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Social Mobility, Middle Class, and Political Transitions

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Abstract

This article addresses the highly variable middle-class attitudes regarding political transitions and suggests that social mobility is a key factor conditioning its behavior. Social mobility creates a trade-off for the middle class between autocracy, which yields lower redistribution today, and democracy, which guarantees higher redistribution tomorrow. The way this trade-off is resolved impacts middle-class attitudes toward democratic transitions. Even when the middle class prefers lower redistribution levels under autocracy today, the middle class may prefer democracy today to guarantee higher levels of redistribution in the future, if it feels vulnerable about its future prospects.

Keywords

social mobility, middle class, political transitions, democratization

One of the surprising elements in the recent mass uprisings against the dictatorships in the Arab World was that they were ''middle-class'' affairs. The middle classes who have lived under these dictatorships for decades, and even benefited from them, have now emerged as the major driving force in the protests and uprisings sweeping the Arab World.[1] Jack Schenker, a *Guardian* reporter, reported from Cairo: ''I've spoken to so many people—including people in the truck with me the other night, who are lawyers and bank analysts and software engineers. These are

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sort of middle class people who are generally enjoying quite a comfortable standard of living, they're not on the poverty line. They've got a lot to lose, and yet they're still motivated to come out, to be beaten, to be hit by water cannons, to be carried off into the desert. And, that's really a remarkable change from what we've seen over the past few years."[2]

This observation illustrates a major puzzle identified in the democratization literature: the classical work by Moore (1966) associates democracy with the rise of the middle class.[3] While some scholarly work supports Moore's arguments (Lipset 1960; Feng and Zak 1999; Rosendorff 2001), some others contest them. According to Therborn (1977, 1979) and Rueschemeyer, Stephens, and Stephens (1992), it is primarily the working class that fuels democratization. Rueschemeyer, Stephens, and Stephens (1992) recognize the role that middle classes play during political transitions; however, they point out that middle classes have often been ambivalent concerning democracy for lower classes and "first and foremost sought their own inclusion and formed the alliances necessary to achieve this end" (p. 168). Collier (1999) provides examples from earlier and recent democratization episodes where the middle classes made allies with the lower classes to push for an inclusive democracy and where they made allies with the upper classes and stayed content under a restricted democracy or even an autocracy. Other scholars argue that middle classes do not make democratic transitions more likely; however, they make democratic consolidation more likely once the regime transitions to democracy (O'Donnell, Schmitter, and Whitehead, 1986; Przeworski 1992).

This article addresses the highly variable middle-class behavior regarding political transitions and suggests that a key factor conditioning its behavior is social mobility. I construct a model in which the upper class holds power under autocracy, and the median voter sets tax rates under democracy. Autocracy is associated with lower levels of redistribution whereas democracy is associated with higher levels of redistribution. Even when the middle class prefers lower redistribution levels under autocracy *today*, the middle class may prefer democracy *today* to guarantee higher levels of redistribution in the future, if the odds of becoming lower-class *tomorrow* is high. In other words, social mobility creates a trade-off for middle-class preferences between autocracy, which yields lower redistribution today, and democracy, which guarantees higher redistribution tomorrow. The way this trade-off is resolved impacts middle-class attitudes toward democratic transitions.

To formalize the argument, I build on Acemoğlu and Robinson's (2001) theory of political transitions and assume that the ruling class, that is, the upper class under autocracy and the median voter under democracy, cannot commit to future income redistribution. This lack of commitment is the main source for regime transitions in the model. Then I introduce the middle class as a player whose support is essential for a successful revolution under autocracy and for a successful coup under democracy. Finally, I incorporate social mobility as a key feature of the economy as follows: an agent's socioeconomic class is determined by luck and by his or her socioeconomic origins, that is, his or her parents' class.

By identifying the trade-off social mobility creates for socioeconomic classes, the equilibrium analysis provides a novel prediction: social mobility accounts for varying middle-class behavior in otherwise similar societies with respect to income inequality and demographic distribution. In particular, under autocracy, when the middle class feels secure about its future prospects, the upper class seeks middle-class support to keep regime stability. In this case, a change in social mobility impacts regime transition through middle-class behavior. An increase in downward mobility for the middle class gives the middle class stronger incentives to support a revolution against the ruling elite and thereby facilitates democratic transition.

In contrast, when the middle class feels vulnerable about its future prospects, it prefers democracy to ensure higher redistribution in the future. Then the upper class seeks lower-class support to sustain the autocratic regime. In this case, a change in social mobility impacts the regime transition through lower-class behavior. An increase in upward mobility for the lower class gives the lower class weaker incentives to revolt and thereby hinders democratic transition.

The predictions of the model are in line with empirical cases. Middle classes are more likely to demand democracy and redistribution when they feel vulnerable about keeping their socioeconomic status under autocracy (South Korea in 1987, Chile in 1980s, and Mexico in 2000); in contrast, they are more likely to support an authoritarian alternative when they feel vulnerable under democracy (Chile in 1973). They are more likely to support the prevailing regime and thereby contribute to regime stability as long as they feel secure about their socioeconomic status (Mexico during Partido Revolucionario Institucional [PRI], South Korea, and China). Moreover, if the lower classes have high prospects of upward mobility, then they, too, are more likely to support the prevailing regime (China and South Korea).

The size and relative income of the middle class also matter for democratic transition and consolidation. If the middle class is rich enough and large enough to be pivotal under democracy, then the redistributive costs of democracy go down for the elite and democratization is more likely. This finding provides support for modernization theory (e.g., Lipset 1960; Moore 1966).[4] A pivotal middle class also eliminates the likelihood of coups under democracy. This finding is in line with the argument that a larger middle class makes democratic consolidation more likely (e.g., see Huber, Rueschemeyer, and Stephens, 1993). In the absence of coup threats, the middle class always sets the tax rate to their most preferred rate so that a consolidated democracy does not experience fluctuations in redistributive policies.

The implications are quite different when the lower class constitutes the majority of the population and hence is the median voter under democracy. The lower class may have to set lower taxes in economically bad times to avoid a coup. As a result, a democratic regime with a lower-class majority experiences fluctuations in economic policies, and even a zero tax rate may not always work to curb the upper-class incentives for a coup (Gasiorowski 1995; Przeworski and Limongi 1997). However, higher downward mobility for the middle class may help democratic consolidation by reducing middle-class support for a coup.

This article bridges several lines of research from recent political economy literature on (1) the relationship between social mobility and redistributive politics (Piketty 1995; Ravallion and Lokshin 2000; Benabou and Ök 2001; Alesina and La Ferrara 2005), (2) the relationship between redistributive politics and political transitions (Acemoğlu and Robinson 2000, 2001, 2006; Rosendorff 2001), and (3) the relationship between social mobility and political transitions (Leventoğlu 2005).

Piketty (1995) argues that it is not only current income but also the social mobility experience an individual has gone through that shapes that individual's attitudes toward redistributive politics. Benabou and Ök (2001) suggest that people vote on the basis of their assessment of their prospects for social mobility (upward or downward) relative to the rest of the society, and individuals with incomes below average may not support high rates of redistribution if they expect to be richer in the future. Ravallion and Lokshin (2000) argue that, in 1990s Russia, support for further redistribution was the strongest among the then well-off Russians who feared losing their jobs and wealth, whereas support was weaker among the Russians with expectations of future welfare. Alesina and La Ferrara (2005), using individual-level data from the United States, show that social mobility negatively affects the individual support for redistributive politics. Regarding the link between redistribution and regime transitions, both Acemoğlu and Robinson (2001) and Rosendorff (2001) suggest that transitions to democracy are more likely in societies whose income distribution is relatively egalitarian. In addition, Acemoğlu and Robinson (2006) argue that an increase in the share of the income going to the middle class hinders democratization. Bridging the literature on social mobility, redistributive politics, and political transitions, Leventoğlu (2005) maintains that social mobility facilitates democratization by reducing the conflict over redistribution between the rich and the poor; it also facilitates democratic consolidation by reducing incentives for a coup under democracy; and it helps to keep an authoritarian regime stable by reducing incentives for mass uprisings against the political elite. However, Leventoğlu (2005) focuses on upper and lower classes only and does not explain middle-class behavior.

The article proceeds as follows: the second section presents the base model. The third section provides the equilibrium analysis for the base model and discusses the model implications. The fourth section generalizes the base model by conditioning social mobility on regime type. The fifth section presents empirical evidence and is followed by the conclusion. I defer all the proofs to the Appendix.

The Base Model

I develop a model of political transitions with social mobility that builds on the influential work by Acemoğlu and Robinson (2001, 2006) where the ruling class cannot commit to future income redistribution.

Consider a discrete time, infinite horizon model. Each period, the economy consists of a new generation of continuum of agents who live for only one period. Each agent has exactly one child that will be active next period (Piketty 1995;

Bourguignon and Verdier 2000). Each agent belongs to a socioeconomic class: *upper, middle,* or *lower* class, denoted by u, m, and l, respectively. Let λ_c denote the ratio of c-class in a period, $c \in \{u, m, l\}$. $\lambda_c > 0$ for each c, $\sum_c \lambda_c = 1$, and $\lambda_u < 1/2$ so that upper class is a minority.

The income of the country, w^e, $e \in \{H, L\}$ is drawn independently and idiosyncratically from the following distribution each period:

$$w = \begin{cases} w^L \text{ with probability } \pi \\ w^H \text{ with probability } 1 - \pi, \end{cases}$$

where $e = H$ is a good time and $e = L$ is a bad time, $w^L < w^H$ and $\pi < 1/2$; that is, economic crises are severe and less likely.

Let x_c^e be the per-capita income of a c-class agent when the state of the economy is $e \in \{H, L\}$. The class lines are drawn by income level $x_l^e < x_m^e < x_u^e$. Let θ_c be the income share of c-class and be independent of the state of the economy. Then $x_c^e = \frac{\theta_c w^e}{\lambda_c}$ and $\frac{\theta_u}{\lambda_u} > \frac{\theta_m}{\lambda_m} > \frac{\theta_l}{\lambda_l}$. This implies $\frac{\theta_u}{\lambda_u} > 1 > \frac{\theta_l}{\lambda_l}$.

Individuals have altruistic preferences. Agents obtains utility from their net income as well as from their child's expected net income. This latter assumption provides the dynamic link between periods and creates a trade-off between current redistribution for one's self and future redistribution for his or her child. I assume the following risk-neutral utility function for each agent:

$$\text{an agent's utility} = \text{his or her net income} + \beta(\text{his or her child's expected net income}),$$

where $\beta > 0$ is the weight of his or her child's expected net income in an agent's utility function. β is the same for all agents.

I introduce social mobility into the model as a key feature of the economy by assuming that each agent's socioeconomic class is determined by luck and by his socioeconomic origin, that is, his or her parents' class. As Pastore (1982, 5) argues, "[i]n the analysis of the social dynamics, studies of upward and downward movements are equally important. The two types of mobility coexist in dynamic societies and bear equal relevance to understanding social development." I incorporate both types of mobility as a Markov process: the child of a lower-class agent will move up to middle class with probability η_l or remain in lower class with probability $1 - \eta_l$. The child of a middle-class agent will move down to lower class with probability η_m, move up to upper class with probability γ_m, or keep his or her middle-class status with probability $1 - \eta_m - \gamma_m$. The child of an upper-class agent will move down to middle class with probability γ_u or remain in upper class with probability $1 - \gamma_u$.

People's perceptions of social mobility may differ across regime types. For example, middle classes may expect more downward mobility under democracy than they do under autocracy, which may lead to middle-class support for an authoritarian regime. In order to highlight the trade-off social mobility creates for socioeconomic classes, I first assume that social mobility remains the same across regime types.

