

A Theoretical Foundation of the Modernization Hypothesis*

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[VERY PRELIMINARY - DO NOT CIRCULATE]

Abstract

In this paper we develop a theoretical framework where citizens derive utility from both material goods, and political liberties, with the two arguments of the utility function potentially exhibiting complementarities to the extent that wealth can never perfectly substitute the lack of political liberties and representation. Goods are produced endogenously, with the opportunity cost of production being the marginal improvement of political freedom that would obtain from political activism. The ruling elites aim at minimizing the degree of political freedom so as to increase their likelihood of retaining power. We demonstrate that economic development as captured by positive productivity shocks, incentivizes citizens to substitute production time for political activism in developed economies, thus bringing support to the modernization hypothesis. In economically backwards polities, we demonstrate that negative economic shocks will increase political activism, in support of theories discrediting the modernization hypothesis. Some (highly preliminary) empirical tests are shown to support our theoretical findings.

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1 Introduction

With the advent of industrialization, several societies experienced in tandem a rise of living conditions and an expansion of their political freedoms. It is only natural then that researchers in both political science and economics have recurrently reflected on the causal link between economics and politics, a question that has preoccupied thinkers dating back at least as far as Ancient Greece. Yet, despite the plethora of scientific writings on the topic, the question is still debated. Economic development may induce countries to democratize (e.g. Barro 1999, Boix and Stokes 2003), but the opposite (non-exclusive) scenario cannot be dismissed either (e.g. Acemoglu et al. 2019, Colagrossi et al. 2020). Moreover, both economic and political developments could very well be jointly rooted in other factors. Proponents of the *modernization hypothesis* (Lipset 1959) argue that economic growth and the associated rise in educational attainments jointly push polities to democratize. Yet, the empirical evidence on the matter is highly divided with findings in support of the modernization hypothesis (e.g. Barro 1999, Che et al. 2013, Treisman 2020) and others disproving it (e.g. Acemoglu et al. 2008, 2009). While this lack of consensus may have raised suspicions on the potential causal effect of modernization on democratization, we argue that empirical studies to date may have failed to look at the problem through the right angle because the theoretical underpinnings being tested are potentially incomplete.

The general argument put forth by Lipset (1959) is that with the advent of industrialization, urbanization, and increases in wealth and education, polities democratize but also become more resilient to autocratic reversals. This quite general statement, if true, could still be explained by a myriad of mechanisms, be it an enlightenment of the up to now uneducated masses, the better coordination capacity of urbanized disenfranchised citizens, or the increased incentives of poor citizens to benefit from the country's economic expansion, to mention few.¹ Importantly, however, to identify which mechanisms could indeed be operating, it is essential to correctly conceptualize the citizens' preferences, since ultimately it is their choices that will generate a mapping from a changing socio-economic environment to politics. The theoretical literature on regime transitions, mostly driven by economics' scholars, has this far mostly assumed that the end goal of citizens is to maximize their *material* welfare, with education, income levels, or technology modifying the relative costs and benefits of pushing for a democratic transition (e.g. Bourguignon and Verdier 2000, Acemoglu and Robinson 2006). On the other hand, political scientists have underlined that citizens have both *material* and *post-material* concerns, that

¹Lipset did elaborate at length on some potential mechanisms, while subsequent writings also gave emphasis to alternative ones.

they may thus value democracy, eventually implying that concepts like self-expression, participation, or tolerance are an integral part of citizens' utility function (Welzel 2007, Inglehart and Welzel 2010). To date, few theoretical advances on the topic have accounted for this important nuance, with a common reductive assumption in these works being that material and non-material goods are at best pure substitutes (e.g. Besley and Persson 2019).

Our goal is to propose a theoretical foundation for the modernization hypothesis that incorporates in citizens' preferences both material goods, i.e. income, and post-material items, i.e. the degree of political freedom of their polity, while also allowing the latter to influence the former through government-led redistribution. We adopt the most natural approach to conceptualize citizens' preferences by assuming decreasing marginal utility over both 'goods'. While decreasing marginal utility over material goods is a commonly accepted assumption, it is only reasonable to think similarly of political rights to the extent that the first concessions granted (voting rights) certainly bear more utility than 'marginal' improvements in free societies (e.g. abortion rights, gay rights). Importantly, we allow the utility function to exhibit complementarities between these two goods to the extent that wealth can never perfectly substitute the lack of political liberties and representation.

Material goods are both available in the form of national wealth, and produced by citizens, with the opportunity cost of production being the marginal improvement of political freedom that would obtain from more intense lobbying/protests for political rights; what we term political activism. The ruling elites aim at minimizing the degree of political freedom so as to maximize the share of embezzled public wealth. Our core contribution is to demonstrate that the effect of increases in economic development on the degree of democracy is conditional on the level of economic development of the society under study. For low initial levels of economic development, when citizens experience a high marginal utility from material goods, modernization as captured by a positive productivity shock will *reduce* political activism and the ensuing political liberties. This result is driven by the fact that increased marginal benefits from productive activities will outmatch the marginal gains from political activism when the marginal utility of income is high. For high levels of economic development when the marginal utility from income is low, the reasoning is reversed. Following a modernization shock, the marginal utility from the material good will be low while the complementarity between material goods and non-material goods will increase the marginal return from political activism, eventually incentivizing citizens to trade-away the already high income for increased political liberties.

To provide evidence of our theoretical mechanism, we propose a (highly preliminary) empirical exercise where we expand the analysis of Acemoglu et al. (2008) by equally accounting for possible non-monotonicities in the relationship between income and democracy. Our findings confirm with a country fixed effects OLS estimation the existence of a U-shaped relationship between the two variables of interest.

