Members of each generation experience idiosyncratic wealth shocks that alter the holdings inherited from their parents. Under conditions to be specified presently, this economy will support a long term stationary distribution of wealth as in Becker and Tomes 1979. An individual's wealth produces a flow of services (called the individual's living standard), the extent of which will depend on first, the relevant production function which determines the extent to which the unequally held wealth generates valued goods and services; and second, the extent of redistributive policies affecting the flow of goods and services associated with privately held wealth, on which we impose an upper bound requiring that increased wealth not be associated with a reduced living standard.

Let an individual's wealth w_i vary with parental wealth $w_i^{'}$ and mean wealth $\underline{w}$ (all measured in natural logarithms, and normalized so that mean wealth is invariant across generations) according to

1) $w_i = (1 - b)\underline{w} + bw_i^{'} + l_i$

where λ is a wealth shock uncorrelated with parental wealth, with mean zero and variance σ_λ^2 The parameter β is termed the intergenerational transmission elasticity and (1- β) is the extent of regression to the mean. Taking the variance of w_i, setting it equal to the variance of $w_i^{'}$ and solving to find the variance of the stationary distribution of wealth μ, we have

2) $\sigma_W^2 = \frac{\sigma_\lambda^2}{(1-\beta^2)}$

which means that (for β <1) the degree of inequality in the stationary distribution is given by the magnitude of the wealth shocks, expanded by the intergenerational transmission multiplier, $(1-\beta^2)^{-1}$, reflecting the fact that where transmission is substantial, the inequalities introduced by wealth shocks in past persist and augment the inequalities induced by contemporaneous shocks.

An individual's per period flow of living standard acquired as a result of her wealth holding Y_i depends on her wealth W_i according to

3) $Y_i = aW_i^{\alpha-\tau}$

where $\alpha \geq \tau \geq 0$ and $\alpha - \tau$ is the elasticity of the (after redistribution) flow of living standards with respect to the amount of wealth held. The exponent α measures the importance of wealth as a contributor to ones living standards, and τ measures effect of redistributive policies. Letting y be ln$Y$, and using (2) our measure of stationary inequality of living standards is thus

4) $\sigma_Y^2 = (\alpha-\tau)^2\sigma_W^2 = \frac{(\alpha-\tau)^2\sigma_\lambda^2}{(1-\beta^2)}$

Equation 4 identifies four aspects of an economy that affect the degree of inequality in living standards:

i. the extent of wealth shocks, σ_λ^2;

ii. the intergenerational transmission multiplier $(1-\beta^2)^{-1}$ which varies with the degree to which wealth is transmitted across generations, β;

iii. the importance of the unequally held form of wealth in producing the goods and services making up the living standards of the people, α; and

iv. the extent of redistributive policies affecting the relationship between the flow of services produced by wealth and the living standards of the wealth's owner, τ

We will see that over the course of history, as a result of differences in both institutions and technologies societies have differed substantially in all of these dimensions. These terms represent the proximate determinants of living standard inequality in the model, suggesting the influence of the underlying causes of inequality. For example the nature of the goods and services making up a people's livelihood (wild versus cultivated species, for example) or the technologies by which a livelihood is gained (material capital intensive versus human capital intensive, for example) will affect σ_λ^2, $(1-\beta^2)^{-1}$ and α. Table 1 provides examples of institutional effects on these parameters.

Path and parameter	*Institutional influences.*
Intergenerational transmission (β=elasticity of wealth with respect to parental wealth)	Informal bequest practices; taxation of inheritances; property rights law and practice; marital sorting and family structure (including polygyny) ; credit market constraints, educational policy
Wealth shocks (σ_λ^2 = variance of shock)	Informal wealth smoothing practices; demographic structure including size of ownership units, social network structure (centrality inequality)
Technology (α = elasticity of pre-tax income with respect to material privately held wealth)	Research and development policies (including IPR), equilibrium selection in cases where multiple technology institutional equilibria exist

Redistribution(τ = share of total income redistributed)	Rule of law, state effectiveness, democracy, institutional determinants of wealth mobility, social network structure (centrality inequality)

Table 1. Institutional influences on the stationary distribution of economic wellbeing.

The distribution of political power and the institutions regulating how the members of society interact in producing their livelihoods will directly affect $(1-\beta^2)^{-1}$ τ and σ_λ^2 and as well as indirectly affecting α .

Because one of the projects proposed below concerns redistribution I extend this model to measure the effects of redistributive policies affecting the flow of living standards from an individual's wealth. To compare the effects of redistribution across economies, we will need a measure of how redistribution affects inequality of living standards conditional on a given level of inequality in wealth. I call this the redistribution ratio, ρ, defined one minus the ratio of post redistribution inequality of living standards to inequality in living standards that would occur in the hypothetical absence of redistributional policies. Thus in a society with unequally held wealth and perfect equality in living standards, we have ρ = 1; while if living standards are no more equally distributed would have occurred in the absence of redistribution policies, we have ρ = 0.

Using (4) with and looking at the difference between the level of inequality when τ > 0 and τ = 0 we have

$$5) \qquad \rho = 1 - \frac{(\alpha-\tau)^2\sigma_W^2}{\alpha^2\sigma_W^2} = \frac{\tau}{\alpha}\left(2-\frac{\tau}{\alpha}\right)$$

from which one sees that as expected if τ = 0 then ρ = 0 and if $\alpha-\tau=0$ so that variations in private wealth do not affect living standards, then ρ = 1.