This restrictive assumption stacks my model against the trade-off. I relax this assumption later.

In order to abstract from the impact of changing income inequality and isolate the impact of social mobility on political transitions, I adopt Behrman's (2000, p.74) definition of relative (exchange) social mobility in the base model: "Holding total income and income distribution constant, after all, relative social mobility is greater if wealthier people more frequently change places with poorer people than if such exchanges occur less frequently. But the number of poorer people is the same whether there are more or fewer of such changes; they just are different people in different periods." Relative social mobility, rather than showing total income change in a society, shows relative social status within a society.

Behrman's (2000) definition corresponds to the stationary distribution of the Markov process in the long run. At the stationary state of the population,

$$\gamma_u \lambda_u = \gamma_m \lambda_m \text{ and } \eta_m \lambda_m = \eta_l \lambda_l;$$

that is, the number of upper-class children moving down to middle class is equal to the number of middle-class children moving up to upper class, and the number of middle-class children moving down to lower class is equal to the number of lower-class children moving up to middle class. Thus, for example, higher upward mobility for lower class means higher downward mobility for middle class while the demographic distribution $(\lambda_u, \lambda_m, \lambda_l)$ is fixed. I perform the equilibrium analysis at the stationary state of the society. I show in the Appendix that the predictions of the model continue to hold when the middle class grows during economic expansions and shrinks during economic recessions.[5]

The political state (regime) can be autocracy (A), democracy (D), or revolution (R); r denotes the regime type, $r \in \{A, D, R\}$. Redistribution occurs through taxation. Each period, the ruling class decides an anonymous tax rate τ in states A and D. $C(\tau)w^e$ is the deadweight loss due to taxation. C satisfies the following: $C(0) = 0$, $C' > 0$, $C'' > 0$, $C'(0) = 0$, and $C'(1) = \infty$. The budget is balanced so that the per-capita transfer is determined as $(\tau - C(\tau))w^e$ when the tax rate is set to $\tau \in [0, 1]$.

The initial political state is autocracy. Only one political transition may occur within a period. The regime at the beginning of each period is the one that has prevailed at the end of the previous period. Then the state of the economy is realized. The state of the country is summarized by $s = (r, e)$, and once s is realized, the timing of the events is as follows.

Under autocracy, the upper class holds power and decides whether to extend the franchise or not. If the upper class extends the franchise, the regime transitions to democracy and the median voter sets the tax rate. Otherwise, the upper class sets the tax rate τ, the lower class decides whether to revolt, and the middle class decides whether to support the revolution. Following Acemoğlu and Robinson (2006), I assume that a revolution succeeds only with middle class support. If the lower class

does not revolt or if the middle class does not support the revolt, then autocracy prevails. If the lower class revolts and the middle class supports it, then the upper class of that period loses everything forever, including their children, and the regime transitions to revolution. Revolution is costly. During revolt, $(1-\delta_R^e)$ of the income realized in that period is destroyed, where $e \in \{H, L\}$ and $\delta_R^e \in [0,1]$. That is, the immediate cost of a revolution may depend on the state of the economy. In periods following a successful revolt, $(1-\kappa)$ of country's income w^e is lost, $\kappa \in [0,1]$, which is the permanent cost of a revolution.[6] Revolution is an absorbing political state. There is no class difference anymore and income is shared equally thereafter. Upper class can always avoid a revolution by extending the franchise. Increasing taxes can also sometimes prevent a revolution.

Under democracy, the median voter sets the tax rate τ, the upper class decides whether to attempt a coup, and the middle class decides whether to support the coup. If the upper class does not attempt a coup or if the middle class does not support it, then democracy prevails. If the upper class mounts a coup and the middle class supports it, then the regime transitions to autocracy.

I focus on symmetric strategies; that is, agents in the same class adopt the same strategy. Moreover, I focus on stationary equilibrium with strategies that depend only on the current state.

The strategy of the upper class is denoted by $\sigma_u(s) = (f_u(s), \tau_u(s), c(s))$. f_u is the decision to extend the franchise, τ_u is the tax rate the upper class sets in state s if it decides not to extend the franchise. f_u and τ_u apply only in autocracy. c is the decision to mount a coup, and it applies under democracy.

The strategy of the middle class is denoted by $\sigma_m(s) = (\tau_m(s), \sup_r(s), \sup_c(s))$. τ_m is the tax rate the middle class sets in state s, and it applies only under democracy and when the middle class is the median voter. $\sup_r(s)$ is the decision to support a revolution under autocracy, and $\sup_c(s)$ is the decision to support a coup under democracy.

The strategy of the lower class is denoted by $\sigma_l(s) = (\tau_l(s), rev(s))$. τ_l is the tax rate the lower class sets in state s, and it applies only under democracy and when the lower class is the median voter. *rev* is the decision to revolt, and it applies only under autocracy.

Expectations about the income of a c-class agent at the beginning of a period under regime r is denoted by $\bar{x}_c(r)$, which is calculated before the state of the economy is realized. I assume that agents form rational expectations. That is, each agent perfectly forecasts the outcome (or the equilibrium) of the following period, then rationally forms his expectations by calculating the expected income of each c-class agent according to the outcome of the following period. Therefore, each agent in the population holds the same expectations.[7]

A strategy profile $(\sigma_u, \sigma_m, \sigma_l)$ and expectations $(\bar{x}_u, \bar{x}_m, \bar{x}_l)$ form a *stationary subgame perfect Nash equilibrium with rational expectations*, if

1. generations adopt the same strategies across time;

2. given the timing and the strategies of other classes and the expectations, for each c-class, at each state s, $\sigma_c(s)$ is optimal at each node of the game; and
3. expectations are formed by calculating the equilibrium of the following period.

The first condition is a selection criterion and the second and third are standard equilibrium conditions. Besides being practical, these strategies suggest the simplest form of behavior that is consistent with rationality. They make behavior in any period depend only on the current state of the world rather than the entire history of the game. Moreover, it is straightforward to calculate the rational expectations.[8]

Equilibrium Analysis

Preliminaries

When the tax rate is set at $\tau \in [0, 1]$, a c-class agent's utility is given by

$$(1-\tau)x_c^e + (\tau - C(\tau))w^e + \beta\{\text{his or her child's expected net income}\},$$

where $c \in \{u, m, l\}$. $(1-\tau)x_c^e$ is his income after tax and $(\tau - C(\tau))w^e$ is the transfer he receives. Since the ruling class cannot commit to future redistribution, it can only set the tax rate in the current period. If there is no threat to the regime, then a c-class ruler sets the tax rate to maximize his or her net income:

$$\max_{\tau} (1-\tau)x_c^e + (\tau - C(\tau))w^e.$$

Let $\hat{\tau}_c$ be the solution to that problem. Then, $\hat{\tau}_u = 0, \hat{\tau}_l$ satisfies

$$C'(\hat{\tau}_l) = 1 - \frac{\theta_l}{\lambda_l},$$

and $\hat{\tau}_m$ is such that $\hat{\tau}_m = 0$ if $\frac{\theta_m}{\lambda_m} > 1$; otherwise, it satisfies

$$C'(\hat{\tau}_m) = 1 - \frac{\theta_m}{\lambda_m}.$$

Convexity of C implies that $\hat{\tau}_l > \hat{\tau}_m$. Each c-class has a single peaked preference with a peak at $\hat{\tau}_c$ so that the median voter determines the tax rate under democracy.

Following Acemoğlu and Robinson (2001), I assume that both revolution and coup are sufficiently costly in economically good times (i.e. δ_C^H, δ_R^H, and κ are sufficiently small), recessions are severe and rare enough (i.e., w^H is large or w^L and π are small), so that there will be no revolution or coup threat during good times. For simplicity, I will also rename δ_C^L and δ_R^L as δ_C and δ_R, respectively. Furthermore, I assume that the likelihood of downward mobility for the upper class, γ_u, is sufficiently low that the upper class always prefers redistribution to extending the franchise when he or she can prevent a revolution via redistribution (see Lemma 6 in Appendix). This assumption is a reasonable approximation when the status of

upper-class children is determined by the abundant welfare of their parents and not by their human capital or employment opportunities whereas the middle- and lower-class children move up or down the social ladder via employment or education.[9]

Since no socioeconomic class can commit to future redistribution and there is no threat of a revolution or a coup in economically good times, the ruling class enjoys its most favorite tax rate in good times: zero for the upper class under autocracy and $\hat{\tau}_c$ for the median voter c-class under democracy, $c \in \{m, l\}$. Extending the franchise provides a way of committing to higher redistribution in the future (Acemoğlu and Robinson 2000, 2001).

The upper class loses everything after a successful revolution, so it avoids revolution in equilibrium either by increasing the tax rate in bad times under autocracy or by extending the franchise. One of the following three regime patterns emerges in equilibrium:

1. stable autocracy;
2. democratic transition and stable democracy; and
3. democratic transition and unstable democracy.

Next, I characterize each equilibrium regime pattern. Let τ_u be the equilibrium tax rate the upper class sets in bad times under autocracy and τ_c be the equilibrium tax rate the median voter c-class sets in bad times under democracy.

Stable Autocracy

After a successful revolution, there is no more class division, and all agents (except for the upper class) share the wealth equally. This yields a utility of

$$x(R) = \frac{\delta_R w^L}{\lambda_m + \lambda_l} + \beta \frac{\kappa \bar{w}}{\lambda_m + \lambda_l}, \tag{1}$$

where the first term is an agent's share from the current wealth after subtracting immediate cost of the revolution, $\bar{w} = \pi w^L + (1 - \pi) w^H$ and the second term is his or her child's expected income.

Consider a stable autocracy. If $w = w^H$, there is no revolutionary threat and the upper class sets a zero tax rate. If $w = w^L$, then the upper class sets a tax rate of τ_u to avoid a revolution. The expected income of a c-class agent under this regime before the state of the economy is realized is given by

$$\bar{x}_c(A) = (1 - \pi) x_c^H + \pi \left[(1 - \tau_u) x_c^L + (\tau_u - C(\tau_u)) w^L \right].$$

When the state of the economy is realized as $w = w^L$, the utility of a lower-class agent under this regime is given by

$$x_l(A) = (1 - \tau_u) x_l^L + (\tau_u - C(\tau_u)) w^L + \beta [\eta_l \bar{x}_m(A) + (1 - \eta_l) \bar{x}_l(A)],$$

where the first two terms on the right-hand side constitute the agent's net income and the last term is his or her utility from his or her child's expected income. The expression in between the square brackets accounts for the social mobility of the lower-class children who move up to the middle class with probability η_l and stay in the lower class otherwise. Similarly, the utility of a middle-class agent under this regime is given by

$$x_m(A) = (1-\tau_u)x_m^L + (\tau_u - C(\tau_u))w^L + \beta[\eta_m \bar{x}_l(A) + \gamma_m \bar{x}_u(A) + (1-\eta_m-\gamma_m)\bar{x}_m(A)],$$

and the utility of an upper-class agent is given by

$$x_u(A) = (1-\tau_u)x_u^L + (\tau_u - C(\tau_u))w^L + \beta[\gamma_u \bar{x}_m(A) + (1-\gamma_u)\bar{x}_u(A)].$$

For $c \in \{m, l\}$ let δ_R^c solve

$$(Rev)\ x(R) = x_c(A),$$

when I substitute $\delta_R = \delta_R^c$ in $x(R)$ and $\tau_u = \hat{\tau}_c$ in $x_c(A)$ and $\bar{x}_c(A)$.

