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A COMMENT ON: "*State Capacity, Reciprocity, and the Social Contract*" *by Timothy Besley*

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Treating civic preferences as endogenous and government policies and tax capacities as both an influence on and a consequence of their evolution is an important new strand of thinking to which Besley has contributed. I ask: Does his model provide a convincing explanation of the way that civic cultures and the expansion of the state evolved as a matter of historical fact? And I suggest a number of alternative modeling approaches that both would recognize that policy makers take account of the effects of their policy choices on preferences and, consistent with empirical observations, would support equilibria with culturally heterogeneous rather than homogeneous populations.

KEYWORDS: Cultural evolution, group selection, civic values, taxation, replicator equation, endogenous preferences.

BESLEY MODELS THE CO-EVOLUTION of a civic culture in a large population of citizens, on the one hand, and state tax capacities and decisions about expenditures on common interest public goods determined by a political elite, on the other. As claimed, the result is illuminating about the "role of civic culture in building an effective fiscal state" and more generally its "historical emergence" and "how civic culture develops in the long run." Besley motivates this model by "one of the most striking features of twentieth century economic history … the increase in the capacity of states to raise significant revenues as a share of national income." This is a valuable contribution on these important (and for the most part neglected) topics.

The key mechanism for the cultural evolution part of the account is a standard replicator equation capturing the idea that when the government elite spends tax revenues on common interest public goods rather than transfers to itself, citizens with civic values are visibly better off and hence more likely to be copied. The result is a "complementarity between the strength of institutions and a quasi-voluntary tax compliance."

The model delivers a coherent explanation of how an evolutionary process embodying this complementarity could work and how it would result in an increase in the share of taxation. I will make some observations on the technical structure of the model at the end of this comment but first, I want to ask: Is this a convincing explanation of the way that civic cultures evolved and state tax revenues expanded, as a matter of historical fact?

1. HOW CIVIC VIRTUES EVOLVED

Besley's model generates homogeneous populations of either all "materialists" or all "civic-minded" citizens, unless one imposes (as Besley does) an ad hoc "irreducible fraction of materialists who are not open to socialization and … an irreducible fraction of civic-minded citizens." But ethnographic, survey, and experimental evidence alike suggests that cultural heterogeneity rather than homogeneity is the rule (Mahdi (1986),

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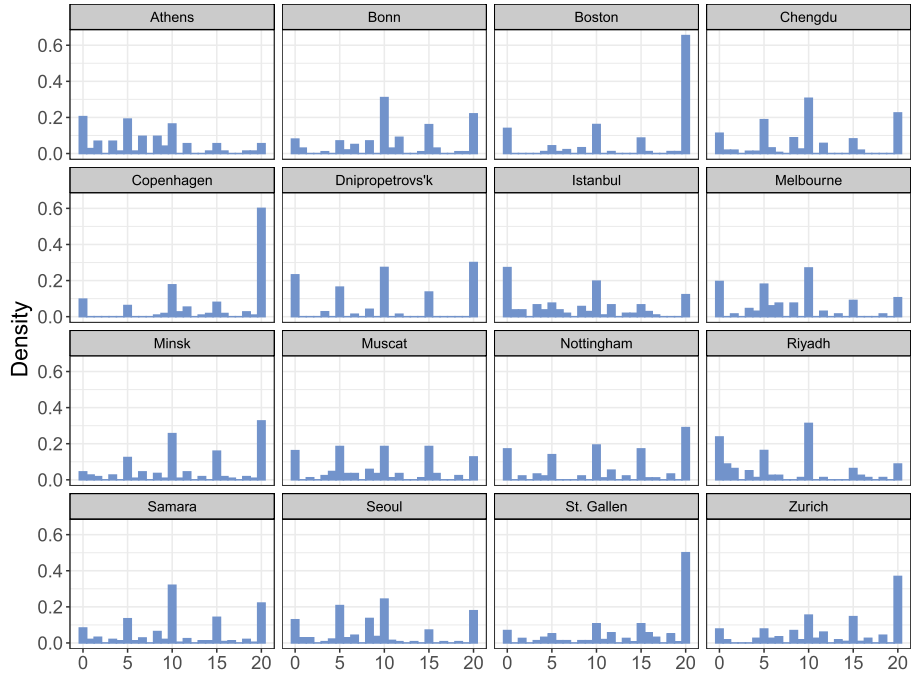

FIGURE 1.—Contributions to a public good in 16 subject pools. (The data are from the experiments described in Herrmann, Thoni, and Gaechter (2008), provided by the authors and available at https://doi.org/10.5061/dryad.87301.) The game is a standard public goods game played over many periods in which in every period after the contributions of each are revealed, group members have the option of paying to reduce the payoffs of other members. Shown are the contributions in the first period.