This measure is restricted in a number of ways. It considers only redistribution policies that may attenuate the living standards effects of disparities in the returns on private wealth, not those "predistribution" policies affecting the extent of private wealth inequality or the extent of returns to wealth. And defining the hypothetical distribution of living standards in the absence of the forms of redistribution associated with our parameter τ presents all of the usual challenges associated with counter factual assumptions.

The framework can be extended (as I do in the next section) to account for between group differences (e.g. inequalities between individuals living under differing national institutions) and to allow for redistribution policies affecting the intergenerational wealth transmission process (as I point out in section IV) through the provision of public goods.

II. Economic integration, institutional divergence and between-group inequality

Background. How can the study of the dynamics of formal and informal institutional change help us reconcile three seemingly conflicting themes in the literature about economic integration and between-population inequality?

- *Factor price and institutional convergence.* Global integration is thought to promote both factor price convergence and institutional convergence. The first we expect from the logic if not the technical details of Samuelson' theorem Samuelson 1948and the second from economists' confidence described by Douglass North 1981 that "Competition in the face of ubiquitous scarcity dictates that the more efficient institutions will survive and the inefficient ones perish."
- *Globalization and growing world inequality*. The increasingly integrated nature of the world economy since the early 19th century has been associated until recently, with greater between population inequalities over time. Neither economic integration nor increased global inequality has been monotonic of course, but the long term trend at least over the century and a half after 1820 is clear (Bourguignon and Morrison 2002, Bourguignon 2012, Milanovic 2016).
- *The magnitude of between-nation inequality and recent changes in this magnitude.* Between-nation inequality remains a major contributor to global inequality among individuals (or families). The world household income Gini coefficient would be very substantial even if all households in every country had the same income (Milanovic 2016). The same data also indicate a massive decline in this measure of between country inequalities – a drop in this hypothetical Gini coefficient of 20 points over the course of just a bit over a half a century – unlikely to have any parallel in the within country equalization process occurring under social democratic governments over the same period.

The proposed project will provide reasons – both conceptual and historical -- why economic integration need not support institutional convergence and how the resulting persistence of institutional differences even in a globally integrated world may be part of the explanation of the durable between population differences in income.

The durability of institutional differences is not in question. But the many instances of centuries-long persistence of institutional differences between populations, often enduring long after their initial causes have disappeared remain a puzzle. In epochs and social orders marked by limited contact and restricted competition among geographically separated areas, persistent institutional differences are hardly surprising. Even in a globally integrated world economy,

however, competition among nations need not induce institutional convergence (Banerjee and Iyer 2005, Dell 2010, Ortiz 1963, Greif and Tabellini 2010 , Guiso, Sapienza et al. 2009, Nunn and Wantchekon 2011, Sokoloff and Engerman 2000 .)

Elements of an explanation. Stephen Durlauf 1999 distinguished between two inequality generating processes. In the standard process studied in economics one's income (or other measure of one's living standard) depends on one's wealth (both material and human). But in his "membership model" what matters is the group or groups to which one belongs. Persistence of group inequality in a liberal environment (meaning in the absence of discrimination) can be explained by the intergenerational dynamics of the acquisition of human capacities (Bowles, Sethi et al. 2014 and the works cited there.) Here I propose to use a variant of the membership model to understand the role of institutional differences in sustaining the significant inequalities between nations observed in the data. In this treatment the group to which one belongs is the entire nation, each member of which by dint of citizenship benefit. The key idea is that membership is associated with a particular set of institutions contribute to income differences between nations.

Incorporating membership into the model of the stationary distribution of income above will involve rewriting equation (3) to take account of the group to which an individual is a member, so that we might have groups (nations would be the most relevant among the feasible alternatives) indexed by j. Thus individual *i* in country *j* would have income

$$3') \quad Y_{ij} = a_j W_{ij}^{\alpha-\tau_j}$$

where the j subscripts on the constant and the redistribution exponent would capture nationally specific informal and formal institutional effects on income.

Our proposed explanation of the persistence of institutional differences under trade liberalization is based on the endogenous co-determination of informal and formal institutions, along with the resulting patterns of economic specialization, a nexus long-studied by economists with a historical bent,(Gerschenkron 1944, Kindleberger 1962, Sokoloff and Engerman 2000) but not formally modeled. I propose to study the decentralized evolution of both formal and informal institutions and show that, when complementarities exist between them, this process can support durable differences in otherwise identical economies, differences that sustain between population inequalities.

One mechanism to be explored is based on two facts.

First, classes of goods differ in the informal and formal institutions best adapted for their production. In the explanation to be developed I will distinguish between two goods. One is intensive in quantitative labor and termed transparent because labor activities that are readily

observed are relatively more important in its production. Transparent goods include standardized manufactured goods (exemplified by most goods produced on an assembly line and any good the production of which is cost effectively compensated by piece rates), most grains and sugar. The production of the opaque good, by contrast, depends more intensively on qualitative aspects of work. Examples of the latter are knowledge-intensive goods (and services), complex and quality-variable manufactured goods (such as wine), personal services ranging from legal advice to preparing meals, and care-sensitive agricultural products (such as tobacco, many vegetables and fruits). For these goods the necessary labor inputs cannot be verified because they are not directly observable and cannot be indirectly inferred from the resulting output.

Second, specialization made possible by economic integration increases the between-economy differences in the composition of outputs among these different classes of goods. This in turn provides pressures for the divergence of informal and informal institutions.