Since the upper class cannot commit to future income redistribution, it can only set the current tax rate. Then, given the future tax rates, the best the upper class can do for any c-class in a given period is to set the tax rate at the optimal tax rate $\hat{\tau}_c$ of that class. Thus, the right-hand side of (Rev) evaluated at $\tau_u = \hat{\tau}_c$ is the maximum utility that a c-class agent can achieve in equilibrium under a stable autocracy. Then the c-class, $c \in \{m, l\}$, prefers the authoritarian regime to revolution if and only if the cost of revolution is sufficiently high; that is, $1 - \delta_R \geq 1 - \delta_R^c$, or equivalently $\delta_R \leq \delta_R^c$. If $\delta_R \leq \delta_R^l$, the lower class does not revolt under autocracy. If $\delta_R \leq \delta_R^m$, the middle class does not support a revolution, and so the revolution cannot succeed. Then the lower class has no incentive to revolt since an unsuccessful revolution only reduces its payoff without changing the regime.

If $\delta_R > \delta_R^c$ for both $c = m, l$, both middle and lower classes prefer revolution to autocracy. In this case, if the upper class keeps the regime autocratic, the lower class attempts a revolution, the middle class supports it, and the revolution is successful. Thus, in order to avoid a revolution, the upper class extends the franchise in economically bad times.

The following proposition summarizes the impact of social mobility on the incentives to start or support a revolution:

Proposition 1: $\dfrac{\partial \delta_R^l}{\partial \eta_l} > 0$, $\dfrac{\partial \delta_R^m}{\partial \eta_m} < 0$, and $\dfrac{\partial \delta_R^m}{\partial \gamma_m} > 0$.

Higher upward mobility for the lower class weakens lower-class incentives to revolt; higher upward mobility and lower downward mobility for the middle class reduce middle-class incentives to support a revolution.

Let $\bar{\eta}_m$ be such that $\delta_R^m = \delta_R^l$. Then Proposition 1 implies that $\delta_R^m > \delta_R^l$ if and only if $\eta_m < \bar{\eta}_m$. This provides a surprising comparative statics on regime transitions, which is summarized in Figure 1: social mobility accounts for the different attitudes lower, and middle classes have toward regime change under autocracy. When $\eta_m < \bar{\eta}_m$, for values $\delta_R \in (\delta_R^l, \delta_R^m)$, the lower class prefers revolution whereas the middle class prefers to keep autocracy because the middle-class children have high prospects of keeping their socioeconomic status. With no support from the middle class, the lower class does not revolt. Thus, it is the middle class's reluctance to support a revolution that helps sustain the authoritarian regime when the middle-class children have high prospects of staying in middle class. Here, the upper class "buys off" the middle class by setting the tax rates accordingly. In contrast, when $\eta_m > \bar{\eta}_m$, for values $\delta_R \in (\delta_R^m, \delta_R^l)$, the middle class prefers revolution whereas the lower class prefers autocracy because lower-class children have high prospects of moving up to middle class. In this case, the lower class does not revolt even though it has middle-class support. Thus, it is the lower class's reluctance to revolt that helps sustain the authoritarian regime when the lower-class children have high prospects of moving up to middle class. Here, the upper class buys off the lower class by setting the tax rate accordingly.

Furthermore, when $\eta_m < \bar{\eta}_m$, $\delta_R^m > \delta_R^l$, the regime switches to democracy only if $\delta_R > \delta_R^m$. That is, when the middle class feels secure about its socioeconomic status, a change in social mobility impacts the regime transition through middle-class behavior. An increase in downward mobility for the middle class gives middle class stronger incentives to support a revolution and thereby facilitates democratic transition.

When $\eta_m < \bar{\eta}_m$, $\delta_R^m > \delta_R^l$, the regime switches to democracy only if $\delta_R > \delta_R^l$. That is, when the middle class feels vulnerable about its socioeconomic status, a change in social mobility impacts regime transition through lower-class behavior. An increase in upward mobility for the lower class gives the lower class weaker incentives to revolt and thereby impedes democratic transition.

I complete the analysis under autocracy with the equilibrium behavior of the agents.

Suppose $\eta_m < \bar{\eta}_m$, so that $\delta_R^m > \delta_R^l$.

If $\delta_R \leq \delta_R^m$, the upper class seeks middle-class support to keep the regime stability. Let τ^m solve equation (*Rev*) for $c = m$ when $\tau_u = \tau^m$ is substituted in $x_m(A)$ and $\bar{x}_m(A)$. If no such solution exists,[10] then set $\tau^m = 0$. The upper class sets the tax rate at zero in economically good times and at $\tau_u = \tau^m$ in economically bad times. The middle class does not support a revolt in bad times, and the lower class does not revolt without the middle-class support.

If $\delta_R > \delta_R^m$, the upper class sets the tax rate at zero in good times and extends the franchise in bad times. If it does not extend the franchise in a bad time, the lower class revolts, the middle class supports the revolution, and the revolution is successful.

Now suppose $\eta_m > \bar{\eta}_m$, then $\delta_R^l > \delta_R^m$.

If $\delta_R \leq \delta_R^l$, the upper class seeks lower-class support. Let τ^l solve equation (Rev) for $c = l$ when $\tau_u = \tau^l$ is substituted in $x_l(A)$ and $\bar{x}_l(A)$.[11] The upper class sets the tax

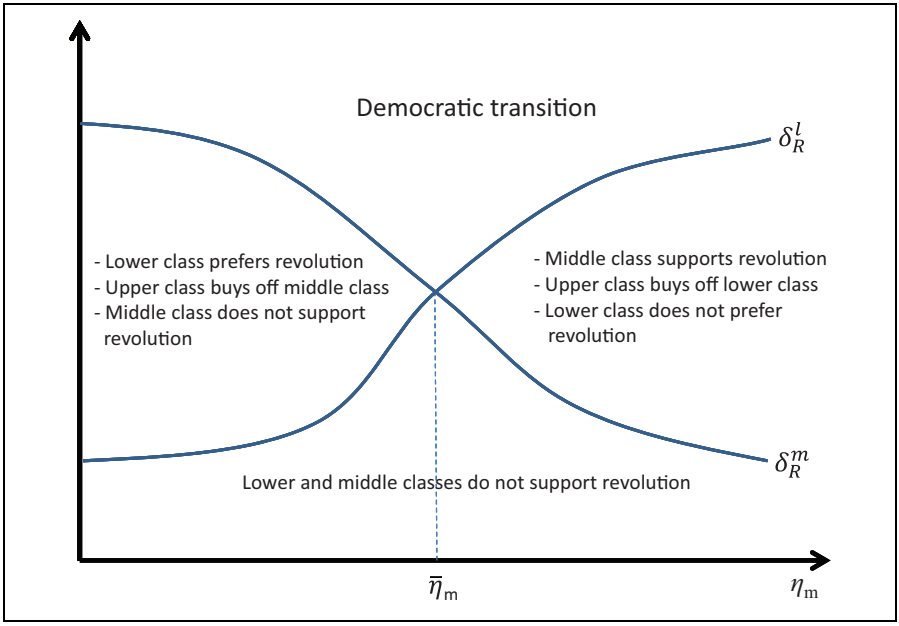

Figure 1. Social mobility and class behavior.

rate at zero in economically good times and at $\tau_u = \tau^l$ in economically bad times. The lower class does not revolt in bad times even though the middle class would support a revolution.

If $\delta_R > \delta_R^l$, the upper class sets the tax rate at zero in good times and extends the franchise in bad times. If it does not extend the franchise in a bad time, the lower class revolts, the middle class supports the revolution, and the revolution is successful.

The equilibrium behavior is in line with the argument that an authoritarian regime stays stable as long as the ruling elite manage the economy well (Geddes 2004) and that democratic transitions are much less likely if there is no social unrest that would push the rich to move the regime toward democracy (Yashar 1997).

The remaining part of the analysis assumes $\delta_R > \delta_R^l$ and $\delta_R > \delta_R^m$ so the upper class extends the franchise in bad times.

Democratic Transition

When $\delta_R > \delta_R^l$ and $\delta_R > \delta_R^m$, the upper class sets the tax rate at zero if $w = w^H$ under autocracy and extends the franchise otherwise. If the upper class extends the franchise, the nature of the new democratic regime is determined by the size of socioeconomic groups. If the lower class does not constitute the majority, that is,

$\lambda_l < 1/2$, the middle class will be the median voter and will set the tax rates under democracy. If $\lambda_l > 1/2$, the lower class will be the median voter and will set the tax rates under democracy. I analyze these two cases separately in the following.

Democratic Transition and Stable Democracy with the Middle Class as the Median Voter. When $\lambda_l < 1/2$, the middle class constitutes the median voter. Under the assumption that downward mobility for the upper class is not too large, the middle class prefers democracy to autocracy and never supports a coup attempt (see Lemma 7 in the Appendix). Therefore, there is never a coup threat and the middle class sets the tax rate to their favorite tax rate $\hat{\tau}_m$ at all times. There is no fluctuation in economic policies under democracy. Thus, a larger middle class helps consolidate the democratic regime.

If $\hat{\tau}_m = 0$, that is, the middle class is rich enough that it does not favor redistribution, then the upper class is indifferent between autocracy and democracy and extends the franchise right away even in a good time, and does not attempt a coup under democracy. Thus, the regime transitions to democracy and is then consolidated. In other words, a larger and richer middle class speeds up democratic transition and consolidation.

Democratic Transition with the Lower Class as the Median Voter. Now, I analyze the equilibrium when the lower class constitutes the majority of the population and hence is the median voter.

Stable Democracy with the Lower Class as the Median Voter. Under autocracy, the upper class sets the tax rate at zero if $w = w^H$ and extends the franchise otherwise. The lower class sets its favorite tax rate $\hat{\tau}_l$ since there is no coup threat just after a democratic transition. Thus, the expected income of a c-class agent under this regime before the state of the economy is realized and is given by

$$\bar{x}_c(A) = (1-\pi)x_c^H + \pi\left[(1-\hat{\tau}_l)x_c^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L\right].$$

Consider a stable democracy. If $w = w^H$, there is no coup threat, and the lower class sets the tax rate at $\hat{\tau}_l$. If $w = w^L$, then the lower class sets a tax rate of τ_l to avoid a coup. The expected income of a c-class agent under this regime before the state of the economy is realized and is given by

$$\begin{aligned}\bar{x}_c(D) = (1-\pi)\left[(1-\hat{\tau}_l)x_c^H + (\hat{\tau}_l - C(\hat{\tau}_l))w^H\right] \\ + \pi\left[(1-\tau_l)x_c^L + (\tau_l - C(\tau_l))w^L\right].\end{aligned}$$

When the state of the economy is realized as $w = w^L$, the utility of an upper-class agent under this regime is given by

$$\begin{aligned}x_u(D) = (1-\tau_l)x_u^L + (\tau_l - C(\tau_l))w^L \\ + \beta[\gamma_u \bar{x}_m(D) + (1-\gamma_u)\bar{x}_u(D)],\end{aligned}$$

where the first two terms on the right-hand side constitute his net income and the last term is his utility from his child's expected income, who moves down to middle class with probability γ_u and remains in upper class otherwise. The utility of a middle-class agent under this regime is given by

$$x_m(D) = (1-\tau_l)x_m^L + (\tau_l - C(\tau_l))w^L + \beta[\eta_m \bar{x}_l(D) + \gamma_m \bar{x}_u(D) + (1-\eta_m-\gamma_m)\bar{x}_m(D)].$$

If the upper class mounts a successful coup, then the regime switches to autocracy and $(1-\delta_C)w^L$ of the income is destroyed. The upper class now sets the tax rate to zero since there is no revolution threat just after a successful coup. In this case, the utility of an upper-class agent under this regime is given by

$$x_u(Coup) = \delta_C x_u^L + \beta[\gamma_u \bar{x}_m(A) + (1-\gamma_u)\bar{x}_u(A)],$$

and the utility of a middle-class agent under this regime is given by

$$x_m(Coup) = \delta_C x_m^L + \beta[\eta_m \bar{x}_l(A) + \gamma_m \bar{x}_u(A) + (1-\eta_m-\gamma_m)\bar{x}_m(A)].$$

For $c \in \{u, m\}$, let δ_C^c solve

$$(Coup)\ x_c(Coup) = x_c(D),$$

when $\delta_C = \delta_C^c$ is substituted in $x_c(Coup)$ and $\tau_l = \hat{\tau}_c$ in $x_c(D)$ and $\bar{x}_c(D)$.