This paper contributes to the literature in important ways. First, we integrate in our theoretical analysis a dimension that has been recognized to be salient by political scientists, non-material valuation of political freedoms, but that has been neglected or modeled in quite restrictive ways in prior theoretical works. A second point relates to the novel mechanism we uncover. We view our assumption that economic and political ‘goods’ feature some degree of complementarity as the most natural way of thinking about preferences over these goods. This assumption gives rise to a very interesting and yet intuitive mechanism: in wealthy societies, citizens become increasingly willing to sacrifice material wealth for increased political rights since these will in turn enhance the satisfaction derived from material goods too. Third, our predictions point to an expected non-monotonic relationship between economic development and democratization. Our (highly preliminary) empirical findings support the existence of a U-shaped relationship between income and democracy; a hypothesis that has thus far not been tested empirically and one that could reconcile apparent contradicting findings in the literature.

In the next section we relate our own theory to the existing literature. Section 3 presents the model and main findings, Section 4 proposes some tentative empirical support, and Section 5 concludes.

2 Literature review

The vast majority of theoretical contributions to political economy assume that democracy carries value to citizens only to the extent that it enables them to reallocate material resources in a beneficial way (e.g. Acemoglu and Robinson 2005, Edmond 2013, Gehlbach et al. 2016). Acemoglu and Robinson (2001) developed a framework along these lines where the disenfranchised parts of the society can be granted voting rights in times of negative economic performances because of the elites’ inability to commit otherwise to a future redistribution of resources. The main prediction stemming from Acemoglu and Robinson (2001) is the democratizing effect of negative income shocks.

Huang (2012) proposes a theoretical model in support of the modernization hypothesis, whereby he hypothesises that the society’s different groups’ political power is a function of their economic power. With modernization, the economic power gradually

switches to the capital owners, before ending up in the hands of workers once they cumulate sufficient human capital. Ray and Esteban (2017) argue that *unequal growth* will lead to conflict, while Kotschy and Sunde (2019) show that negative income shocks in the presence of inequality push countries to democratize.

The model we propose produces both results since for low levels of economic development our predictions will converge with the ones of Acemoglu and Robinson (2001), while for high levels of economic development we bring support to the *modernization hypothesis*.

In a recent theoretical contribution Mayoral and Ray (2021) conceptualize the political struggle as one concerning exclusively the control of the allocation of public goods. Besides the different focus of our respective studies given Mayoral and Ray's (2021) particular attention to the relative group size of political contestants, our two setups feature a fundamental conceptual difference: we view political rights a non(-perfectly) substitutable to material goods.

The above-reviewed approaches have totally disregarded the intrinsic value of democracy to citizens. Welzel (2007) and Inglehart and Welzel (2010) emphasize the importance of self-expression values that constitute defining characteristics of democratic regimes. Indeed, we all give value to different degrees to freedom of speech, or to the ability to influence decisions over non-material issues like e.g. whether or not to accept abortion, gay marriage, or religious public education. A handful of theoretical contributions have incorporated non-material considerations (e.g. Besley and Persson 2019), but in a very restrictive manner. In Besley and Persson (2019), citizens derive utility from democratic values alongside material goods, but these two ingredients enter their utility function in an additive way, de facto implying a perfect substitution assumption between these "goods". Yet, such restriction may seem ad hoc to the extent that the weight given to democratic values is hardly independent from one own material wealth, or, in the words of Inglehart and Welzel (2010) "*rising levels of economic security bring growing emphasis on self-expression values [...] When survival is insecure, it tends to dominate people's life strategies*". By adopting a more general formulation of citizens' preferences that accommodates decreasing marginal utility for both goods, i.e. the material good and political rights, as well as complementarities between material goods and political rights, we show that the effect of modernization on democratization is non-monotonic.

Regarding the empirical literature linking economic performance and regime type, there is no consensus either. Barro (1999), Boix and Stokes (2003), and Boix (2011), for instance, showed that economic development enables countries to democratize, while Przeworski and Limongi (1997) posited that economic development can at best help

democracies avoid a relapse in authoritarianism, but not initiate the democratization process. Acemoglu et al. (2008) brought evidence that the correlations in support of Lipset’s hypothesis were entirely driven by country-specific characteristics, thus resulting in the theory being disproved when adding country fixed effects to the econometric exercise. Subsequent work resurrected the modernization hypothesis, whether by adding further control variables (Cervellati et al. 2014) while using the same methodology as Acemoglu et al. (2008), by using system GMM rather than difference GMM (Che et al. 2013), or by distinguishing short run from long run effects of modernization (Treisman 2015). Burke and Leigh (2010), Bruckner and Ciccone (2011), and Franck (2016) establish empirically evidence corroborating Acemoglu and Robinson’s (2001) theory that economic contractions lead to democratization, thence presenting evidence in stark opposition to Lipset’s hypothesis. Further, Aidt and Leon (2016) confirm that negative economic shocks in Sub-Saharan Africa sparked riots that resulted in the elites making democratic concessions for fear of the riots evolving in a full-fledged revolution (e.g. Aidt and Jensen 2014, Aidt and Franck 2015).

The empirical debate has to a large extent opposed “institutionalists” to proponents of (various forms of) the modernization hypothesis. The institutionalists view a polity’s degree of democracy intimately tied to the institutional (and cultural) legacies that are rooted in a country’s history and oftenwise determined by events having taken place at “critical junctures” (e.g. Acemoglu et al. 2008, Olsson 2009, Alesina and Giuliano 2015, Acemoglu and Robinson 2021, Ang et al. 2021, and Gorodnichenko and Roland 2021). Given this “long run view” of societies, some scholars therefore explored the relationship of income and democracy with longer time series than the ones typically used in the empirical literature. These scholars re-establish the (positive) connection between the two variables by adopting a “long run analysis” that extends the period under consideration way before 1960 (Murtin and Wacziarg 2014 and Barro 2015)—the starting date of Acemoglu et al.’s (2008) analysis—and as early as 1820 (Gundlach and Paldam 2009). Both approaches contribute importantly to our understanding of the relationship between income and democracy, and yet their approach of the question has disregarded the possibility that this relationship be non-monotonic, as we show to be the case both theoretically and empirically in the current paper. We thus view our contribution as complementary to earlier writings, and one opening the way for further exploration of the topic.