The implied correspondence between institutions and trade specialization is widely observed. Eric Nilsson 1994 studied the effects on comparative advantage and specialization resulting from the emancipation of slaves at the time of the U.S. Civil War. Cotton, according to Nilsson, was a 'slave commodity' for which kinds of labor beyond that which could be coerced from the worker were of little importance. For other commodities – manufactures and tobacco in Nilsson's empirical study – variations in the labor quality were more important, and impossible to secure by coercion. Nilsson exploited the natural experiment provided by the end of slavery to study the effect of an exogenous institutional shock on production specialization in 169 counties in the Confederacy. He found that the end of slavery brought about a significant shift away from the 'slave commodity' (cotton) and towards manufactures and tobacco.

Stefano Fenoaltea 1984 studied slave and non-slave production and makes a similar distinction between 'care intensive' and 'effort intensive' productive activities, the former being opaque in our terminology and the latter transparent. A similar distinction between sugar and tobacco was made by Fernando Ortiz 1963, who contrasted the coerced labor and hierarchical and authoritarian culture of the sugar plantation regions of Cuba with the self-motivated labor and liberal culture of the tobacco family-farming areas.

Contemporary evidence comes from Marianna Belloc and my very preliminary study of the statistical association across nations between trade specialization and the social norm of reciprocity as measured by cooperation in public goods with punishment game.

In the proposed mechanism, trade induces institutional divergence. The reverse causation may also be at work: institutional complementarities (including between formal and informal institutions) may result in persistent between economy differences among otherwise identical economies, providing a basis for specialization and comparative advantage. In this framework, an

institution --- the prevalence of a particular share contract in farming, for example, or primogeniture as a wealth inheritance practice --- need not reflect deliberate public policy, the explicit prohibition of alternative contracts, for example. Instead, like cultures, institutions may persist as the result of decentralized actions in non-cooperative settings (Young, 1998).

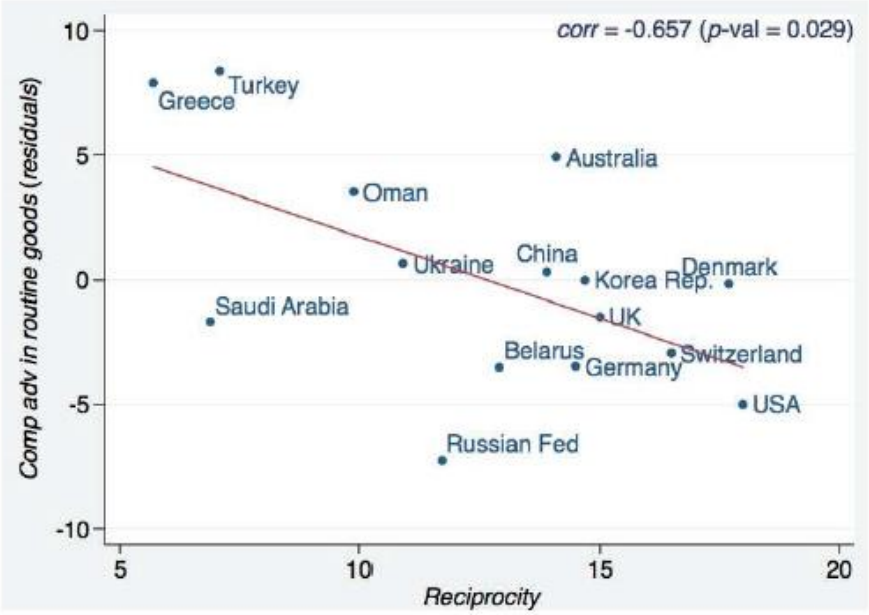

Figure 1. Informal institutions and trade specialization. Source: Belloc and Bowles, unpub.

The proposed model is a stochastic Markov process of the type developed by Young and used to explain institutional persistence in autarkic economies by Belloc and Bowles 2013. In this approach the gains from trade may "deepen" the basins of attraction of institutional conventions, impeding transitions that would result in convergence. This in turn will reinforce and possibly enhance the degree of institutional differences between populations. The result will be to sustain or to increase the variance of the membership effect of income, that is, the constant *a* in equation (3').The same process may sustain differences in the extent of redistribution τ to be studied below.

The proposed research is contribution to the new economics of culture, institutions and their evolution applied to the problems of development and inequality.

Cases to be studied include the emergence of a (roughly) north south institutional hiatus in Europe in the centuries following the bubonic plague, coevolving with the development of long distance trade and market integration, extending right up to the present and perhaps even deepening since the formation of the Euro zone (Allen 2001, Pamuk 2007, Fochesato 2015,

Boltho and Carlin 2013). Included would be the contrasting experience of East Germany and the Mezzogiorno following their respective political unifications (Boltho, Carlin et al. 2016.) Another is the persistence of institutions associated with bonded labor in Latin America long after demise of the gold mining and plantation farming that initially introduced these rules of the game(Sokoloff and Engerman 2000, Bertola and Ocampo 2012) The distinctiveness of Latin American institutions can (it is argued) be traced to the patterns of trade and specialization. Other cases are the reemergence of slavery in Egypt under the influence of the global cotton boom during the U.S. Civil War (Saleh 2014) and the coexistence of very different systems of contractual enforcement for long distance trade in the late medieval Mediterranean (Greif 1994). A sub project will develop econometric tests of two hypotheses relevant to the proposed explanation: namely that differences in informal and formal institutions are associated different patterns of specialization consistent with the model.