Since the lower class cannot commit to future income redistribution, it can only set the current tax rate. Given the future tax rates, the best that the lower class can do for any c-class is to set the tax rate at the optimal tax rate $\hat{\tau}_c$ of that class. Thus, the right-hand side of (*Coup*) evaluated at $\tau_l = \hat{\tau}_c$ is the maximum utility that a c-class agent can achieve in equilibrium under stable democracy. Then a c-class agent, $c \in \{u, m\}$, prefers democracy to a coup if and only if $\delta_C \leq \delta_C^c$. If $\delta_C \leq \delta_C^u$, then the upper class does not attempt a coup under democracy. If $\delta_C \leq \delta_C^m$, then the middle class does not support a coup, and the upper class has no incentive to attempt a coup since an unsuccessful coup only reduces its payoff without changing the regime.

When downward mobility for the upper class is not too large, the upper class has stronger preferences for a coup than the middle class. That is, if γ_u is not too large, then $\delta_C^u < \delta_C^m$ (see Lemma 8 in the Appendix). The next proposition summarizes the impact of social mobility on the incentives to attempt or support a coup when the lower class is the median voter:

Proposition 2: $\dfrac{\partial \delta_C^u}{\partial \gamma_u} > 0$ if and only if $\dfrac{w^H}{w^L} > \dfrac{\pi}{1-\pi}$, $\dfrac{\partial \delta_C^m}{\partial \gamma_m} < 0$, and $\dfrac{\partial \delta_C^m}{\partial \eta_m} > 0$.

Higher downward mobility for the upper class means that the upper-class children are more likely to benefit from higher redistribution under democracy tomorrow. However, this outweighs the benefits of an autocracy today only if the recession is severe enough, that is, w^L is sufficiently small. In this case, higher downward

mobility for the upper class weakens the upper-class incentives to attempt a coup. Higher upward mobility and lower downward mobility for the middle class boost the middle-class incentives to support a coup.

I complete the analysis of democracy with the equilibrium behavior of the agents. Let τ^{md} solve equation (*Coup*) for $c = m$ when $\tau_l = \tau^{md}$ is substituted in $x_m(D)$ and $\bar{x}_m(D)$. If no such solution exists,[12] then set $\tau^{md} = 0$. If $\delta_C \leq \delta_C^m$, in equilibrium, the lower class sets the tax rate at $\hat{\tau}_l$ in economically good times and at $\tau_l = \tau^{md}$ in economically bad times. The middle class does not support a coup in bad times, so the upper class does not attempt a coup. In other words, the lower class seeks middle-class support in bad times.

Unstable Democracy with the Lower Class as the Median Voter. This pattern sustains in equilibrium if $\delta_R > \delta_R^l$, $\delta_R > \delta_R^m$, and $\delta_C > \delta_C^m$. In this case, regime transitions occur in all economically bad times. The upper class sets the tax rate at zero in good times under autocracy and extends the franchise in bad times to avoid a successful revolution supported by the middle class. The lower class sets the high tax rate of $\hat{\tau}_l$ right after the transition and also in economically good times in the following periods. The upper class mounts a successful coup with the support of the middle class in economically bad times.

The Equilibrium

I summarize the equilibrium outcome of the base model in the following theorem:

Theorem 1: In economically good times, the upper class sets the tax rate at $\hat{\tau}_u = 0$ under autocracy and the median voter c-class sets the tax rate at $\hat{\tau}_c > 0$ under democracy, $c \in \{m, l\}$.

1. Stable autocracy
   a. If $\eta_m \leq \bar{\eta}_m$ and $\delta_R \leq \delta_R^m$, the upper class sets the tax rate at τ^m in economically bad times under autocracy, the middle class does not support a revolution and the lower class does not revolt.
   b. If $\eta_m > \bar{\eta}_m$ and $\delta_R \leq \delta_R^l$, the upper class sets the tax rate at τ^l in economically bad times under autocracy, the middle class supports a revolution and the lower class does not revolt.
2. Democratic transition with middle class as the median voter—stable democracy: if $\delta_R > \delta_R^m$ and $\delta_R > \delta_R^l$, the upper class extends the franchise in economically bad times. The middle class sets the tax rate at $\hat{\tau}_m$ in economically bad times. The middle class does not support a coup in bad times and the upper class does not attempt a coup.
3. Democratic transition with lower class as the median voter: If $\delta_R > \delta_R^m$ and $\delta_R > \delta_R^l$, the upper class extends the franchise in economically bad times.

a. Stable democracy: If $\delta_C \leq \delta_C^m$, the lower class sets the tax rate at τ^{md} in economically bad times. The middle class does not support a coup in bad times, and the upper class does not attempt a coup.
b. Unstable democracy: If $\delta_C > \delta_C^m$, the middle class supports a coup in bad times, the upper class mounts a successful coup in economically bad times.

As I discussed earlier, by identifying the trade-off social mobility creates for socioeconomic classes, the equilibrium provides a novel prediction: social mobility accounts for varying middle-class attitudes toward democracy and democratization in otherwise similar societies in terms of inequality and demographic distribution (parts 1a and 1b). In Appendix, I show that this prediction continues to hold when economic expansions are associated with a growing middle class and recessions are associated with a shrinking middle class. More importantly, this prediction obtains under the restrictive assumption that social mobility remains the same across regime types. Next I relax this assumption and generalize the model.

Social Mobility and Regime Types

In order to highlight the trade-off social mobility creates for socioeconomic classes, the base model assumes that social mobility remains the same across regime types. This restrictive assumption stacks the model against the trade-off. In reality, people's perceptions of social mobility are conditioned on regime types. In order to capture this, let γ_u^A and γ_u^D be the probability with which an upper-class child will move down to the middle class under autocracy and democracy, respectively. Similarly, under regime $r \in \{A, D\}$, let γ_m^r be the probability with which a middle-class child will move up to the upper class, η_m^r be the probability with which a middle-class child will move down to the lower class, and η_l^r be the probability with which a lower-class child will move up to the middle class. For example, if $\eta_m^D > \eta_m^A$, then the probability of downward mobility for a middle-class child is higher under democracy than that under autocracy.

Although the likelihood of social mobility may change across regime types, I assume that the stationary demographic distribution remains the same. Therefore, for each $r \in \{A, D\}$, at the stationary state of the population,

$$\gamma_u^r \lambda_u = \gamma_m^r \lambda_m \text{ and } \eta_m^r \lambda_m = \eta_l^r \lambda_l;$$

that is, the number of upper-class children moving down to the middle class is equal to the number of middle-class children moving up to the upper class, and the number of middle-class children moving down to the lower class is equal to the number of lower-class children moving up to the middle class.

I defer the full analysis to the Appendix, which is similar to that of the base model. However, the comparative statics exercises are now contingent on regime type. I summarize and interpret the comparative statics in this section. As before, let

δ_R^l denote the lower class's cutoff for revolt, δ_R^m and δ_C^m denote the middle class's cutoffs to support a revolution and a coup, respectively, and δ_C^u denote the upper class's cutoff to attempt a coup. The next proposition summarizes the impact of social mobility on lower- and middle-class behavior under autocracy:

Proposition 4: $\frac{\partial \delta_R^l}{\partial \eta_l^A} > 0$, $\frac{\partial \delta_R^m}{\partial \eta_m^A} < 0$, and $\frac{\partial \delta_R^m}{\partial \gamma_m^A} > 0$.

Higher upward mobility for the lower class under autocracy hinders democratic transition by weakening lower-class incentives for a revolution. Higher downward mobility or lower upward mobility for the middle class under autocracy boost middle-class incentives to support a revolution.

The next proposition summarizes the impact of social mobility on middle-class behavior under democracy:

Proposition 5: $\frac{\partial \delta_C^m}{\partial \gamma_m^A} < 0$, $\frac{\partial \delta_C^m}{\partial \gamma_m^D} > 0$, $\frac{\partial \delta_C^m}{\partial \eta_m^A} > 0$, and $\frac{\partial \delta_C^m}{\partial \eta_m^D} < 0$.

An improvement in the future prospects of the middle class under a regime enhances its support for that regime. For example, if there is an increase in upward mobility for the middle class under democracy, then the middle class becomes less supportive of a coup. In contrast, if its future prospects under autocracy improves, the middle class becomes more supportive of a coup under democracy.[13]

Empirical Evidence

A complex set of internal and external factors lead to democratic transitions, breakdowns of democratic regimes, or stability in any kind of political regime. For example, high levels of income inequality may hinder democratic consolidation and lead to substantial fiscal volatility (Acemoğlu and Robinson 2001). However, variables that are not directly linked to current income inequality, such as people's perceptions about social order, certainty, and security (China and South Korea) or education policies (Chile, Mexico, and South Korea), also play crucial roles in determining class attitudes toward regimes. In the following, I present suggestive evidence that while social mobility is not the only factor conditioning class behavior vis-à-vis regime transitions, it does play an important role.

Consistent with my model predictions, the cases illustrate that middle classes are more likely to demand democratic transition when they feel vulnerable about keeping their socioeconomic status under autocracy (South Korea in 1987, Chile in 1980s, and Mexico in 2000), and they are more likely to support an authoritarian alternative when they feel vulnerable under democracy (Chile in 1973). In contrast, middle classes are more likely to support the prevailing regime and thereby contribute to regime stability as long as they feel secure about their socioeconomic status

(Mexico during PRI, South Korea, and China). Moreover, if the lower classes have high prospects of upward mobility, then they are also more likely to support the prevailing regime (China and South Korea).[14]

South Korea illustrates a situation where it is not possible to characterize the middle class "as progressive or conservative towards democracy in a permanent sense" (Koo 1991). The South Korean middle class has been the major beneficiary from decades of economic growth and prosperity. One of the most important messages the middle-class status carries here is "hope in a society in which the lives of the children will be better than those of the parents" (Steinberg 1995, 403).

According to Jones (1998), their concern about order, certainty, and security is the constituting feature of the South Korean middle classes, and this is clearly reflected in the politics of the country. The highly centralized authoritarian Yushin regime installed in 1972 was based on buying off the urban middle classes so that they would not ally with the dissident forces against the political regime. The Yushin system guaranteed stability, security, order, and efficiency to the middle classes while pursuing high growth and prosperity, and thereby forced them to choose economic growth over democracy (Choi 1993). Similarly, the expansion of the number of students in higher education during the military period from 100,000 to 600,000 "was intended not only to generate an educated workforce for Korea's new industrial strength but more importantly to satisfy a pervasive hunger for education and break up the *yangban* monopoly on higher education" (Steinberg 1995, 381) that would help with upper social mobility for middle classes and in turn keep a large segment of the middle class as supporters of the regime.[15]

The Chun government, following the Yushin system, sets economic policies that mostly favored big business at the expense of other segments of the society. In particular, the taxing of salary and wage incomes at much higher rates than land and capital income put the burden on the middle and lower classes (Choi 1993). As it became increasingly clear that the military regime did not anymore guarantee certainty to the middle class, the middle class allied with the lower class and demanded constitutional democracy (Dong 1993). Jones (1998) maintains that the middle-class protests did not really indicate a demand for democracy but for assurance, because during the events of June 1987 the Korean middle class "somewhat surreally took the streets chanting the decidedly unrevolutionary slogan of 'order'" (p. 159). Interestingly, and consistent with my theoretical results, once the regime made concessions to the middle class to assure them about their future prospects, the middle class abandoned the protests at a record speed (Choi 1993). Even more importantly, the sustained economic growth benefited the bulk of the South Korean working class to a point that the now upwardly mobile workers became increasingly reluctant to support their radical leadership.