Last, our model provides a theoretical underpinning to seemingly contrasting empirical results. On the one hand, we show that for low levels of economic development, negative economic shocks will incentivize citizens to increasingly contest political rights,

especially if the elites have a privileged access to material resources. Our explanation derives from a totally different mechanism than Acemoglu and Robinson (2001) since we show that for low levels of economic development, a negative productivity shock will reduce the marginal utility from economic activities, thus incentivizing citizens to substitute economic activity by political activism since the marginal utility of the latter will have been left mostly unaffected by the economic shock. Quite interestingly, the empirical works in support of Acemoglu and Robinson's (2001) theory have made use of identification strategies affecting poor populations alone (e.g. Climate or resource-related shocks, or the study of historical cases like 18th century France and 19th Century England), giving thus additional mileage to our theory. On the other hand, for high levels of economic development our predictions are reversed and bring thus support but also a theoretical basis to the empirical findings confirming the modernization hypothesis. Indeed, and echoing the intuition of Welzel (2007) and Inglehart and Welzel (2010), at high levels of economic development when basic needs are satisfied and the marginal utility from material goods has reached low levels. In such contexts, an increase in one's productivity will provoke a strong enough income effect to incentivize the citizens to invest in political activism in view of expanding the amount of the (complementary) non-material good enjoyed.

3 The model

3.1 The setup and equilibrium

We consider a society composed of citizens and elites where political rights, $p \in [0, 1]$, define the weight of the citizens' influence in the decision-making process. As such, we allow political rights to reflect any possible polity ranging from a pure autocracy where elites are in total control of policies, i.e. $p = 0$, to a perfect democracy where citizens decide policies on their own, i.e. $p = 1$. We take the initial political rights to equal some value p_0 and we term this the initial degree of democracy. These political rights can in turn be used to define how common resources R (e.g. oil, land, etc...) are shared between the two societal groups, while the citizens also derive direct utility from living in a more democratic polity: citizens enjoy civil liberties and rights above and beyond the material benefits derived from deciding public policies.

Citizens have a time-endowment e that can be allocated to either labour at a unit wage of w , or to political activism. They can therefore dedicate effort, $x \in [0, e]$, to contest the current degree of democracy by protesting, rioting, or engaging in other forms of political

activism. We suppose the elites can invest y resources in countering these demands. We assume that the scope of rights that are contested is given by $\gamma \in [0, 1]$ (in Section 3.3 we consider the possibility of citizens influencing the value of γ). The outcome of this political tension is given by a Tullock contest so that the share of γ awarded to the citizens is $\sigma\gamma$, where $\sigma = \frac{x}{x+y}$, and that awarded to the elite is $[1 - \sigma]\gamma$. Accordingly, the resulting degree of democracy is $p = p_0[1 - \gamma] + \sigma\gamma$, and consequently the elite's influence in the decision-making process is then given by $[1 - p] = 1 - p_0[1 - \gamma] - \sigma\gamma$.

Citizens derive utility over material goods, m , and over political rights, p , and their payoff is given by:

$$U = U(m, p), \quad (1)$$

with $m = w[e - x] + \beta[p_0[1 - \gamma] + \sigma\gamma]R$, where β is a parameter that controls the importance of shared resources to the citizens. Moreover, we make the following assumptions on $U(m, p)$: $U_m > 0$, $U_{mm} < 0$, $U_p > 0$, $U_{pp} < 0$, and $U_{mp} \geq 0$, with indices denoting partial derivatives. We are therefore adopting a very standard approach in viewing citizens experiencing diminishing marginal utility over both material goods and political rights, with the latter assumption reflecting the fact that increments in political rights in less democratic regimes (e.g. extending the suffrage) generates more utility than increments in highly democratic regimes (e.g. animal rights). Moreover, we view material goods and political rights as featuring some degree of complementarity, or at least we rule out the possibility of the goods being substitutes. Last, defining the marginal rate of substitution between material goods and political rights as $MRS = \frac{U_m}{U_p}$, we observe that indifference curves are strictly concave since the following observations are verified:

Observation 1 $MRS_m = \frac{U_{mm}U_p - U_mU_{mp}}{[U_p]^2} < 0$,

and,

Observation 2 $MRS_p = \frac{U_{mp}U_p - U_mU_{pp}}{[U_p]^2} > 0$.

The elite's payoff is given by:

$$V = [1 - p_0[1 - \gamma] - \sigma\gamma]R - y, \quad (2)$$

so we are assuming that the elites merely enjoy material benefits.²

Let us start by assuming that $\beta = 0$ so that citizens' material benefits are given by $m = w[e - x]$. This could be justified by supposing that the availability of common

²Note, however, that the elite's payoff could be represented by any monotonic transformation of this net material outcome.

resources is relatively scarce in relation to the number of citizens so each cares little about them. We impose this for simplicity, and later relax it. For the elite they seek to optimize the following problem:

$$\max_{y \geq 0} [1 - p_0[1 - \gamma] - \frac{x}{x+y}\gamma]R - y. \quad (3)$$

The first-order condition is given by:

$$V' = \frac{x}{[x+y]^2} \gamma R - 1 = 0,$$

and the second-order condition is straightforwardly shown to be satisfied. Accordingly, the elite's repression reaction function is given by:

$$\hat{y}(x) = [\gamma R x]^{1/2} - x. \quad (4)$$

For the citizens, they seek to

$$\max_{x \geq 0} U \left(w[e - x], p_0[1 - \gamma] + \frac{x}{x+y}\gamma \right). \quad (5)$$