Wiessner (2005)). As an illustration, in Figure 1 I show the distribution of contributions among 16 subject pools in the first period of an experimental public goods with punishment game.

But it is not the discrepancy between the model and what we know about the distribution of behavioral traits in a population that matters per se, but rather what it reveals about the dynamics of the model. The replicator equation governing the evolution of the fraction of the population that are civic-minded, that drives the population to cultural homogeneity (when unbounded by the ad hoc constraints that Besley imposes on the evolutionary process), also supports an interior stationary but unstable population distribution. This interior stationary point is the boundary of the basin of attraction of the two homogeneous equilibria.

This setup would be expected to support long periods of stasis in the neighborhood of one of the two stable stationary states in the dynamic, with rare but rapid transitions from one type of homogeneous population to the other. Adequate historical evidence of a quantitative nature is hard to come by, but in two important respects this is not the process by which the behaviors associated with a civic culture appear to have evolved in the various populations of Europe (the instance of this process on which we have the best record). The first concerns the speed of change, the second the mechanism.

First, my reading of studies of the evolution of civic virtue including the rule of law – elements of what Norbert Elias called "the civilizing process" – is that, to the extent that this occurred within populations, it was slower than the accelerated transition that would take place if the population crossed the boundary of the two basins of attraction in Besley's

model (Elias (2000), Gellner (1983), Klingenstein, Hitchcock, and DeDeo (2014), Weber (1976)). Of course, without filling in more of the details of the updating process, the speed of the passage to the neighborhood of the all civic equilibrium once the population has entered the basin attraction of that equilibrium cannot be pinned down. But the structure of Besley's model delivers what biologists call a punctuated equilibrium process of extended periods of stasis interrupted by rapid transitions (Eldredge and Gould (1972)), and I see no evidence that civic virtue emerged in such a punctuated way.

Second, while evolutionary processes operating entirely within populations surely contributed to the emergence and diffusion of the civic virtues, another factor is also an important motor of this process, namely, competition – often military – between political units. As Charles Tilly (whom Besley cites) showed, the evolution of European culture has been profoundly influenced by conflict between political jurisdictions and the assimilation of smaller into larger units (Tilly (1990)). Though it describes the same outcome – the emergence of voluntary tax compliance on a mass scale – this apparently occurred by an evolutionary process quite different from Besley's, namely, cultural group selection rather than the transformation of cultures within a single population.

Here is Tilly's account. A half a millennium ago in what is now Italy, there were two to three hundred distinct city states. At the same time, South Germany was ruled by 69 free cities in addition to numerous bishoprics, principalities, duchies, and other state-like entities. The whole of Europe at that time was governed by about 500 sovereign bodies. But by the First World War, fewer than 30 states remained. This culling of states not only thinned the number of sovereign bodies, it radically reduced the heterogeneity of forms of governance. A single political form – the national state – emerged, where once had ruled, according to Tilly (1990):5, "[e]mpires, city states, federations of cities, networks of landlords, religious orders, leagues of pirates, warrior bands, and many other forms of governance." Unlike the competing forms that it eclipsed, the national state exhibited a centralized bureaucratic structure maintaining order over a defined territory, with permanent armed forces made possible by the capacity to raise substantial amounts of revenue in the form of taxation.

What explains the competitive success of this novel form of rule? The simple answer is that when national states warred with other forms of governance, they tended to win. But, Tilly writes: "No monarch could make war without securing the acquiescence of nearly all of his subject population, and the active cooperation of at least a crucial few" (Tilly (1990):75). A system of taxation paid in money, coupled with the capacity to borrow large sums, allowed rulers of national states to make war without resort to more unpopular means such as the direct seizure of food, weapons, and animals. The establishment of well-defined private property rights and markets thus facilitated the task of mobilizing the coercive resources needed to win wars. Market environments favored state formation in a less obvious way, by inducing tax compliance:

> Participants in markets already do a significant share of the requisite surveillance through the recording of prices and transfers. Properly socialized citizens, furthermore, come to attach moral value to the payment of taxes; they monitor themselves and each other, blaming tax evaders as free riders. (Tilly (1990):89)

Successful national states assimilated the populations they absorbed, and over the period they promoted and eventually required a common pattern of childhood socialization through schooling.