China illustrates another case where the middle classes do not seem to demand more democracy as long as they are satisfied with their socioeconomic status and confident that their children will be able to keep their socioeconomic status or have upward mobility. Chen (2010) and Chen and Lu (2011) use data from a probability

sample survey run in three Chinese cities in 2006 and 2007 to study the level and sources of middle-class support for democratization. They find that "even though the Chinese middle class has become vigilant about its own rights, it still favors social order over political freedom" (Chen and Lu 2011, 709). The authors suggest it is material interests that prompt the middle class to have a strong preference for social order over democratization, because social disorder among the large lower class may harm the middle-class interests in social mobility, employment stability, and private property. Xiao (2003) argues that "the stake that these [middle class] people held in the booming economy hardly made them adventurous political reformists; on the contrary, they worried that too much political change too fast could ... endanger their material interests" (p. 62).

Chen and Lu (2011) find that, in general, there is a significant and negative relationship between satisfaction with socioeconomic status and support for democracy in China. This negative effect is stronger for the middle class, however, similar to the South Korean case, lower-class citizens who are satisfied with their socioeconomic status are also less likely to support democratization.

The middle classes in Latin America, Nun (1967) argues, constantly aspired to the values of the upper classes and thus abandoned the democratization of their countries when they perceived threats to their socioeconomic status and stability. Tedesco and Barton (2004) suggest Latin American middle classes have played an ambiguous role in democratization: they pushed for their own inclusion, but their attitude toward inclusion of lower classes depended on the need for an alliance with them. The middle classes pushed for democracy along with lower classes when they were dominated by exclusionary upper classes; however, when they started to perceive threats to their socioeconomic status by popular pressures under democracy, they did not hesitate to support an authoritarian alternative.

In Mexico, during the seven decades of the PRI regime, the economic fortunes of the Mexican middle class were very closely connected to the well-being of the Mexican authoritarian state where government employees constituted one-third of organized labor (Schatz 2000), and the middle class did not push for an inclusive democracy as long as they had positive perceptions of their socioeconomic status (D. Levy and Bruhn 1995).

The economic decline of the 1980s and 1990s gradually wiped out the positive perceptions of the regime, particularly among the middle classes who saw their personal assets and living standards declined and accordingly their hopes for keeping their socioeconomic status faded away (Cornelius 2002). Although the crises hit all, the massive market reforms had direct effects on the middle class. For example, the privatization and closing of several state-owned firms and the reduction in subsidies to public services increased unemployment among urban middle classes (Torche and Lopez-Calva 2012). The government also eliminated subsidies that used to benefit urban areas, such as the tortilla subsidy, and favored primary and secondary education over post secondary education. These policies reallocated resources from the middle classes to the lower classes and thereby increased middle-class vulnerability as an unintended consequence

(Levy 2007, 2008). As noted by Torche and Lopez-Calva (2012), some scholars argue that these reforms are at the core of the democratic change that occurred in Mexico in 2000 when the Partido Acción Nacional (PAN) won the presidential elections.

The Chilean case displays a middle class that allied with the upper class to support a military coup in 1973 when it felt vulnerable about its socioeconomic status under democracy. Subsequently, it allied with the lower class to demand democracy in 1980s when it again felt vulnerable about its socioeconomic status under the military rule.

Before the breakdown of democracy in 1973, Chile was classified as a democratic success with decades of stable and uninterrupted constitutional rule (Valenzuela 1995). With the social democratization of the political system in the 1930s, the Chilean middle classes became recipients of large social welfare benefits (Garreton 1989) and tended to be identified with expectations of progress and social mobility (Barozet and Fierro 2011).

In 1970, Salvador Allende came to office with strong support from the lower class but also with some considerable support from the middle class (Garreton 1989). Allende was determined to keep the middle classes on his side, and so his Popular Unity (UP) government tried to implement reforms that would benefit lower as well as middle classes at the expense of domestic and foreign capital (Valenzuela 1978; Garreton 1989).

However, the middle class gradually got alienated from the UP government. An important issue was a UP government proposal for a national unified educational system that would give the government greater control over private schools that had mainly catered to middle and upper classes (Oppenheim 1993). In a country where education was the most fundamental aspiration for the middle class (Barozet and Fierro 2011), this proposal became extremely controversial and made large segments of the middle class feel insecure about their potential upward mobility or at least keeping their socioeconomic status (Oppenheim 1993).

The growing economic crisis was another major factor turning people away from the UP government, in particular the middle class. In December 1971, middle-class women staged the widely publicized March of the Empty Pots. A survey from 1972 shows that 99% of the upper class and 77% of the middle class felt it was difficult to buy supplies (Valenzuela 1978) suggesting clear discontent in the middle class. Furthermore, the decline in middle-class living standards came to a point where even the presidential wage decrees failed to compensate white-collar employees for a rise in the cost of living (Falcoff 1989). As the economic crisis deepened, and as they witnessed the working class takeover of factories, the middle classes started to perceive the workers as a direct threat to their socioeconomic status as if the working classes would come to their homes and rob them of their houses and personal possessions (Oppenheim 1993). Thus, the middle classes gradually abandoned institutional politics that culminated in their support for the military coup along with the upper classes (Garreton 1989).

The same middle class that supported the military coup in 1973 then played an important role in the protests against the military regime in 1980s. The middle class

suffered economically under the military regime, in particular after the 1981 economic crisis. The crisis hit many domestic businesses hard. The living standards of the middle class plunged, and when massive political protests began in 1983, the middle classes were at the forefront of the protests along with the lower classes (Garreton 1989). Large segments of the middle class, many of whom had used their kitchen pots and pans to show their opposition to Allende, now used them to express their opposition to the military regime they had helped come to power. The military government was determined to break this middle–lower class alliance that they made certain concessions to buy off the middle class. In particular, the government made concessions to middle-class trade and professional associations and, above all, gave debt relief to the middle classes. Once the middle classes were assured about keeping their socioeconomic status under the military rule, they gradually became reluctant to support the mobilizations against the military regime (Garreton 1989).

Today, the survey data reveal that Chilean middle classes remain vulnerable and do not present a particularly favorable attitude toward democracy in comparison to other socioeconomic groups (Tedesco and Barton 2004). Barozet and Fierro (2011) argue the recent wave of public protests in 2011 was a clear reflection of middle-class vulnerability. The demonstrators called for free education—education is considered by Chilean middle classes as one single most important "vehicle of privilege for social mobility" (p. 32). This observation suggests that the vulnerable middle class is less likely to play a positive role in democratic consolidation process.

Conclusion

The literature has long recognized the puzzling role that middle classes have played in political transitions. I develop a formal model of political transitions and incorporate social mobility as a key feature of the economy capturing political attitudes toward redistribution. I show that prospects of social mobility may account for the varying middle-class attitudes toward democracy and democratization.

First, different regime types are associated with different levels of redistribution and income inequality determines attitudes toward different regimes. Second, social mobility makes people move among income groups, and therefore change their preferences for redistribution. Thus, social mobility creates a trade-off in preferences for regime types and how this trade-off is resolved accounts for the variance in middle-class attitudes toward democracy and democratization in otherwise similar societies in terms of income inequality and demographic distribution. More importantly, this prediction holds even under a restrictive assumption that social mobility is constant across regime type.

The model predicts regime transitions when socioeconomic classes feel vulnerable under the current regime (South Korea in 1987, Chile in 1973, and Mexico in 2000) and regime stability when socioeconomic classes feel secure about their socioeconomic status under the prevailing regime (Mexico during PRI, South Korea, and China).

In addition, this article poses new questions. First, especially in late-developing countries, the middle class depends heavily on the state for education and career

opportunities (Jones 1998). Thus, the state has a critical role in creating and shaping the socioeconomic classes, and social mobility arises as a strategic tool for the ruling class in order to maintain its power. How social mobility is determined endogenously remains an open question.

Moreover, even though the assumption in most theoretical models, including this one, is that the middle class is a unitary actor, empirically, different segments of middle class may have different attitudes toward democratization. For example, Koo (1991) argues, in the context of South Korea, that the old middle class is more likely to support democratization whereas the new middle class, that is, the people who ascended from lower class, are less likely to support democratization. Disentangling the middle class and examining why different segments have different attitudes toward democracy is also an open question.

Many political analysts have noted that it is the deteriorating prospects of the middle class that has recently mobilized them against the dictatorships in the Arab countries in North Africa and the Arabic Peninsula. For example, in a detailed historical account of Egypt, Osman (2010) says that the middle class was increasingly "squashed" economically during the Mubarak regime. Still, whether social mobility has played a role in the changing attitudes of the Arab middle classes remains an important empirical question.

Appendix

The Parametric Restrictions

I put restrictions on the parameters of the model to guarantee that there will be no threat of a coup or a revolution during economically good times; the upper class always prefers to prevent revolution by a temporary tax increase, whenever possible, rather than extending the franchise; and the middle class never supports a coup under democracy when the middle class is the median voter under democracy.

First, consider a democratic regime in economically good times, $w = w^H$. Since an upper-class agent prefers lower taxes, and a middle-class agent's most preferred tax may be different than that of an upper-class agent and is different than that of a lower-class agent, the lower bound for the utility an upper-class agent obtains in a good time under democracy can be written as

$$\begin{aligned}(1-\hat{\tau}_I)x_u^H + (\hat{\tau}_I - C(\hat{\tau}_I))w^H + \beta\{\gamma_u[\min_{\tau\in\{0,\hat{\tau}_I\}}(1-\tau)\hat{x}_m + (\tau - C(\tau))\bar{w}] \\ + (1-\gamma_u)[(1-\hat{\tau}_I)\hat{x}_u + (\hat{\tau}_I - C(\hat{\tau}_I))\bar{w}]\},\end{aligned} \tag{A1}$$

where $\hat{x}_c = \pi x_c^L + (1-\pi)x_c^H$ is the average pretax income of a c-class agent, and $\bar{w} = \pi w^L + (1-\pi)w^H$ is the average gross income of the country. $\hat{\tau}_I$ is the maximum tax rate set in democracy.

The upper bound for the utility an upper-class agent obtains from a coup in a good time under democracy can be written as follows assuming that his child's most preferred tax rate will be implemented tomorrow:

$$\delta_C^H x_u^H + \beta\{\gamma_u[(1-\hat{\tau}_m)\hat{x}_m + (\hat{\tau}_m - C(\hat{\tau}_m))\bar{w}] + (1-\gamma_u)\hat{x}_u\}, \tag{A2}$$

where $(1-\delta_C^H)$ of the generated income is destroyed during the coup. The following assumption guarantees that the upper class will not attempt a coup during economically good times.

Assumption 1: The value of (A1) is larger than the value of (A2).