The associated first-order condition then reads as:

$$\frac{\partial U}{\partial x} = -wU_m + \frac{y}{[x+y]^2} \gamma U_p = 0, \quad (6)$$

while the second-order condition is satisfied since

$$\frac{\partial^2 U}{\partial x \partial x} = w^2 U_{mm} - 2w \frac{y}{[x+y]^2} \gamma U_{mp} - \frac{2y}{[x+y]^3} \gamma U_p + \left[\frac{y}{[x+y]^2} \gamma \right]^2 U_{pp} < 0. \quad (7)$$

The first-order condition can then be written as follows:

$$MRS \left(w[e - x], p_0[1 - \gamma] + \frac{x}{x+y}\gamma \right) = \frac{y}{[x+y]^2} \frac{\gamma}{w}, \quad (8)$$

and substituting for (4), the equilibrium effort of political activism x^* is thus defined by

$$x : l \equiv MRS \left(w[e - x], p_0[1 - \gamma] + \left[\frac{\gamma x}{R} \right]^{1/2} \right) - \frac{[\gamma R x]^{1/2} - x}{w R x} = 0. \quad (9)$$

The equilibrium political rights are therefore given by $p^* = p_0[1 - \gamma] + \gamma \sigma^*$, where $\sigma^* = \frac{x^*}{x^* + y^*} = \left[\frac{x^*}{\gamma R} \right]^{1/2}$.

3.2 Comparative Statics

Effect of changes in w .

Having implicitly derived the equilibrium level of repression by the elites and the equilibrium efforts of the citizens (in (9)), we next inquire about the effect of exogenous income shocks—as captured by shocks on w —on the players' equilibrium efforts, as well as on the equilibrium degree of democracy, p^* .

We begin by understanding the effect of w on x^* . By the implicit function theorem, we know that $dx^*/dw = -\frac{\partial l}{\partial w} / \frac{\partial l}{\partial x^*}$. Note that

$$\begin{aligned}\frac{\partial l}{\partial x^*} &= -wMRS_m + \frac{1}{2} \frac{\gamma}{R} \left[\frac{\gamma x^*}{R} \right]^{-1/2} MRS_p + \frac{1/2 [\gamma R x^*]^{1/2}}{wR[x^*]^2} \\ &= \frac{1}{x^*} \left[-wx^*MRS_m + \frac{1}{2} \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p + \frac{1}{2w} \left[\frac{\gamma}{Rx^*} \right]^{1/2} \right] > 0.\end{aligned}$$

Focusing next on $\partial l / \partial w$, we obtain:

$$\begin{aligned}\frac{\partial l}{\partial w} &= [e - x]MRS_m + \frac{[\gamma R x]^{1/2} - x}{w^2 R x} \\ &= \frac{1}{w} [w[e - x]MRS_m + MRS] \\ &= \frac{1}{w} [mMRS_m + MRS],\end{aligned}$$

where the second line follows from using (9). Define $\eta_m \equiv \left| \frac{mMRS_m}{MRS} \right|$ and recall that $MRS_m < 0$. Then it follows that

$$\frac{\partial l}{\partial w} \geq 0 \iff \eta_m \leq 1.$$

We can then deduce that:

$$\frac{\partial x^*}{\partial w} \leq 0 \iff \eta_m \leq 1.$$

Moreover, since $\sigma^* = [\frac{x^*}{\gamma R}]^{1/2}$ it follows that $\text{sgn}\{\frac{\partial \sigma^*}{\partial w}\} = \text{sgn}\{\frac{\partial x^*}{\partial w}\}$ thence allowing us to state the following proposition:

Proposition 1 *Political activism and the degree of democracy are increasing in income for $\eta_m > 1$, and decreasing otherwise.*

The intuition of this proposition is that the effect of citizens' wages on political activism, and by extension the equilibrium degree of democracy, critically hinges on the

elasticity of the marginal rate of substitution (between material goods and political rights) to the amount of material goods consumed by the citizen: if the MRS is highly elastic to m (i.e. $\eta_m > 1$), then increments in w will lead to a drastic reduction of the MRS, which—accounting for the strategic reaction of the elites—in turn incentivizes citizens to substitute production effort by political activism, i.e. $\partial x^*/\partial w > 0$, despite its higher opportunity cost. Since the equilibrium degree of democracy is monotonically increasing in political activism, this in turn implies that higher incomes map into more democratic polities. Contrariwise, in instances where the m -elasticity of the MRS is low, higher wages will spur the incentives of citizens to increase their production effort and consequently decrease political activism.

We can further decompose the key expression determining the sign of $\partial x^*/\partial w$ since, replacing by the appropriate terms, we obtain that:

$$\frac{\partial x^*}{\partial w} \leq 0 \iff \frac{m [U_{mm}U_p - U_mU_{mp}]}{[U_p]^2} + \frac{U_m}{U_p} \geq 0.$$

Accordingly, the counter-modernization result identified in Proposition 1 for $\eta_m < 1$ is more likely to be observed if (i) the MRS is high, (ii) the MRS is not very sensitive to changes in m , and (iii) the complementarities between m and p are limited.

It is interesting at this stage to reflect on the relationship between a country's income and the degree of democracy. From the above three conditions determining whether η_m is larger or smaller than unity, we deduce that the degree of democracy is likely to *decrease* with a country's income level (as proxied by wages) if the country is relatively poor. Indeed, for such countries the wage is low and the MRS is high (because of decreasing marginal utility), while it is also reasonable to expect that for such low incomes the *complementarities* between material goods and political rights will be low. Last, this will be all the more true if the utility derived from material benefits and political rights is rather insensitive to changes in quantities, i.e. if the citizens' needs in terms of material goods are far from being satisfied so that their marginal utility of consuming goods does not drop with marginal increases in income. Conversely, we expect the degree of democracy to *increase* with income for wealthier polities.

Effect of changes in R.

We now inspect the effect of changes in resource rents on political activism. We proceed in two steps by first retaining the assumption that $\beta = 0$, and then inspecting the consequences of a relaxation of this constraint.