Many of the effects of international economic integration -- like factor price equalization in Paul Samuelson's theorem (Samuelson, 1948) -- are independent of whether integration is accomplished through the elimination of barriers to trade in commodities or through the mobility of factors of production. However, where comparative advantage is based on country differences in institutions, as in our proposal, this is not the case.

Extensions of our model may help explain patterns of specialization, for example, in the city states of Italy in the early modern period (Goldthwaite, 2009). It may also provide insights on the institutional and economic divergence among the nations of Europe in the late 19th century (Gourevitch 1977, Gerschenkron 1944), the entire Western Hemisphere since the 17th century (Sokoloff and Engerman 2000), and between China and Europe during the great divergence (Greif and Tabellini 2010).

IV. Institution shocks

Facts motivating the study. Henry Aaron once quipped that tracking changes in the personal distribution of income was “like watching the grass grow.” (Aaron 1978 p. 17). He was writing at the end of a long period during which aggregate measures of income inequality among Americans changed relatively little and at the onset of a new era in which dramatic institutional changes (in regulatory and tax policy for example) were accompanied by sharp increases in most measures of inequality. The fact that institutional changes are sometimes associated with changes in economic disparities is well established by the example of France and other economies during Great Depression and the Second World War (Piketty 2013). But establishing a causal connection between the two has proven challenging.

Here is an example. The year of the Confederate secession that launched the U.S. Civil War inequalities in material wealth in the states with a significant number of slaves exceeded wealth inequalities in the non-slave states by a wide margin. The Gini coefficients of 0.878 and 0.733 respectively are based on estimates calculated counting slaves along with other members of the population with no recorded material wealth. Slave ownership as a form of wealth is not included in "material wealth." Is this difference of fourteen and a half Gini points a measure of the effect of the institution of slavery on the distribution of wealth? A simple comparison of the two numbers cannot answer this question because the slave states were surely different in ways that could have affected the degree of wealth inequality but were unrelated to slavery.

Important advances have been made in studying the long term effects of arguably exogenous institutional differences among adjacent or nearby geographical units (Dell 2010,Banerjee and Iyer 2005). Other studies exploiting temporal regression discontinuities and other temporal comparisons have contributed to our knowledge in this area (e.g. Chattopadhyay and Duflo 2004) but not always in ways consistent with the hypothesis that institutions have a major impact on inequality (Acemoglu, Naidu et al. 2013).

Institution shocks and inequality. The close study of one or more "institution shocks" is another lens with which to study the institutions-inequality nexus. This could be based on a small number of historical cases in which it seems that institutional change did have an important impact on economic disparities, to better understand what the causal mechanisms were. To allow the relevant statistical analysis to yield causal inferences we need cases in which not only are the relevant data available but also there is an important change in institutions the cause of which was arguably unrelated causally to the determinants of economic inequality. Two are readily identified, the U.S. abolition of slavery and the economic measures adopted by the Japanese emperor in the years immediately prior to and during World War II including dividend and executive pay caps and a doubling of the marginal tax rate on high income groups Moriguchi and Saez 2008. Here we concur with the recent work of Lindert and Williamson:

> The best analogue [to what I am here calling an institution shock] in … American history would be the emancipation of slaves and the defeat of the Confederacy. In both the Japanese and Confederate crises, a polity that had been slow to liberalize had much of this top wealth suddenly confiscated and redistributed to those in the bottom 99 percent.

The effect of the institution shock in Japan was dramatic: the share of income going to the richest 0.01 percent fell substantially in every year over the period 1938 to 1945 reaching a level less than a sixth of its initial value at war's end. A piece of the relevant data is in Figure 2. (The fact that most of this decline took place before Japan suffered any significant war damage suggests that the process was driven by institutional changes not by the destruction of material wealth.)

A third candidate institution shock – in addition to Japan in the years prior to and during World War II would be the rapid (in archaeological time) expansion of the domain of private property – extend during the Neolithic in many populations to stored food, dwellings, animals, and eventually land -- and the associated increase in political hierarchy and economic inequality in some but far from all cases. This case is of interest because the associated new technology, farming, was not initially associated with significant increases in wealth inequality in many perhaps most of the populations on which we have data. It is worth reviewing the evidence for this statement in detail because it is essential to establishing the status of the advent of private property as the "treatment" which could have affected subsequent inequality rather than itself being the consequence of preexisting inequality. Thus we need to establish the fact that the expansion of the domain of private property in most cases preceded the development of political hierarchies and sustained durable inequalities.

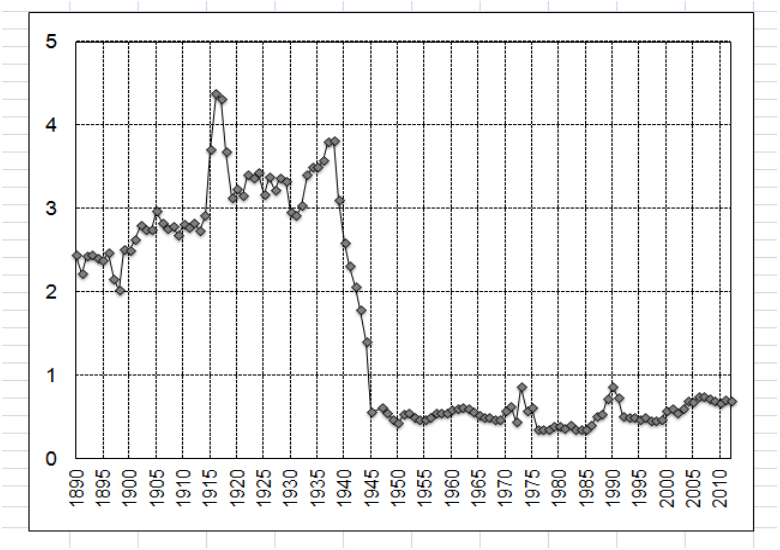

Figure 2. An institution shock in Japan: Top 0.01% income share, 1890-2012. Source: Moriguchi and Saez.