Now, consider an autocracy in economically good times, that is $w = w^H$. If the lower class does not revolt and there is no redistribution today, the minimum utility for a lower-class agent can be calculated by

$$\frac{\theta_l}{\lambda_l} w^H + \beta[\eta_l(\min_{\tau\in\{0,\hat{\tau}_l\}}(1-\tau)\hat{x}_m + (\tau - C(\tau))\bar{w}) + (1-\eta_l)\hat{x}_l]. \tag{A3}$$

If the lower class revolts, the utility of a lower-class agent in this period is

$$\frac{\delta_R^H w^H}{\lambda_m + \lambda_l} + \beta\frac{\kappa\bar{w}}{\lambda_m + \lambda_l}. \tag{A4}$$

The following assumption guarantees that the lower class will not revolt in economically good times.

Assumption 2: The value of (A3) is larger than the value of (A4).

Assumptions 1 and 2 are satisfied when δ_C^H, δ_R^H, and κ are sufficiently small, w^H is large enough and w^L and π are small enough. For simplicity, I rename δ_C^L and δ_R^L as δ_C and δ_R, respectively.

Next, I show that if γ_u is small enough, the upper class prefers preventing a revolution via redistribution.

Lemma 6: Suppose that the upper class can prevent a revolution via redistribution. If γ_u is small enough, then the upper class always prefers redistribution to extending the franchise.

Proof: I prove the result for $\gamma_u = 0$. Then the result follows for small enough γ_u by continuity.

Suppose that $\gamma_u = 0$. Consider an autocracy in economically bad times, $w = w^L$. Since there is no threat of revolution in good times, the upper class will set the tax rate to zero tomorrow if $w = w^H$. $\hat{\tau}_l$ is the maximum tax rate that can be set in a bad time in equilibrium because it is the preferred tax rate of the lower class and $\hat{\tau}_l > \hat{\tau}_m$. Since the upper class prefers lower tax rates, the lower bound for the utility an upper-class agent obtains under a sustained autocratic regime today is given by

$$(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L + \beta\{(1-\pi)x_u^H + \pi[(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L]\}. \tag{A5}$$

The upper bound for the utility an upper-class agent obtains in case the regime switches to democracy is given as follows:

$$(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L + \beta\{(1-\pi)[(1-\hat{\tau}_l)x_u^H + (\hat{\tau}_l - C(\hat{\tau}_l))w^H] + \pi x_u^L\}, \tag{A6}$$

where the lower class immediately imposes $\hat{\tau}_l$. In good times, there is no coup threat and the lower class imposes $\hat{\tau}_l$. x_u^L is the upper bound of an income that an upper-class agent can have in bad times. After rearranging the terms and substituting $x_u^e = \frac{\theta_u}{\lambda_u} w^e$, (A5) being larger than (A6) becomes equivalent to

$$\hat{\tau}_l \frac{\theta_u}{\lambda_u} > \hat{\tau}_l - C(\hat{\tau}_l),$$

which is true since $\frac{\theta_u}{\lambda_u} > 1$. So the value of (A5) is larger than the value of (A6). This proves that if $\gamma_u = 0$, then the upper class prefers to lower taxes to extending the franchise.

When $\gamma_u > 0$, (A5) becomes

$$\begin{aligned}(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L + \beta\{&(1-\pi)(\gamma_u x_m^H + (1-\gamma_u)x_u^H) \\ &+ \pi\gamma_u \min_{\tau\in\{0,\hat{\tau}_l\}}[(1-\tau)x_m^L + (\tau - C(\tau))w^L] \\ &+ \pi(1-\gamma_u)[(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L]\}\end{aligned}$$

This takes into account that the minimum and maximum tax rates that can be set in equilibrium are zero and $\hat{\tau}_l$, respectively; $0 \le \hat{\tau}_m < \hat{\tau}_l$; and middle-class preferences for taxes are single-peaked around $\hat{\tau}_m$.

(A6) becomes

$$\begin{aligned}(1-\hat{\tau}_l)x_u^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L &\\ + \beta\{&(1-\pi)[(1-\hat{\tau}_l)(\gamma_u x_m^H + (1-\gamma_u)x_u^H) + (\hat{\tau}_l - C(\hat{\tau}_l))w^H] \\ &+ \pi\gamma_u[(1-\hat{\tau}_m)x_m^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L] \\ &+ \pi(1-\gamma_u)x_u^L\}\end{aligned}$$

Since these are continuous functions of γ_u, the result follows for small enough values of γ_u■.

Next consider the middle-class behavior under democracy when the median voter is middle class. Similarly, suppose that $\gamma_u = \gamma_m = 0$. Then the middle class always prefers democracy to autocracy because (1) it sets the tax rate under democracy and (2) middle-class children will have higher income under democracy whether they

remain middle class or move down the social ladder and become lower class. So, the middle class never supports a coup attempt by the upper class and therefore the upper class does not attempt a coup. By continuity, this result holds for small enough values of γ_m. I summarize this in the following lemma.

Lemma 7: If the middle class is the median voter under democracy and γ_m is small enough, the middle class never supports a coup attempt by the upper class, and therefore, the upper class does not attempt a coup.

The rest of the analysis follows under these parametric restrictions.

Proof of Proposition 1: $x(R)$ is independent of η_m and γ_m. So analyzing $x_c(A)$ in (*Rev*) is sufficient. Substitute $\tau_u = \hat{\tau}_l$ in $x_l(A)$ and $\bar{x}_l(A)$ to compute δ_R^l. Then

$$\begin{aligned}\frac{\partial x_l(A)}{\partial \eta_l} &= \beta[\bar{x}_m(A) - \bar{x}_l(A)] \\ &= \beta\left[(1-\pi)(x_m^H - x_l^H) + \pi(1-\hat{\tau}_l)(x_m^L - x_l^L)\right] > 0,\end{aligned}$$

so an increase in η_l increases the right-hand side of (*Rev*) without changing the left-hand side, and δ_R^l on the left-hand side must be increased for the equality to hold. So $\frac{\partial \delta_R^l}{\partial \eta_l} > 0$, which implies $\frac{\partial \delta_R^l}{\partial \eta_m} > 0$ since $\lambda_m \eta_m = \lambda_l \eta_l$. $x_l(A)$ is independent of γ_m so that $\frac{\partial \delta_R^l}{\partial \gamma_m} = 0$.

Similarly,

$$\frac{\partial x_m(A)}{\partial \eta_m} = -\beta[\bar{x}_m(A) - \bar{x}_l(A)] < 0,$$

so that $\frac{\partial \delta_R^m}{\partial \eta_m} < 0$. Also

$$\begin{aligned}\frac{\partial x_m(A)}{\partial \gamma_m} &= \beta[\bar{x}_u(A) - \bar{x}_m(A)] \\ &= \beta\left[(1-\pi)(x_u^H - x_m^H) + \pi(1-\hat{\tau}_l)(x_u^L - x_m^L)\right] > 0,\end{aligned}$$

so that $\frac{\partial \delta_R^m}{\partial \gamma_m} > 0$.

Proof of Proposition 2: To solve for δ_C^u, substitute $\tau_l = 0$ in (*Coup*). Then

$$\delta_C^u x_u^L = x_u^L + \beta[\gamma_u(\bar{x}_m(D) - \bar{x}_m(A)) + (1-\gamma_u)(\bar{x}_u(D) - \bar{x}_u(A))].$$

Then $\frac{\partial \delta_C^u}{\partial \eta_m} = 0$ since the equation is independent of η_m. Also,

$$x_u^L \frac{\partial \delta_C^u}{\partial \gamma_u} = \beta[(\bar{x}_m(D) - \bar{x}_m(A)) - (\bar{x}_u(D) - \bar{x}_u(A))]$$
$$= \beta\hat{\tau}_l[(1-\pi)(x_u^H - x_m^H) - \pi(x_u^L - x_u^L)],$$

so that $\frac{\partial \delta_C^u}{\partial \gamma_u} > 0$ (equivalently $\frac{\partial \delta_C^u}{\partial \gamma_m} > 0$) if and only if $\frac{x_u^H - x_m^H}{x_u^L - x_u^L} = \frac{w^H}{w^L} > \frac{\pi}{1-\pi}$.

To solve for δ_C^m substitute $\tau_l = \hat{\tau}_m$ in (Coup). Then

$$\delta_C^m x_m^L = (1-\hat{\tau}_m)x_m^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L + \beta$$
$$[\eta_m \bar{x}_l(D) + \gamma_m \bar{x}_u(D) + (1-\eta_m-\gamma_m)\bar{x}_m(D)] - \beta$$
$$[\eta_m \bar{x}_l(A) + \gamma_m \bar{x}_u(A) + (1-\eta_m-\gamma_m)\bar{x}_m(A)],$$

which implies

$$x_m^L \frac{\partial \delta_C^m}{\partial \gamma_m} = \beta[(\bar{x}_u(D) - \bar{x}_m(D)) - (\bar{x}_u(A) - \bar{x}_m(A))]$$
$$= -\beta\hat{\tau}_m(1-\pi)(x_u^H - x_m^H) < 0,$$

and

$$x_m^L \frac{\partial \delta_C^m}{\partial \eta_m} = \beta[(\bar{x}_l(D) - \bar{x}_m(D)) - (\bar{x}_l(A) - \bar{x}_m(A))]$$
$$= \beta\hat{\tau}_m(1-\pi)(x_m^H - x_l^H) > 0,$$

so that $\frac{\partial \delta_C^m}{\partial \gamma_m} < 0$ and $\frac{\partial \delta_C^m}{\partial \eta_m} > 0$. This completes the proof of Proposition 2.

I utilize this result to rank the upper-class and middle-class cutoffs in the next lemma.

Lemma 8: $\delta_C^u < \delta_C^m$ for sufficiently small γ_u.

Proof: I will prove the result for $\gamma_u = 0$ and the general proof of the proposition will follow from continuity.

Suppose that $\gamma_u = 0$. Taking social mobility into account, define the expected income of a middle-class child as $\tilde{x}_m^e = \eta_m x_l^e + (1-\eta_m)x_m^e$ and the expected income of a lower-class child as $\tilde{x}_l^e = \eta_l x_m^e + (1-\eta_l)x_l^e$ when the state of the economy is $e \in \{H, L\}$. The cutoff for the middle class is given by

$$x_m^L \delta_C^m = (1-\hat{\tau}_m)x_m^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L \tag{A7}$$
$$+ \beta \begin{bmatrix} (1-\pi)\left[(\hat{\tau}_l - C(\hat{\tau}_l))w^H - \hat{\tau}_l \tilde{x}_m^H\right] \\ +\pi\left[(\hat{\tau}_l - \hat{\tau}_m)\tilde{x}_m^L + (\hat{\tau}_m - C(\hat{\tau}_m) - \hat{\tau}_l + C(\hat{\tau}_l))w^L\right] \end{bmatrix},$$

which implies

$$x_m^L \frac{\partial \delta_C^m}{\partial \hat{\tau}_m} = \left[-x_m^L + (1 - C'(\hat{\tau}_m))w^L\right] + \beta\pi\left[-\tilde{x}_m^L + (1 - C'(\hat{\tau}_m))w^L\right]$$
$$= \beta\pi\left[-\tilde{x}_m^L + (1 - C'(\hat{\tau}_m))w^L\right].$$

The last equality follows from the fact that $\hat{\tau}_m$ maximizes $(1 - \hat{\tau}_m)x_m^e + (\hat{\tau}_m - C(\hat{\tau}_m))w^e$ so that the first-order condition $-x_m^L + (1 - C'(\hat{\tau}_m))w^L = 0$ holds. If $\tilde{x}_m^L = x_m^L$, that is, there is no social mobility, then $-\tilde{x}_m^L + (1 - C'(\hat{\tau}_m))w^L = -x_m^L + (1 - C'(\hat{\tau}_m))w^L = 0$ because it is the first-order condition of the problem of maximizing $(1 - \hat{\tau}_m)x_m^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L$. If there is social mobility, that is, $\eta_m > 0$, then $\tilde{x}_m^L < x_m^L$, then $-\tilde{x}_m^L + (1 - C'(\hat{\tau}_m))w^L > -x_m^L + (1 - C'(\hat{\tau}_m))w^L = 0$. So $\frac{\partial \delta_C^m}{\partial \hat{\tau}_m} \geq 0$.