Following the same approach to above, we have:

$$\frac{\partial x^*}{\partial R} = -\frac{\partial l / \partial R}{\partial l / \partial x^*} \Rightarrow \text{sgn} \left\{ \frac{\partial x^*}{\partial R} \right\} = -\text{sgn} \left\{ \frac{\partial l}{\partial R} \right\}.$$

Focusing then on the sign of the last expression above, we have:

$$\begin{aligned} \frac{\partial l}{\partial R} &= -\frac{1}{2R} \frac{\gamma x^*}{R} \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p - \left[\frac{wRx^* \frac{1}{2} \gamma x^* [\gamma Rx^*]^{1/2} - wx[[\gamma Rx^*]^{1/2} - x^*]}{[wRx^*]^2} \right] \\ &= -\frac{1}{2R} \left[\left[\frac{\gamma x}{R} \right]^{1/2} MRS_p \right] + \frac{1/2[\gamma Rx]^{1/2} - x}{wR^2x} \\ &= \frac{1}{2R} \left[-\left[\frac{\gamma x}{R} \right]^{1/2} MRS_p + \frac{[\gamma Rx]^{1/2} - x}{wRx} - \frac{x}{wRx} \right] \\ &= \frac{1}{2R} \left[-[p - p_0[1 - \gamma]]MRS_p + MRS - \frac{x}{wRx} \right] \\ &= \frac{1}{2R} \left[MRS - pMRS_p + p_0[1 - \gamma]]MRS_p - \frac{1}{wR} \right] \end{aligned}$$

Define $\eta_p = \frac{pMRS_p}{MRS}$. Then in a similar fashion to above, we can deduce that $\eta_p \leq 1 \Rightarrow MRS - pMRS_p \geq 0$. The sign of the squared-bracketed term, however, is ambiguous even if we sign η_p since we do not know what the sign of $p_0[1 - \gamma]]MRS_p - \frac{1}{wR}$ is.

Although it does not seem obvious to determine the effect of R on the equilibrium political activism, we can nevertheless reach more conclusive results for the effect of resource rents on the equilibrium degree of democracy, p . Indeed, we know that $\sigma^* = \left[\frac{x^*}{\gamma R} \right]^{1/2}$ so that:

$$\text{sgn} \left\{ \frac{\partial \sigma^*}{\partial R} \right\} = \text{sgn} \left\{ R \frac{\partial x^*}{\partial R} - x^* \right\}.$$

Replacing for the expression derived above, we can then write the following:

$$\begin{aligned} R \frac{\partial x^*}{\partial R} - x^* &= \frac{1/2 \left[\frac{\gamma x}{R} \right]^{1/2} MRS_p - \frac{1/2[\gamma Rx]^{1/2} - x}{wRx}}{\frac{1}{x} \left[-wxMRS_p + \frac{1}{2} \left[\frac{\gamma x}{R} \right]^{1/2} MRS_p + \frac{1/2[\gamma Rx]^{1/2}}{wRx} \right]} - x \\ &= \frac{1}{\frac{1}{x} \left[-wxMRS_p + \frac{1}{2} \left[\frac{\gamma x}{R} \right]^{1/2} MRS_p + \frac{1/2[\gamma Rx]^{1/2}}{wRx} \right]} [wxMRS_m - MRS] < 0, \end{aligned}$$

with the sign following from the fact that the denominator of this expression has been shown to be positive.

We can then state the following result:

Proposition 2 When $\beta = 0$ higher resource-rents always map into less democratic polities.

The intuition is quite immediate: higher resource-rents push the repression reaction function of the elites outwards, so that irrespective of whether x^* increases or decreases, the resulting effects on the gain in political rights will always be negative. Note that since $\beta = 0$ the effect of an increase in R is to increase the y from the elite so this is, perhaps not so surprising. We later relax this assumption and derive more nuanced results.

The importance of the initial degree of democracy

We now investigate the effect of different “initial conditions”, namely we study whether the political evolution in initially more democratic countries differs from that observed in otherwise similar less democratic ones. Our first focus is on the effect on equilibrium political activism as well as on the equilibrium “democratic change” σ^* :

$$\frac{\partial x^*}{\partial p_0} = -\frac{\partial l / \partial p_0}{\partial l / \partial x} \Rightarrow \text{sgn} \left\{ \frac{\partial x^*}{\partial p_0} \right\} = -\text{sgn} \left\{ \frac{\partial l}{\partial p_0} \right\}$$

Moreover $\text{sgn} \left\{ \frac{\partial \sigma^*}{\partial p_0} \right\} = \text{sgn} \left\{ \frac{\partial x^*}{\partial p_0} \right\}$.

Computing the expression $\partial l / \partial p_0$, we obtain:

$$\frac{\partial l}{\partial p_0} = [1 - \gamma] MRS_p > 0 \Rightarrow \frac{\partial x^*}{\partial p_0} < 0 \text{ and } \frac{\partial \sigma^*}{\partial p_0} < 0,$$

thus implying that the citizens’ political activism decreases for higher initial levels of democratic rights, and that the “democratic change” is increasingly in favor of the elites as polities start off with more democratic institutions. Despite the lower efforts of citizens in promoting democracy, however, we next show that the resulting degree of democracy, $p_0[1 - \gamma] + \sigma\gamma$, will be larger with more democratic initial conditions. To see that, observe first that:

$$\frac{\partial p}{\partial p_0} = [1 - \gamma] + \gamma \frac{\partial \sigma^*}{\partial p_0}$$