Because mortuary practices leave archaeological traces and often reveal striking differences in wealth and social status, most of the evidence concerning economic inequality among Natufians is based on data from burials, some of which were decorated in ways differing across sites. Byrd and Monahan 1995, Kuijt 1996, and Belfer-Cohen 1995 have studied this evidence. Contrary to earlier work based on incomplete evidence, Belfer-Cohen 1995:16 writes "Evidence for social stratification in the Natufian inferred from the decorated burials is … non-existent." The grave goods in the earlier period were almost entirely personal ornaments which increased in use during the later Natufian period but, as she shows, virtually disappeared from burials.

Byrd and Monahan 1995:280 focus on early Natufian evidence "since later Natufian burials are characterized by a virtual absence of mortuary elaboration (particularly with respect to grave goods and construction techniques)." They conclude that "there is no strong mortuary

evidence for hereditary social inequality in the Natufian.' (p. 251). Their summary (p. 280) is worth citing at length:

> There is no burial evidence for ranked group status …or for a chiefdom with hereditary elites. ..If there was mortuary evidence for a ranked society then we would expect that certain spatially clustered kin group graves would have either significantly higher frequencies of more elaborately constructed graves or more individuals interred with gave goods, or at least some individuals with an order of magnitude more grave goods, and that some of the markings would cut cross all sex and age categories within this group. Since such mortuary patterns are absent we assert that there is no data to support previous interpretations of ascribed status during the early Natufian.

While alike in finding no evidence for systematic wealth differences among Natufians, Byrd and Monahan (1995) and Kuijt (1996) offer distinct (but possibly complementary) interpretations of what their mortuary practices may suggest about Natufian social structure.

Kuijt (1996):332 proposes that late Natufian mortuary practices were part of "a system of social codes for limiting the development and centralization of power and authority.." and that later mortuary and archectual evidence (from c. 11,500 BP to c.9,500) "indictes that social codes were expanded and increasingly standardized within the Levantine region to reinforce a shared community ethos and limit the development of social inequality." He writes (p.331) that this "egalitarian" and solidaristic late Natufian and early Holocene 'belief system was materially expressed through 1) the control and restriction of the display of material differences (lack of grave goods, homogeneous grave construction and individual burials) and/or 2) the development of mortuary rituals that emphasize a community of identity and a shared ancestor (cranial removal, secondary mortuary practices.)"

Byrd and Monahan (1995) suggest that Natufian mortuary practices may reflect the emergence of new concepts of ownership. Burials below the floors of dwellings suggest family ownership of homes prior to farming during the Natufian and much earlier (15,750 BP, Bar Yosef and Arensburg 1973 also, Muheisen 1988. But some evidence, e.g. from Catalhoyuk in Anatolia, suggests limited biological relatedness among those burried under a given dwelling. Pilloud and Larsen 2011).

The differentiation among Natufian burial practices from one cemetary to another is attributed to differentiation among kin groups but "there is no evidence to indicate that any of these kin groups had significantly greater wealth or status." (p.251). They suggest that

> ...the need to legitimate residential rights at base camps and access to pivotal local wild resources ... may have been a key factor in the emergence of early Natufian mortuary behavior of spatially segregating kin group burials. Each of these groups may have been legitimizing their rights to the area and its resources and one's affiliation with a particular group. 283

And like Kuijt, they see “a continuity [in the Late Natufian] with subsequent early Neolithic mortuary practices” but distinct from Kuijt’s suggestion, the continuity is “with their emphasis on ownership, inheritance, descent, family units and burials associated with buildings.” (p. 283)

Perhaps the most extensively studied site is Abu Hureyra on the Euphrates (Moore, Hillman et al. 2000) where at least some evidence spans the entire period from initial settlement as a Natufian community of hunter gatherers to the adoption of the full Neolithic farming package. Consistent with our suggestion(Bowles and Choi 2013) that possession based private property rights emerged with sedentism, Moore and his co authors, like Byrd and Monahan, provide evidence of burials under the floors of dwellings. They write that “the houses were family dwellings…a family could lay claim to the space its house occupied…and its descendents could build a new house on the same spot in which to live… family rights to private property were firmly established in Abu Hureyra 2 [9,400-7,000 BP].

This evidence comes from well into the Neolithic, when Abu Hureyra was already a farming community, but as the following passage indicates, it is consistent with the view that the advent of both cultivation and private property did not entail significant economic and political differences among the resident families.

> “The similarity in the houses across the site and the lack of differentiation between the burials of each sex suggest that in material terms the villages were of similar status. .. Abu Hureyra 2 seems to have been an egalitarian community. ..” (p. 505) “There was no indication from the burials that they had developed a social system based on a hierarchy of classes that was maintained from one generation to the next. Abu Hureyra, then, was an unusually large, early Neolithic village. It had not developed all of the characteristics, for example, substantial public buildings, a social hierarchy, and large scale trade, that we associate with the towns of early historic times in Southwest Asia.” (p. 495)

This preliminary review of the evidence suggests that the emergence of private ownership predates evidence of sustained and inherited inequality and thus may constitute an institution shock in the sense outline above.