Also $\frac{\partial \delta_C^m}{\partial \eta_m} > 0$ from Proposition 2. So a lower bound for δ_C^m can be found by substituting $\hat{\tau}_m = \eta_m = 0$ in (A7). Denote this lower bound by δ_C^{LB}. Then

$$\delta_C^{LB} = 1 - \frac{\beta}{x_m^L}\left[\hat{\tau}_l \frac{\theta_m}{\lambda_m} - (\hat{\tau}_l - C(\hat{\tau}_l))\right]\left[(1 - \pi)w^H - \pi w^L\right],$$

so

$$\delta_C^{LB} > \delta_C^u,$$

is equivalent to $\frac{\theta_m}{\lambda_m} < \frac{\theta_u}{\lambda_u}$, which is true. So $\delta_C^m \geq \delta_C^{LB} > \delta_C^u$ ■.

Social Mobility and Regime Types

The analysis of this general model follows the steps of the analysis of the base model.

Stable Autocracy. Consider a stable autocracy. The expected income of a c-class agent under this regime before the realization of the state of the economy is given by

$$\bar{x}_c(A) = (1 - \pi)x_c^H + \pi\left[(1 - \tau_u)x_c^L + (\tau_u - C(\tau_u))w^L\right].$$

When the state of the economy is realized as $w = w^L$, the utilities under this regime are given by

$$x_u(A) = (1 - \tau_u)x_u^L + (\tau_u - C(\tau_u))w^L + \beta\left[\gamma_u^A \bar{x}_m(A) + (1 - \gamma_u^A)\bar{x}_u(A)\right],$$
$$x_m(A) = (1 - \tau_u)x_m^L + (\tau_u - C(\tau_u))w^L + \beta\left[\eta_m^A \bar{x}_l(A) + \gamma_m^A \bar{x}_u(A) + (1 - \eta_m^A - \gamma_m^A)\bar{x}_m(A)\right],$$
$$x_l(A) = (1 - \tau_u)x_l^L + (\tau_u - C(\tau_u))w^L + \beta\left[\eta_l^A \bar{x}_m(A) + (1 - \eta_l^A)\bar{x}_l(A)\right].$$

or $c \in \{m, l\}$, let δ_R^c solve

$$(Rev)\ x(R) = x_c(A),$$

when $\delta_R = \delta_R^c$ is substituted in $x(R)$ and $\tau_u = \hat{\tau}_c$ in $x_c(A)$ and $\bar{x}_c(A)$.

The impact of social mobility on transitions from autocracy to democracy is summarized in Proposition 4. The proof follows:

Proposition 4: $\frac{\partial \delta_R^l}{\partial \eta_l^A} > 0$, $\frac{\partial \delta_R^m}{\partial \eta_m^A} < 0$, and $\frac{\partial \delta_R^m}{\partial \gamma_m^A} > 0$.

Proof: $x(R)$ is independent of η_m and γ_m. So analyzing $x_c(A)$ in (*Rev*) will be sufficient. Substitute $\tau_u = \hat{\tau}_l$ in $x_l(A)$ and $\bar{x}_l(A)$ to compute δ_R^l. Then

$$\begin{aligned}\frac{\partial x_l(A)}{\partial \eta_l^A} &= \beta[\bar{x}_m(A) - \bar{x}_l(A)] \\ &= \beta\big[(1-\pi)(x_m^H - x_l^H) + \pi(1-\hat{\tau}_l)(x_m^L - x_l^L)\big] > 0,\end{aligned}$$

so an increase in η_l^A increases the right-hand side of (*Rev*) without changing the left-hand side and δ_R^l on the left-hand side must be increased for the equality to hold. So $\frac{\partial \delta_R^l}{\partial \eta_l^A} > 0$, which implies $\frac{\partial \delta_R^l}{\partial \eta_m^A} > 0$. $x_l(A)$ is independent of γ_m^A so that $\frac{\partial \delta_R^l}{\partial \gamma_m^A} = 0$.

Similarly,

$$\frac{\partial x_m(A)}{\partial \eta_m^A} = -\beta[\bar{x}_m(A) - \bar{x}_l(A)] < 0,$$

so that $\frac{\partial \delta_R^m}{\partial \eta_m^A} < 0$ and

$$\begin{aligned}\frac{\partial x_m(A)}{\partial \gamma_m} &= \beta[\bar{x}_u(A) - \bar{x}_m(A)] \\ &= \beta\big[(1-\pi)(x_u^H - x_m^H) + \pi(1-\hat{\tau}_l)(x_u^L - x_m^L)\big] > 0,\end{aligned}$$

so that $\frac{\partial \delta_R^m}{\partial \gamma_m^A} > 0$■.

Democratic Transition. When $\delta_R > \delta_R^l$ and $\delta_R > \delta_R^m$, the upper class sets the tax rate at zero if $w = w^H$ under autocracy and extends the franchise otherwise. The analysis of the case with middle class as the median voter is the same as the analysis of the base model.

Next, assume that the lower class is the median voter under democracy. The expected income of a c-class agent under autocracy before the realization of the state of the economy is given by

$$\bar{x}_c(A) = (1-\pi)x_c^H + \pi\big[(1-\hat{\tau}_l)x_c^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L\big].$$

Consider a stable democracy. If $w = w^H$, there is no coup threat, and the lower class sets tax rate at $\hat{\tau}_l$. If $w = w^L$, then the lower class sets a tax rate of τ_l to avoid a coup. The expected income of a c-class agent under this regime before the realization of the state of the economy is given by

$$\bar{x}_c(D) = (1-\pi)\left[(1-\hat{\tau}_l)x_c^H + (\hat{\tau}_l - C(\hat{\tau}_l))w^H\right] + \pi\left[(1-\tau_l)x_c^L + (\tau_l - C(\tau_l))w^L\right].$$

When the state of the economy is realized as $w = w^L$, the utilities under this regime are given by

$$x_u(D) = (1-\tau_l)x_u^L + (\tau_l - C(\tau_l))w^L + \beta[\gamma_u^D \bar{x}_m(D) + (1-\gamma_u^D)\bar{x}_u(D)],$$

$$\begin{aligned} x_m(D) = {} & (1-\tau_l)x_m^L + (\tau_l - C(\tau_l))w^L + \beta[\eta_m^D \bar{x}_l(D) + \gamma_m^D \bar{x}_u(D) \\ & + (1-\eta_m^D - \gamma_m^D)\bar{x}_m(D)], \end{aligned}$$

$$\bar{x}_l(D) = (1-\tau_l)x_l^L + (\tau_l - C(\tau_l))w^L + \beta[\eta_l^D \bar{x}_m(D) + (1-\eta_l)\bar{x}_l^D(D)].$$

If a successful coup is mounted, then the regime switches to autocracy and $(1-\delta_C)w^L$ of the income is destroyed, the upper class sets the tax rate to zero since there is no revolution threat after the transition. In this case, the utility of an upper-class and middle-class agents under this regime are given by

$$x_u(Coup) = \delta_C x_u^L + \beta[\gamma_u^A \bar{x}_m(A) + (1-\gamma_u^A)\bar{x}_u(A)],$$

$$x_m(Coup) = \delta_C x_m^L + \beta[\eta_m^A \bar{x}_l(A) + \gamma_m^A \bar{x}_u(A) + (1-\eta_m^A - \gamma_m^A)\bar{x}_m(A)].$$

For $c \in \{u, m\}$, let δ_C^c solve

$$(Coup)\ x_c(Coup) = x_c(D),$$

when $\delta_C = \delta_C^c$ is substituted in $x_c(Coup)$ and $\tau_m = \hat{\tau}_c$ in $x_c(D)$ and $\bar{x}_c(D)$. Then,

Proposition 5: $\dfrac{\partial \delta_C^m}{\partial \gamma_m^A} < 0$, $\dfrac{\partial \delta_C^m}{\partial \gamma_m^D} > 0$, $\dfrac{\partial \delta_C^m}{\partial \eta_m^A} > 0$, and $\dfrac{\partial \delta_C^m}{\partial \eta_m^D} < 0$.

Proof: To solve for δ_C^m, substitute $\tau_l = \hat{\tau}_m$ in $(Coup)$. Then

$$\begin{aligned} \delta_C^m x_m^L = {} & (1-\hat{\tau}_m)x_m^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L + \beta \\ & [\eta_m^D \bar{x}_l(D) + \gamma_m^D \bar{x}_u(D) + (1-\eta_m^D - \gamma_m^D)\bar{x}_m(D)] - \beta \\ & [\eta_m^A \bar{x}_l(A) + \gamma_m^A \bar{x}_u(A) + (1-\eta_m^A - \gamma_m^A)\bar{x}_m(A)], \end{aligned}$$

so that

$$\begin{aligned} x_m^L \frac{\partial \delta_C^m}{\partial \gamma_m^A} = {} & -\beta[\bar{x}_u(A) - \bar{x}_m(A)] \\ = {} & -\beta[(1-\pi)(x_u^H - x_m^H) + \pi(1-\hat{\tau}_l)(x_u^L - x_m^L)] < 0, \end{aligned}$$

and

$$x_m^L \frac{\partial \delta_C^m}{\partial \gamma_m^D} = \beta[\bar{x}_u(D) - \bar{x}_m(D)]$$
$$= \beta\left[(1-\pi)(1-\hat{\tau}_l)(x_u^H - x_m^H) + \pi(1-\hat{\tau}_m)(x_u^L - x_m^L)\right] > 0,$$

and

$$x_m^L \frac{\partial \delta_C^m}{\partial \eta_m^A} = -\beta[\bar{x}_l(A) - \bar{x}_m(A)]$$
$$= \beta[(1-\pi)(x_m^H - x_l^H) + \pi(1-\hat{\tau}_l)(x_m^L - x_l^L)] > 0,$$

and

$$x_m^L \frac{\partial \delta_C^m}{\partial \eta_m^D} = \beta[\bar{x}_l(D) - \bar{x}_m(D)]$$
$$= -\beta[(1-\pi)(1-\hat{\tau}_l)(x_m^H - x_l^H) + \pi(1-\hat{\tau}_m)(x_m^L - x_l^L)] < 0,$$

so that $\frac{\partial \delta_C^m}{\partial \gamma_m^A} < 0$, $\frac{\partial \delta_C^m}{\partial \gamma_m^D} > 0$, $\frac{\partial \delta_C^m}{\partial \eta_m^A} > 0$, and $\frac{\partial \delta_C^m}{\partial \eta_m^D} < 0$■.

Regime change when recession and expansion periods are associated with downward and upward mobility, respectively

I now generalize the base model by assuming that the middle class grows in size when the economy transits from bad times to good times (expansion), and it shrinks when the economy transits from good times to bad times (contraction). My predictions are mostly robust to this change. In particular, I find that higher downward mobility for the middle class facilitates democratic transition by enhancing middle-class incentives to support a revolution. Likewise, lower downward mobility during an expansion period for the middle class gives middle class stronger incentives to support a coup. Surprisingly, higher downward mobility during a contraction period for the middle class facilitates middle-class support for a coup. This is because democratic transition occurs in bad times, in which the size of the middle class has shrunk so that the lower class is the median voter and the transition period is associated with higher redistribution than the middle class would prefer. This finding does not contradict with the predictions of the base model, since the base model does not involve contraction and expansion periods.