Since $\sigma^* = \left[\frac{x^*}{\gamma R} \right]^{1/2}$, $\frac{\partial \sigma^*}{\partial p_0} = \frac{[x^*]^{1/2}}{2[\gamma R]^{3/2}} \frac{\partial x^*}{\partial p_0}$, where $\frac{\partial x^*}{\partial p_0} = -\frac{[1 - \gamma] MRS_p}{\frac{1}{x^*} \left[-wx^* MRS_m + 1/2 \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p + \frac{1/2 [\gamma R x^*]^{1/2}}{w R x^*} \right]}$,

which implies

$$\frac{\partial \sigma^*}{\partial p_0} = -\frac{1/2 \left[\frac{x^*}{\gamma R} \right]^{1/2} [1 - \gamma] MRS_p}{\left[-wx MRS_m + 1/2 \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p + \frac{1/2 [\gamma R x^*]^{1/2}}{w R x} \right]}.$$

Thus,

$$\begin{aligned}\frac{\partial p}{\partial p_0} &= [1 - \gamma] \left[1 - \frac{1/2\gamma \left[\frac{x^*}{R}\right]^{1/2} MRS_p}{\left[-wx^* MRS_m + 1/2\left[\frac{\gamma x^*}{R}\right]^{1/2} MRS_p + \frac{1/2[\gamma R x^*]^{1/2}}{wR x^*}} \right] \\ &= \frac{[1 - \gamma]}{\left[-wx MRS_m + 1/2\left[\frac{\gamma x^*}{R}\right]^{1/2} MRS_p + \frac{1/2[\gamma R x^*]^{1/2}}{wR x}\right]} \left[-wx^* MRS_m + \frac{1/2[\gamma R x^*]^{1/2}}{wR x^*} \right] > 0.\end{aligned}$$

We can then state the next proposition:

Proposition 3 *Higher initial levels of democracy map into lower levels of political activism and smaller political gains (that could be negative). Yet, initially more democratic polities will always end up more democratic than initially more autocratic ones.*

This result is quite intuitive. Given the decreasing marginal gains of extending political rights, citizens are less eager to renounce on material goods (for a given wage) when they already enjoy plenty of political rights as compared to when political rights are scarcer. Consequently, the political gains will also be lower (and possibly the losses higher if $\sigma^* < 1/2$), and yet we also show that this effect will only close the gap between two polities with different initial democracy levels, without ever inverting the democracy-rank of these polities.

Varying the scope of political demands, γ

Thus far, we have considered fixed demands by the citizens, γ . We now inspect how the equilibrium outcomes are influenced by the size of these demands. Looking first at the effect of the size of the demands on political activism, we have $\frac{\partial x^*}{\partial \gamma} = -\frac{\partial l / \partial \gamma}{\partial l / \partial x}$ so that $\text{sgn}\{\frac{\partial x^*}{\partial \gamma}\} = -\text{sgn}\{\frac{\partial l}{\partial \gamma}\}$. We can then compute $\frac{\partial l}{\partial \gamma}$ as follows:

$$\begin{aligned}\frac{\partial l}{\partial \gamma} &= \left[-p_0 + \frac{1}{2} \frac{x^*}{R} \left[\frac{\gamma x^*}{R} \right]^{-1/2} \right] MRS_p - \frac{1/2 R x^* [\gamma R x^*]^{-1/2}}{wR x^*} \\ &= \frac{1}{2\gamma} \left[-2\gamma p_0 + \left[\frac{\gamma x^*}{R} \right]^{-1/2} \right] MRS_p - \frac{[\gamma R x^*]^{-1/2}}{wR x^*} \\ &= \frac{1}{2\gamma} \left[p MRS_p - MRS - p_0 [1 + \gamma] MRS_p - \frac{1}{wR} \right].\end{aligned}$$

Thus $\eta_p < 1 \Rightarrow \frac{\partial l}{\partial \gamma} < 0 \Rightarrow \frac{\partial x^*}{\partial \gamma} > 0$, and if η_p is sufficiently large we will have $\frac{\partial x^*}{\partial \gamma} < 0$. Focusing next on the effect on $\sigma^* = \left[\frac{x^*}{\gamma R}\right]^{1/2}$, we have:

$$\frac{\partial \sigma^*}{\partial \gamma} = \frac{1}{2} \left[\frac{\gamma R \frac{\partial x^*}{\partial \gamma} - x^* R}{[\gamma R]^2} \right] \left[\frac{x^*}{\gamma R} \right]^{1/2}.$$

From the above expression, we deduce that $\text{sgn}\{\frac{\partial \sigma^*}{\partial \gamma}\} = \text{sgn}\{\gamma \frac{\partial x^*}{\partial \gamma} - x^*\}$. Concentrating first on $\frac{\partial x^*}{\partial \gamma}$, we can use the above-derived expressions to deduce:

$$\frac{\partial x^*}{\partial \gamma} = - \frac{\frac{1}{2\gamma} \left[p MRS_p - MRS - p_0[1 + \gamma] MRS_p - \frac{x^*}{w R x^*} \right]}{\frac{1}{x^*} \left[-w x^* MRS_m + \frac{1}{2} \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p + \frac{\frac{1}{2} [\gamma R x^*]^{-1/2}}{w R x^*} \right]}.$$

By substitution then, we obtain:

$$\gamma \frac{\partial x^*}{\partial \gamma} - x^* = \frac{x^*}{2} \frac{\left[-p MRS_p + MRS + p_0[1 + \gamma] MRS_p + \frac{x}{w R x} + 2w x MRS_m - \left[\frac{\gamma x}{R} \right]^{1/2} MRS_p - \frac{[\gamma R x]^{-1/2}}{w R x} \right]}{\left[-w x^* MRS_m + \frac{1}{2} \left[\frac{\gamma x^*}{R} \right]^{1/2} MRS_p + \frac{\frac{1}{2} [\gamma R x^*]^{-1/2}}{w R x^*} \right]}.$$