Thus, while Tilly's account shares with Besley's a key role for change in values, the process accounting for the change is entirely different.

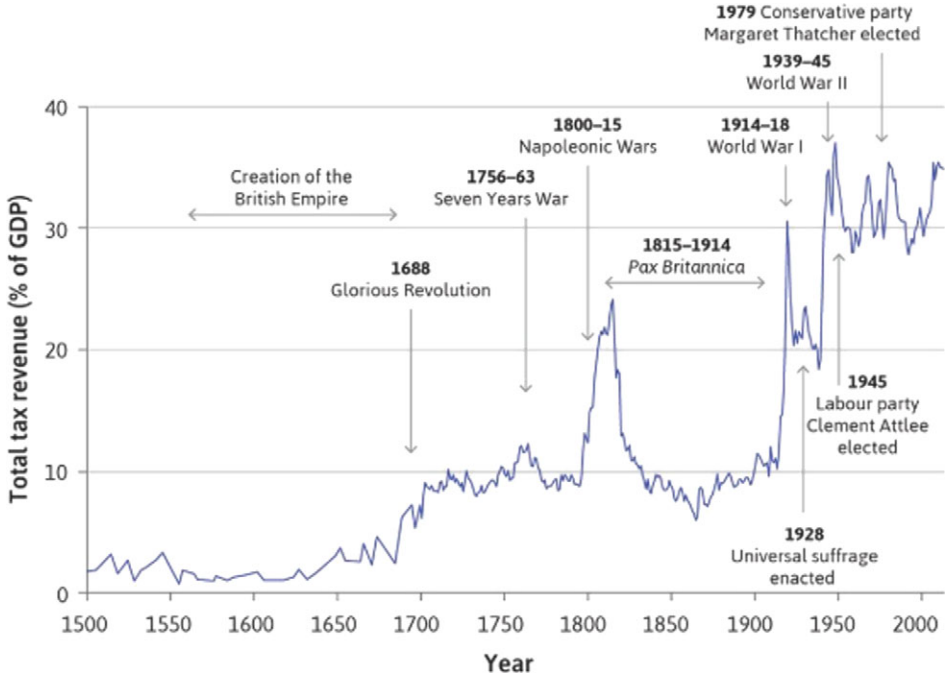

FIGURE 2.—Total tax revenues as a fraction of GDP, Great Britain, 1500–2015. Source: CORE based on early historical data from O'Brien and Hunt (CORE Team (2017), O'Brien and Hunt (1993)).

2. WHY GOVERNMENT REVENUES GREW

Turning from the emergence of civic values to its consequences, the key element in Besley's explanation of the growth of state revenues as a share of income is the emergence of a civic-minded population that largely voluntarily paid taxes. But a look at the historical trajectory of state revenues (at least for Great Britain, the longest consistent series that I could find) suggests that two other factors were important. My reading of Figure 2 is the following. A gradual increase in the revenue share took place in the century and a quarter after 1600, followed by a leveling off (other than around the Seven Years War) lasting a century. The Napoleonic Wars doubled the tax share, but only temporarily: just prior to the First World War, the tax share was no greater than at the time of the Glorious Revolution well over two centuries earlier. The two world wars brought the tax share to contemporary levels. The extension of suffrage to virtually all adults in the aftermath of the First World War (a common pattern among early democracies) may well be among the reasons why the tax share did not return to pre-20th century levels at the middle of the past century.

By this account, the same thing that promoted the proliferation of tax-compliant populations over the very long run also helps to explain the extraordinary increase in the tax share over the last century. This is war.