A fourth possible institution shock would be the Islamic conquest of Mesopotamia, as there are quite adequate inequality measures both prior to and after the Persian defeats. Additional cases may be developed. Equally interesting would be to study cases of major institutional shocks that were not associated with major changes in distribution that challenge our current understanding of the processes generating inequality. In all the cases to be studied, the objective would be to document the effects of the shock as a basis for then uncovering insofar as possible the causal mechanisms accounting for the change in the degree of inequality (or lack of change).

IV. The political economy of redistribution

Which institutions account for differences among populations in living standard inequality?

The research focus on redistribution proposed here is motivated by the following puzzle. The kinds of institutional differences commonly invoked to explain differences in economic inequality – the presence the liberal democratic political institutions as opposed to absolutist states for example – do not appear explain differences in wealth inequality in the economies for which we have data over the past 9 millennia.[1] The data show that with a few exceptions material wealth is very unequally held in virtually all of the economic systems evident in the figure. Yet the extent of inequality in living standards as measured by disposable income differs markedly among modern nations as the data in Figure 3.

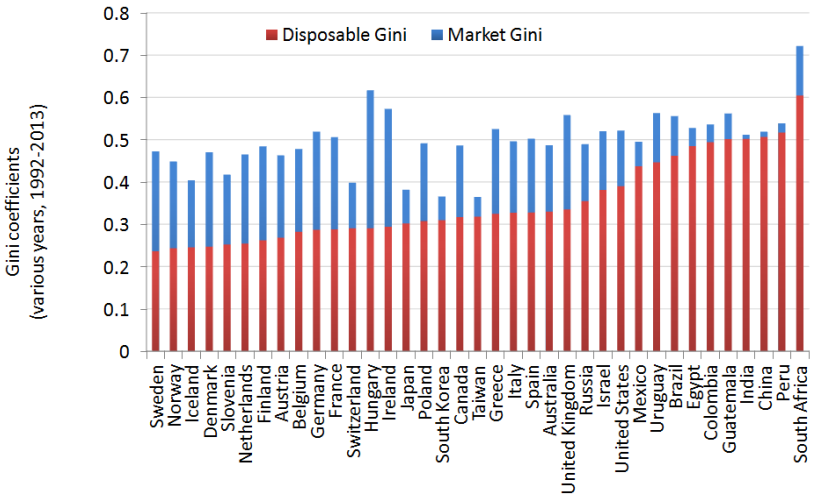

Figure 3. Gini coefficients for disposable income (red bars) and pre tax and transfer income (blue bars). Source: CORE Project (Unit1).

[1] Fochesato and Bowles, work in progress. The advantage of this dataset for the study of institutions is the substantial variation in institutions that it encompasses. Included in our data set are measures of wealth inequality among peoples who made their living from hunting and gathering, hand tool farming, and herding as well as more modern livelihoods such as farming, manufacturing and service provision, and whose economies were governed by institutions as diverse as the egalitarianism of foragers, ancient slavery, feudalism, absolute states, and democratic capitalism. Our data set on wealth inequality complements that of Branko Milanovic, Peter Lindert and Jeffrey Williamson on ancient income inequality(Milanovic, Lindert et al. 2010.) In contrast to other cross cultural inequality comparisons, our inequality estimates are derived from data on wealth holding of individuals (or families) rather than inferences from aggregate data or from subjective assessments based on ethnographic observation.(Murdock 1967) . Methods for ensuring comparability across differing asset types, recipient units and population sizes are described in the cited document.

The resolution to this puzzle proposed here is that differences in redistributive institutions drive a wedge between asset inequalities and in living standards. A valuable recent survey of taxation and other redistribution institutions is Scheve and Stasavag 2016.

To proposed focus on redistribution institutions rather than those affecting the distribution of wealth, I ask: How much of between country differences in the degree of disposable income inequality can be explained (in an accounting sense) by inequalities in market income and by redistribution respectively. Let the superscripts 1 and 0 refer to disposable and market respectively. The definition of the redistribution ratio ρ is

$$\rho := 1 - G^1 / G^0$$

or

$$G^1 = G^0(1-\rho)$$

so

$$\ln G^1 = \ln G^0 + \ln(1-\rho)$$

and

$$\operatorname{var} \ln G^1 = \operatorname{var} \ln G^0 + \operatorname{var} \ln(1-\rho) + 2\operatorname{cov}(\ln G^0, \ln(1-\rho))$$

The last expression decomposes country differences in inequality in living standards into a part that is arguably due to the market value of endowments, a part that is due to redistribution of the income flows associated with these endowments, and the covariation of these two influences. Using the data in Figure 4, we have the decomposition in the table.

Decomposition component	*Values*	*%*
Variance of ln Gini (market income)	0.0194	0.284
Variance of ln (1- ρ)	0.0465	0.681
Covariance of [ln Gini (market income), ln (1- ρ)]	0.0024	0.035
Variance of ln Gini (disposable income)	0.0683	1.000

Table 2. Market income inequality and redistribution. Decomposition of between-country differences in inequality in disposable income.

It is clear that by this measure redistribution accounts for the greater part of the between country differences in inequality in disposable income.

A related fact is that among contemporary societies with a long tradition of democratic government, differences in the degree of income inequalities and associated disparities in living standards are not primarily due to differences in the degree of material wealth inequality but

instead are almost entirely attributable to differences in the extent to which the incomes arising from differing assets and capacities are redistributed.