Observe that $\frac{x}{w R x} - \frac{[\gamma R x]^{-1/2}}{w R x} = -MRS$ and that $p_0[1 + \gamma] MRS_p - \left[\frac{\gamma x}{R} \right]^{1/2} MRS_p = [-p_0 + \gamma p_0 + 2p_0 - \left[\frac{\gamma x}{R} \right]^{1/2}] MRS_p = -p MRS_p + 2p_0 MRS_p$. Substituting in the above expression we then deduce that the sign of $\gamma \frac{\partial x^*}{\partial \gamma} - x^*$ is given by the sign of $[p_0 - p] MRS_p + w x MRS_m$. Consequently:

$$\text{sgn} \left\{ \frac{\partial \sigma^*}{\partial \gamma} \right\} = \text{sgn} [p_0 - p] MRS_p + w x MRS_m.$$

We can then state our next proposition:

Proposition 4 *The political gains of citizens, σ^* , are larger when the stakes, γ , are higher if citizens derive some gains from contesting the actual political equilibrium ($p > p_0$). Otherwise, the political gains can still increase with the level of political demands provided (i) the wages are high, (ii) U_{mm} is highly negative, (iii) U_{pp} is small.*

This result reveals that in polities where citizens are strongly implicated in political activism, higher stakes will map into increased political gains. This first observation is quite intuitive. Interestingly, this will also be the case even when citizens are not strongly implicated in political activism if the polity is wealthy (high w) and the marginal utility of material goods is quickly deteriorating. In such instances, increasing the political stakes will incentivize citizens to substitute production effort (and thus material goods whose

marginal utility is rapidly deteriorating) by political activism. Moreover, this will be all the more true if the marginal gains from improved political rights do not drop quickly with expansions in political rights.

3.3 Endogenizing political claims, γ

In what precedes, we have taken the political claims, γ , as given. We now extend the benchmark model to allow citizens to decide what the exact scope of their political demands is, i.e. what is the optimal γ from the citizens' perspective. We begin by writing the payoff of citizens:

$$U = U \left(w[e - x], p_0[1 - \gamma] + \left[\frac{\gamma x}{R} \right]^{1/2} \right). \quad (10)$$

The optimal γ then is found by first deriving the first-order condition:

$$\frac{dU}{d\gamma} = \left[-p_0 + \frac{1}{2} \left[\frac{x^*}{\gamma R} \right] \right] U_p = 0,$$

with the above expression implicitly defining γ^* provided the second-order condition is verified. Denoting $A = \left[-p_0 + \frac{1}{2} \left[\frac{x^*}{\gamma R} \right]^{1/2} \right]$, we can show that the problem is quasi-concave since:

$$\frac{d^2U}{d\gamma^2} = A^2 U_{pp} - \frac{1}{4} \frac{[x^*]^{1/2}}{\gamma^{3/2} R^{1/2}} U_p + \frac{\partial(\frac{dU}{d\gamma})}{\partial x} \frac{\partial x}{\partial \gamma},$$

and if $A = 0$, then $\frac{d^2U}{d\gamma^2} < 0$. To verify the latter assertion, observe that it is sufficient to establish that the last term of the above expression is negative. To show that, observe that $\frac{\partial(\frac{dU}{d\gamma})}{\partial x} = \frac{\partial(\frac{dU}{dx})}{\partial \gamma}$ so that the sign of this comparison is given by:

$$\frac{1}{2\gamma} AMRS_p - \frac{\gamma^{1/2}}{w[Rx]^{1/2}},$$

and this expression is negative for $A = 0$ thereby establishing quasi-concavity.

*Comparative statics on γ^**

The comparative statics of γ with respect to w is most straightforward. We know that γ^* is implicitly defined by $A = 0$. We then have:

$$\frac{d\gamma^*}{dw} = - \frac{\frac{\partial A}{\partial w}}{\frac{\partial A}{\partial \gamma}}$$

And since the denominator of this expression has been proven to be negative at optimality, the sign of $\frac{d\gamma^*}{dw}$ is thus given by:

$$\text{sgn} \left\{ \frac{\partial A}{\partial w} \right\} = \text{sgn} \left\{ \frac{\partial x^*}{\partial w} \right\},$$

with the sign of the latter expression being given by earlier computations.

We then inspect how γ^* is impacted by the amount of resource rents available in the country (bearing in mind that we are still assuming at this stage that $\beta = 0$). Turning to the comparative statics with respect to R , rewrite first A^* as:

$$A^* = \sigma^* - 4p_0^2$$

It follows that the sign of $\frac{d\gamma^*}{dR}$ is given by the sign of $\frac{d\sigma^*}{dR}$, which we already shown to be negative earlier.

Last, we focus on the effect of p_0 on γ^* , and we obtain:

$$\text{sgn} \left\{ \frac{d\gamma^*}{dp_0} \right\} = \text{sgn} \left\{ \frac{\partial \sigma^*}{\partial p_0} - 8p_0 \right\}$$

Yet, having shown that $\frac{\partial \sigma^*}{\partial p_0} < 0$, we deduce that $\frac{d\gamma^*}{dp_0} < 0$

Combining these findings, we can state our next result:

Proposition 5 *The optimal level of political claims made by citizens, γ^* , increases (decreases) with income if the equilibrium level of democracy increases (decreases) with income. Moreover, if a polity is initially more democratic and/or if it is better endowed in resource rents, the amount political claims contested by citizens will be lower.*

The economic intuition of these results is quite straightforward. The sign of dx^*/dw has been shown to be equal to the sign of $d\sigma^*/dw$, which in turn implies that if σ^* increases (decreases) with w , the citizen will be willing to contest a higher (lower) share of political rights since the share of it he will eventually be controlling is equally larger (smaller). Higher initial levels of democracy p_0 imply lower incentives for citizens to expand their political rights, and therefore lower equilibrium political gains σ^* . Likewise, higher amounts of resource rents incentivize the elites to repress more the population, which also maps in lower equilibrium political gains to the citizens. Thence, since in both instances the citizens expect their successful claims obtained through political activism to be lower, they will also have incentives to contest a reduced scope of concessions.