3. RUDIMENTS OF AN ALTERNATIVE MODEL

A model capturing the central part played by competition between groups, without requiring special assumptions about how citizens' values respond to policy-makers' choices, could be based on the following ideas borrowed from population biology (Bowles, Choi,

and Hopfensitz (2003), Price (1970)). A group is any entity that collects taxes to fund government services for a given population. Tax compliance is a trait that diffuses by being copied (either culturally or genetically). Paying taxes is contributing to a public good; those who contribute experience lower payoffs than those who do not and are as a result less likely to be copied than those who do not. But a group in which tax compliance is high tends to win some form of economic, military, or other competition with other groups, which it then absorbs. Members of the less tax-compliant losing populations are unlikely to be copied because they either do not survive or receive low payoffs. Larger groups subdivide to stabilize the number of groups.

Let the number of replicas next period of individual i in group j be π_{ij}, termed the fitness (cultural or biological) of that individual. Individuals can be either tax compliant or not. The fraction of compliant types in group j is p_j and p_{ij} is an indicator equal to 1 if the individual is tax-compliant, and zero otherwise. Then, letting β_g be the positive effect on fitness of being in a group with many compliant types due to competition among groups, β_i be the negative effect of being tax-compliant due to competition within group, and β_0 the fitness of members of a group with no tax-compliant types, we have

$$1) \quad \pi_{ij} = \beta_0 + p_j\beta_g + p_{ij}\beta_i.$$

Using the Price equation from population biology, and setting the average population fitness to 1 (meaning a stationary population size), we know that the change in the population fraction of compliant types, p, is

$$2) \quad \Delta p = \mathrm{var}(p_j)(\beta_g + \beta_i) + E\big(\mathrm{var}(p_{ij})\big)\beta_i,$$

where the expectation operator $E(\,)$ indicates a weighted summation over groups (the weights being relative group size).

It is clear from the second equation that a stationary interior equilibrium – a mixed population of tax-compliant and non-compliant citizens – will occur when the effect of intergroup competition just offsets the within-group selection against the compliant types. Models based on this process have been shown to provide a plausible account of the genetic or cultural evolution of altruistic behaviors among humans and other animals (Bowles (2006, 2009), Bowles and Gintis (2012), Wilson and Holldobler (2005)).

This sketch of a model provides a scaffolding on which the particulars of tax compliance and public spending could be grafted. But even without extensions, this rudimentary model suggests some applications: If the groups in question are states, regions, or towns, then policy-makers seeking to promote a more civic-minded tax-compliant population could manipulate both the individual costs of tax compliance (through the choice of a tax rate and enforcement) and the group benefits (by directing tax revenues to activities supporting group advantage, or altering the frequency, type, or stakes of between-group competition).

4. EXTENSIONS AND MODIFICATIONS OF THE MODEL

I confess that my comments so far have been of the genre: "why didn't he write a different paper?" I will close with three suggestions for extending the model that Besley *did* write.

First, the imposed limits that prevent the population from being entirely homogeneous could be replaced by the less ad hoc assumption that a genetically transmitted predisposition to altruism or reciprocity is distributed unequally in the population in such a way as to ensure an interior stable stationary state.

Second, if the elite know that the fraction of civic-minded citizens will evolve in response to their choice of expenditures (how could they not know?), they should take this into account. I find it difficult to motivate Besley's strategy of wedding a single period model of tax and expenditure decisions made by a political elite that does not know that culture is evolving, on the one hand, to a model of cultural dynamics in which the fraction who are civic-minded is affected by the policy-makers' choices, on the other. The simplest (and entirely adequate for the purpose) way to address this concern is (a) adopt a setup with an interior stationary fraction of reciprocators as a function of the tax rate and expenditure choices of the elite (as suggested immediately above) and then (b) let the elite maximize their objective function, taking account of the endogenous nature of population fraction that are civic-minded.

Third, even with the framework that produces homogeneous populations (absent ad hoc restrictions), the analysis could more closely reflect the real historical dynamic problems. Asking, as Besley does, what influences will shift the interior unstable equilibrium to expand the basin of attraction of the tax-compliant equilibrium could be replaced by positing a stochastic environment with some noise in the cultural updating process such that transitions from one of the stationary states to the other are possible as exemplified by works in stochastic evolutionary game theory (Belloc and Bowles (2017), Weibull (1995), Young (1998)). This would allow an analysis of policy effects on the first passage time (waiting time for a transition) from the "materialist" equilibrium to the basin of attraction of the all civic state.

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