The available data for this set of nations using as a measure of inequality in living standards the Gini coefficient for disposable income (that is income net of transfers to (taxes, e.g.) and from (income support e.g.) the government) exhibit a substantial inverse statistical association between the degree of inequality in material wealth and the degree of inequality in disposable income. An alternative measure of living standards including in kind transfers such as schooling and health care provision is available for a somewhat smaller data set, but the results are similar.

While archaeological data are lacking, ethnographic evidence (Fochesato and Bowles 2015) suggests an even greater role for informal consumption smoothing institutions among mobile hunter gatherers. In three Latin American and one African forager group a mean of almost two-thirds of the food acquired by an individual is consumed by those beyond his or her immediate family.

The data in these three figures suggest that understanding the way that institutions affect the processes by which differences in endowments are translated into differences in living standards is critical the analysis of inequality in economic well being. In societies with redistributive states, these processes can be considered under two headings.

The first are the institutional determinants of the prices of the elements of the vector of human and material assets making up an individual's endowment. These price determinants include the extent of competition, quantity constraints, and other aspects of the structure of labor, credit and product markets as exemplified by studies of trade union bargaining (Moene and Wallerstein 1995). Also included under the pricing of endowments heading are studies of the evolution of the bargaining rules that determine how classes or other actors share the join surplus (Axtell, Epstein et al. 2001, Banerjee, Gertler et al. 2002, Bardhan 1989, 1984, Bowles 2004, Young 1998, Young and Burke 2001).

The second set of processes that influence the relationship between differences in endowments and in living standards are tax, transfer and other policies by which governments redistribute private incomes. I have chosen to study this second class of processes, namely redistribution institutions as a fundamental determinant of the degree of disparity in material living standards.

The political economy of redistribution: Rule of law, democracy, and state effectiveness.

The workhorse model by which economics has studied the process of redistribution is the median voter model advanced by Meltzer and Richard 1981 the logic of which they explained in this way:

> … the distribution [of income] is skewed to the right, so the mean income lies above the median income. Any voting rule that concentrates votes below the mean provides an incentive for redistribution of income financed by (net) taxes on incomes that are (relatively) high.

At least in this simple form, the model has not performed well in explaining the extent of redistribution. (Przeworski, Alvarez et al. 2000, Acemoglu, Naidu et al. 2013 and the works cited there). An implication of the model is that greater inequality will support higher levels of redistribution (because it widens the gap between the median voter and the mean income voter). In table 2 above, then, we would expect the covariance term to be negative: high levels of income inequality before taxes and transfers should be associated with a higher level of redistribution (and hence a lower level of $1-\rho = G^1/G^0$ the disposable income inequality to income inequality before taxes and transfers). But it is not.

The median voter model can be modified to take account of less than ideal democracy by positing a 'decisive voter,' and this device in principle allows reconciliation of anomalous cases – such as the highly unequal economies in figure 5 that do relatively little redistribution. But it may be the underlying difficulty is that the model -- inspired by a problem in spatial allocation from location economics (Hotelling 1929)--is not really about politics.

Harold Lasswell 1936 defined politics as the study of "who gets what when and how." Consistent with this approach I propose to develop a model in which the state elite plays an active rather than a passive role and in which the exercise of power in the determination of who gets what, when and how depends on political institutions.

Objective The objective is to use a familiar principal agent model to study inequality between state elite and a citizenry and using this model to explore the way that the rule of law, democratic accountability, and the effectiveness of the state in service delivery affect the level of public goods provision and taxation. The broader objective is to represent the state elite as claimant on income rather than simply an impersonal social planner distributing income among members of society according to some social welfare function or idealized electoral process.

I propose to do this by leaving entirely the view of inequality as a result of exploitation of producers made possible by the powers associated with ownership of capital goods (and perhaps a state allied with them) to a model in which a governing elite extracts rents from citizens by taxation made possible by the coercive powers of the state and insufficient democratic accountability.

The appropriate model for this is a principal agent relationship (citizens as principals, elite as agent) where democratic accountability takes the form not of delegation, but rather contingent renewal, that is, the state elite may be dismissed for non performance, the likelihood of this occurring depending on the rule of law and the extent of democratic accountability.

The extent of public goods provision in model directly affects the intergenerational elasticity introduced in section II above: the greater is the share of public goods in the citizens' standard of living, the greater is the importance of mean wealth in equation 1 and the lesser is β. Differential public goods provision across nations also enhances the importance of group membership (introduced in section III) as a determinant of inequality in living standards.

Below I sketch the basic idea of such a model.

Possible Setup

- A citizen and a member of the state elite are the two players; the citizen benefiting from public goods and the elite garnering rents by providing fewer public goods than the citizen's taxes would allow. (The model will be extended subsequently to take account of the fact that the elite may value (in addition to their own rents) the provision of public goods.)
- The citizen, who to distinguish the two readily is a woman, decides on the level of taxes *T* (either by legislation or by the extent of evasion) knowing the elite's public goods provision *P* in response to each tax rate selected.
- This elite best (public goods provision) response function is for any given level of T, the level of P that maximizes his utility, which is increasing and concave in expected rents R.
- The elite's expected rent R is per period rents (*r* = taxes minus expenditures on public goods) times the expected duration of the regime (meaning this particular elite's rule, Δ.)
- The probability of a regime termination (Δ^{-1}) is decreasing in the public goods provision ratio P/*T*.
- At the end of each period the elite is displaced or not; in the latter case the previous period is repeated (the game is time invariant) until the regime is terminated, and the game ends.