4 Contrasting our results with Acemoglu et al. (2008)

Our theory sheds new light on the relationship between income and democracy, and therefore enables us to revisit in a constructive manner earlier literature on the modernization hypothesis. Proposition 1 uncovers a U-shaped relationship between income and democracy, while the literature has exclusively focused on monotonic relationships in trying to support (XX) or to disprove (e.g. Acemoglu et al. 2008) Lipset’s argument. Yet, the non-monotonicity result we have uncovered—if empirically true—is likely to deeply impair the predictive capacity of empirical models focusing exclusively on monotonic relationships. non-monotonicities, essentially due to the data-censoring property of all democratic indices having a maximal value of democracy, have already been underlined in the empirical literature and when appropriately accounted for have been shown to deeply alter predictions (e.g. Benhabib et al 2013). This specific issue is further aggravated by the fact that a small of group of countries (e.g. Luxembourg or Switzerland) have income levels that are higher than 2 or 3 standard deviations from the average income level (roughly 16,600 \$/cap in 2015), thus constituting “horizontal outliers” that exert a very important leverage on the estimation, thereby contributing to cancelling-off any effect of income on democracy (see Dehon et al. 2009). Certainly, by taking the logarithm of countries’ GPD/capita, the latter problem is partly addressed in Acemoglu et al. (2008), although the former one is not.

To inquire whether the relationship between income and democracy is indeed a non-monotonic one, we re-visit some of the estimation of Acemoglu et al. (2008) in the following manner. We estimate the benchmark model of Acemoglu et al. (2008) with the added nuance that we consider the added variable y_{it-1}^2 capturing the square of the lagged income as an additional explanatory variable. We are therefore considering the following equation:

$$d_{it} = \alpha d_{it-1} + \beta y_{it-1} + \gamma y_{it-1}^2 + \mu_t + \delta_i + \epsilon_{it}, \quad (11)$$

where d_{it} is the democracy score of country i in period t as measured by Polity IV, where the lag of the dependent variable being included—as in Acemoglu et al (2008)—to account for the persistence of political regimes. Unlike Acemoglu et al. (2018), we do not take the lagged value of log of income per capita to measure income, but instead take the income per capita. This choice of variable is justified by our goal of testing the non-monotonicity of the relationship, hence the inclusion in the above equation of both the (lagged) income and its square. Last, always in line with Acemoglu et al. (2008), we consider both time and country fixed effects, and we shall present the results with the

Table 1: Fixed Effects Results Using Polity Measure of Democracy

Democracy	(OLS Ac. 5-y dta) (1)	(FE OLS Ac. 10-y dta) (2)	(FE OLS Ac. annual) (3)	(OLS) (4)	(F.E. OLS) (5)
$Democracy_{t-1}$	0.749 (0.034)	0.060 (0.091)	[0.00]	0.976 (0.002)	0.916 (0.009)
$Income_{t-1}$	0.053 (0.010)	0.007 (0.070)	[0.33]	.003 (.001)	-0.0066 (.0027)
$(Income_{t-1})^2$				-.00001 (0.000)	.00002 (0.000)
<i>N</i>	854	419	945	7206	7206
<i>Number of countries</i>	136	114	148	152	152
<i>R2</i>	0.77	0.77	0.79	0.96	0.96

Pooled cross-sectional OLS regressions in columns 1 and 4, with robust standard errors clustered by country in parentheses. Fixed effects OLS regressions in columns 2,3, and 5 with country dummies and robust standard errors clustered by country in parentheses. In column 3, each right-hand-side variable has five annual lags; and the value reported is the value from an F-test for the joint significance of all five lags.

inclusion of country fixed effects and without. Our data is taken from Acemoglu et al. (2008), with the nuance that instead of using data for the period 1960-2000 we expand the dataset to the period 1950-2014. Our democracy variable is taken from the Polity IV dataset.

In Table 1 we re-transcript in Columns 1-3 results of Acemoglu et al. (2008) when using simple OLS (Column 1; 5-year data) and fixed effects OLS (Column 2; 10 year data and Column 3; annual data). Our own results with simple OLS are reported in Column 4 (annual data), while the fixed-effects estimates are reported in Column 5 (annual data). The argument of Acemoglu et al. (2008) is that the inclusion of fixed effects turns the coefficient of the lagged income variable non-significant as observed by comparing Column 1 to Columns 2 and 3 (in Column 3 each right-hand-side variable has five annual lags, and the value reported is the value from an F-test for the joint significance of all five lags). We proceed likewise in Columns 4 and 5, and yet we observe that the inclusion of country fixed effects does not cancel the effect of income on democracy but it inverts the sign of both income and its square. In other words, although simple OLS reveal a strongly significant inverted U-shaped relationship, the inclusion of country fixed-effects flips the coefficients and reveals a highly significant U-shaped relationship. This implies therefore that the data does fully corroborate our theoretical findings suggesting that for low levels of income, economic development result in lower levels of democracy, whereas for high levels of income the relationship is a positive one.

5 Conclusion

In this paper we proposed a novel view of the relationship between income and democracy. In our theory we assume decreasing marginal utility over both material goods and political rights, while also allowing for complementarities between the two components of the citizens' utility function. Our core contribution is to demonstrate that the effect of increases in economic development on the degree of democracy is conditional on the level of economic development of the society under study. For low initial levels of economic development, when citizens experience a high marginal utility from material goods, modernization as captured by a positive productivity shock will *reduce* political activism and the ensuing political liberties. This result is driven by the fact that increased marginal benefits from productive activities will outmatch the marginal gains from political activism when the marginal utility of income is high. For high levels of economic development when the marginal utility from income is low, the reasoning is reversed. Combined, these observations suggest a U-shaped relationship between income and democracy; a relationship that we show to hold for some (highly preliminary) empirical findings. Interestingly, our empirical findings are shown to hold for setups where scholars have otherwise found either no relationship between the variables of interest, or an increasing monotonic one. We view our results as opening up a new avenue of research on the literature surrounding the modernization hypothesis.

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