The key variables of interest could be:

- $\rho \in [0,1]$ = the *extent of the rule of law* defined as the probability that the current elite will be displaced independently of the level of provision of public goods (this is a very particular use of the term rule of law).
- $\delta \in [0,1]$ = the *degree of democratic accountability* is the extent to which under the rule of law, the failure of the elite to provide public goods adequately will result in its displacement; and
- $\varepsilon \in [0,1]$ = *state effectiveness* in delivering public goods, defined below.

The first two variables provide us with a taxonomy that might be filled in along the lines of Table 3. A challenge of the project would be to find data that would allow this.

Democracy / *Rule of law*	*Yes*	*No*
Yes	Germany, India	Vietnam, Singapore
No	Colombia, Italy	Pakistan, DRC, South Sudan

Table 3. The factors affecting regime termination: Democracy (failure to provide public goods) and Rule of Law (terminations unrelated to public goods provision).

Basic mechanisms at work in the model.

Regime termination. The rule of law and degree of democratic accountability together govern the duration of the regime Δ which is the inverse of the per period probability λ that the regime will be terminated. The termination arises from two sources. The first is unrelated to the provision of public goods and inversely related to the rule of law so the absence of rule of law or ρ = 0 means that the regime will terminate with certainty after one period while ρ= 1 means that the only cause of the regime terminating is a failure to adequately provide public goods. This failure constitutes the second cause of terminations and is increasing in the degree of democracy and the rule of law. Thus we have

$$\lambda = (1-\rho) + \rho(1-P/T)\delta = 1-\rho(1-\delta(1-P/T)) \qquad (1)$$

the derivatives of which with respect to ρ, δ, and μ will play an essential role in the model. Thus we have:

- The rule of law diminishes the probability of termination of the regime, and this is especially the case if public goods are amply provided so that the regime will not be terminated (under the rule of law), or if democratic accountability is limited.

  $\lambda_\rho = -[1-\delta(1-P/T)] < 0$

- Democratic accountability increases the probability of termination and does so especially when few public goods are provided and the rule of law is strong. $\lambda_\delta = \rho(1 - P/T) > 0$
- The provision of public goods decreases the probability of termination especially when both democracy and the rule of law are substantial. $\lambda_p = -\delta\rho/T < 0$.

State effectiveness reduces the cost C of providing public goods P. The cost C to the elite of providing public goods *P*, is $C = C(P, \varepsilon)$ where the function used to illustrate the model here could be $C = cP^2/\varepsilon$. The difference between what the elite spent on the provided level public goods, $C = C(P, \varepsilon)$, and what the same level would have cost had the state been completely effective is

$$cP^2(1/\varepsilon - 1)$$

This amount is not enjoyed by the elite, but represents waste (public servants not doing their jobs, provision of goods that are not of value, etc) that may in an empirical application be essential to the stabilization of the coalition of forces keeping the elite in power.

Possible results and applications. Reasoning by extension from similar principal agent models of the labor, credit, and other markets Bowles 2004 I anticipate that the resulting Nash equilibrium of this interaction will have the following characteristics

- The elite will receive a rent, that is, a level of utility (or equivalently taxes received not spent on providing public goods) superior to its next best alternative.
- The citizen will exert a kind of power over the elite (that is a credible threat of dismissal which were it to occur would be costly to the elite) but the extent of this power will depend on the extent of democracy and the rule of law.
- The outcome will be Pareto inefficient, leaving an opening for institutional innovations that would result in mutual (state-citizen) improvement.
- The level of public goods provision and hence egalitarian redistribution will depend on the extent of democracy, but only minimally so if the rule law is limited.

Discussion. The model provides a framework for understanding the process of egalitarian redistribution when the high income group is the state elite subject to some kind of democratic accountability however limited, rather than a class owning the means of production or those possessing superior endowments of some kind.

It could be the basis of a narrative of the emergence of representative institutions and eventually universal suffrage. In many nations this was a real historical process by which a government's tenure in office came to depend at least in part on their performance in providing citizens with essential public goods. For example, in the United States, the School Committee in the textile city of Lowell, Massachusetts in its 1846 *Annual Report* advocated an expansion of public goods provision with these words: "Let then the influence of our Common Schools become universal; for they are ....a protection of our… safety against internal commotions." *The Tenth Federalist Pape*r advocating what was at the time an advance of representative institutions in the U.S noted in its opening paragraph that "our governments are too unstable, that the public good is disregarded" (Hamilton, Madison et al. 1961, initially published in 1788).

James Madison, the author of *The Tenth*, may have thought the only way to limit "tumult and disorder" and ensure the rule of law is to increase democracy. If there were some function $\rho(\delta)$ increasing in δ then it would be interesting to explore the conditions under which ruling elite would concede to a more democratic rule.

While the model may provide a framework for understanding the joint advance of the rule of law and democratic accountability (in the particular senses used here), it is unclear how well it can explain the limited effect of democratic government on the degree of inequality in living standards mentioned at the outset. This would require explaining why the institutions associated with the conventional measures of democracy (in the studies cited) did not effectively raise δ, the extent to which regime survival is conditional on providing the less well off with essential public goods. Reasons why this would be the case would include the greater legitimacy of economic inequality under liberal democratic social conditions, and the possibility that the extension of suffrage did not increase the political influence of the least well off, and other mechanisms explored in Acemoglu, Naidu et al. 2013 and the literature cited there.

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