To simplify the analysis, assume $\gamma_u = 0$, so that social mobility occurs between the middle and the lower class only. The per capita income of the agents are higher in economically good times. In addition, the middle class grows in size when the economy transits from bad times to good times, and it shrinks when the economy economy transits from good times to bad times. Therefore, the economy goes through four states, expansion (E), high (H), contraction (C), and low (L). E and H represent

economically good times, and E represents transition from a bad time to a good time. Similarly, C and L represent economically bad times, and C represents transition from a good time to a bad time.

The transition between the states is as follows: if the economy was in expansion in the previous period, then it transits to the contraction state with probability π^H and to the high state with probability $1 - \pi^H$. If the economy was in the high state in the previous period, then it transits to the contraction state with probability π^H and stays in the high state with probability $1 - \pi^H$. If the economy was in contraction in the previous period, then it transits to the low state with probability π^L and to expansion with probability $1 - \pi^L$. If the economy was in the low state in the previous period, then it stays in the low state with probability π^L and transits to expansion with probability $1 - \pi^L$.

Let x_c^e be the per-capita income of a c-class agent when the economy is in state $e \in \{E, H, C, L\}$. Assume that $x_u^e > x_m^e > x_l^e$ for every $e \in \{E, H, C, L\}$ and $x_c^E = x_c^H > x_c^C = x_c^L$ for every $c \in \{u, m, l\}$. That is, the upper class has the highest per-capita income and the lower class has the lowest per-capita income in all states of the economy. The per capita income of each class is the same and higher in expansion and high states (good times), and it is the same and lower in contraction and low states (bad times).

Social mobility rates may differ in high and low states. An expansion period is associated with more upward mobility for the lower class and a contraction period is associated with more downward mobility for the middle class. Thus, the economy grows in an expansion period because every individual becomes richer and in addition more lower-class agents move up and become middle class. Similarly, the economy contracts in a contraction period because every individual becomes poorer and the size of the middle class shrinks.

Let λ_c^e be the size of the c-class when the economy is in state e. The population is given by

$$\lambda_u^e = \lambda_u \text{ for all } e \in \{E, H, C, L\},$$

$$\lambda_m^E = \lambda_m^H > \lambda_m^C = \lambda_m^L, \text{ and}$$

$$\lambda_l^C = \lambda_l^L > \lambda_l^E = \lambda_l^H.$$

Denote $\lambda^H = (\lambda_u, \lambda_m^H, \lambda_l^H)$ and $\lambda^L = (\lambda_u, \lambda_m^L, \lambda_l^L)$. The population demographics is given by λ^H in expansion and high states, it is given by λ^L in contraction and low states.

I assume that $\lambda_l^E = \lambda_l^H < \frac{1}{2}$ so that the middle class is the median voter in expansion and high periods, and $\lambda_l^E = \lambda_l^H > \frac{1}{2}$ so that the lower class is the median voter in contraction and low states.

The income of the country is given by

$$w^E = w^H = \lambda_u x_u^H + \lambda_m^H x_m^H + \lambda_l^H x_l^H, \text{ and}$$

$$w^C = w^L = \lambda_u x_u^L + \lambda_m^L x_m^L + \lambda_l^L x_l^L.$$

Let η_m^e be the probability a middle-class child becomes lower class and η_l^e be the probability a lower-class child becomes middle class when the state of economy is e. Then the following must hold when the economy stays in a high state:

$$\lambda_m^H \eta_m^H = \lambda_l^H \eta_l^H.$$

The left-hand side is the number of middle-class children that become lower class in a high state and the right-side is the number of lower-class children that become middle class in a high state. So, if the economy was in a expansion or high state in the previous period and stays in the high state, the demographics do not change. Similarly, the following must hold when the economy stays in a low state:

$$\lambda_m^L \eta_m^L = \lambda_l^L \eta_l^L.$$

Consider the economy in an expansion state. The economy can transit to expansion only from a low or contraction state. Therefore, the demographics in the previous period is given by λ^L and the demographics in the current period is given by λ^H. So, the following has to be satisfied:

$$\lambda_m^H = (1 - \eta_m^E)\lambda_m^L + \eta_l^E \lambda_l^L.$$

The left-hand side of the first equation is the number of middle-class agents in the current period. $(1 - \eta_m^E)\lambda_m^L$ on the right-hand side is the number of middle-class children who remain middle class and $\eta_l^E \lambda_l^L$ is the number of lower-class children who become middle class.[16]

Consider the economy in an contraction state. Similarly, the economy can transit to contraction only from an expansion or high state. Therefore, the demographics in the previous period is given by λ^H and the demographics in the current period is given by λ^L. So, the following has to be satisfied:

$$\lambda_m^L = (1 - \eta_m^C)\lambda_m^H + \eta_l^C \lambda_l^H.$$

The left-hand side of the first equation is the number of middle-class agents in the current period. $(1 - \eta_m^C)\lambda_m^H$ on the right-hand side is the number of middle-class children who remain in middle class, and $\eta_l^C \lambda_l^H$ is the number of lower-class children who become middle class.[17]

I assume that it is prohibitively costly to attempt a coup or a revolution when the income is high. When there is no threat to the regime, a c-class ruler sets the tax rate in order to maximize his or her net income:

$$\max_{\tau}(1-\tau)x_c^e + (\tau - C(\tau))w^e.$$

Let $\hat{\tau}_c^e$ be the solution to that problem. Then for all $e \in \{E, H, C, L\}$, $\hat{\tau}_u^e = 0$ $\hat{\tau}_l^e$ satisfies

$$C'(\hat{\tau}_l^e) = 1 - \frac{x_l^e}{w^e},$$

and $\hat{\tau}_m^e$ is such that $\hat{\tau}_m^e = 0$ if $\frac{x_m^e}{w^e} > 1$; otherwise, it satisfies

$$C'(\hat{\tau}_m^e) = 1 - \frac{x_l^e}{w^e}.$$

Convexity of C implies that $\hat{\tau}_l^e > \hat{\tau}_m^e$. Also, each c-class has a single peaked preference with peak at $\hat{\tau}_c^e$ so the median voter determines the tax rate under democracy.

Stable Autocracy. After a successful revolution, there is no more class division and wealth is shared equally among all agents excluding the upper class, which yields a utility of

$$x(R) = \frac{\delta_R w^L}{\lambda_m + \lambda_l} + \beta \frac{\kappa \bar{w}}{\lambda_m + \lambda_l}.$$

Consider a stable autocracy. There is no threat of revolution when $e \in \{E, H\}$ so the upper class sets the tax rate to zero and the income of a c-class agent is given by

$$\hat{x}_c^E = \hat{x}_c^H = x_c^H.$$

When $e \in \{C, L\}$, the upper class sets the tax rate to τ_u, and the income of a c-class agent is given by

$$\hat{x}_c^C = \hat{x}_c^L = (1-\tau_u)x_c^L + (\tau_u - C(\tau_u))w^L.$$

When $e \in \{C, L\}$, the utilities under this regime are calculated as follows:

$$x_u(A; e) = \hat{x}_u^e + \beta[\pi^L \hat{x}_u^L + (1-\pi^L)\hat{x}_u^E],$$

$$\begin{aligned} x_m(A; e) = {} & \hat{x}_m^e + \beta\pi^L[\eta_m^L \hat{x}_l^L + (1-\eta_m^L)\hat{x}_m^L] \\ & + \beta(1-\pi^L)[\eta_m^E \hat{x}_l^E + (1-\eta_m^E)\hat{x}_m^E], \end{aligned}$$

and

$$\begin{aligned} x_l(A; e) = {} & \hat{x}_l^e + \beta\pi^L[\eta_l^L \hat{x}_m^L + (1-\eta_l^L)\hat{x}_l^L] \\ & + \beta(1-\pi^L)[\eta_l^E \hat{x}_m^E + (1-\eta_l^E)\hat{x}_l^E]. \end{aligned}$$

For $c \in \{m, l\}$, let δ_R^c solve

$$(Rev)\ x(R) = x_c(A; e)$$

when $\delta_R = \delta_R^c$ is substituted in $x(R)$ and $\tau_u = \hat{\tau}_c$ in $x_c(A;e)$, $\hat{x}_c^C$ and $\hat{x}_c^L$.

The impact of social mobility on transitions from autocracy to democracy is summarized in the following proposition:

Proposition 9: $\dfrac{\partial \delta_R^l}{\partial \eta_m^L} > 0$, $\dfrac{\partial \delta_R^l}{\partial \eta_m^E} > 0$, $\dfrac{\partial \delta_R^m}{\partial \eta_m^L} < 0$, and $\dfrac{\partial \delta_R^m}{\partial \eta_m^E} < 0$.

Proof: $x(R)$ is independent of η_c^e. So analyzing $x_c(A;e)$ in (*Rev*) will be sufficient.

Substitute $\tau_u = \hat{\tau}_l$ in $x_l(A;e)$ and $\hat{x}_l^C = \hat{x}_l^L$ to compute δ_R^l. Then

$$\frac{\partial x_l(A;e)}{\partial \eta_l^L} = \beta \pi^L \left[\hat{x}_m^L - \hat{x}_l^L\right] = \beta \pi^L (1 - \hat{\tau}_l)(x_m^L - x_l^L) > 0.$$

That is, an increase in η_l^L increases the right-hand side of (*Rev*) without changing the left-hand side and δ_R^l on the left-hand side must be increased for the equality to hold. So $\dfrac{\partial \delta_R^l}{\partial \eta_l^L} > 0$ which implies $\dfrac{\partial \delta_R^l}{\partial \eta_m^L} > 0$. Similarly,

$$\frac{\partial x_l(A;e)}{\partial \eta_l^E} = \beta(1 - \pi^L)\left[\hat{x}_m^E - \hat{x}_l^E\right] = \beta(1 - \pi^L)(x_m^E - x_l^E) > 0,$$

so that $\dfrac{\partial \delta_R^l}{\partial \eta_m^E} > 0$.

Similarly, substitute $\tau_u = \hat{\tau}_m$ in $x_m(A;e)$ and $\hat{x}_m^C = \hat{x}_m^L$ to compute δ_R^m. Then,

$$\frac{\partial x_m(A;e)}{\partial \eta_m^L} = -\beta \pi^L \left[\hat{x}_m^L - \hat{x}_l^L\right] = -\beta \pi^L (1 - \hat{\tau}_m)\left(x_m^L - x_l^L\right) < 0$$

$$\frac{\partial x_m(A;e)}{\partial \eta_m^E} = -\beta(1 - \pi^L)\left[\hat{x}_m^E - \hat{x}_l^E\right] = -\beta(1 - \pi^L)(x_m^E - x_l^E) < 0,$$

so that $\dfrac{\partial \delta_R^m}{\partial \eta_m^L} < 0$ and $\dfrac{\partial \delta_R^m}{\partial \eta_m^E} < 0$ ■.

Democratic Transition. When $\delta_R > \delta_R^l$ and $\delta_R > \delta_R^m$, the upper class sets the tax rate at zero if $w = w^H$ under autocracy and extends the franchise otherwise.

Consider a stable democracy. Democratic transition occurs when $e \in \{C, L\}$ so the lower class is the median voter. Since there is no threat of a coup during the transition period, the lower class sets the tax rate at $\hat{\tau}_l$ and the income of a c-class agent is given by

$$\hat{x}_c^T = \hat{x}_c^T = (1 - \hat{\tau}_l)x_c^L + (\hat{\tau}_l - C(\hat{\tau}_l))w^L.$$

Consider a nontransition state under democracy. When $e \in \{E, H\}$, there is no coup threat, the middle class is the median voter, the tax rate is set to $\hat{\tau}_m$, and the income of a c-class agent is given by

$$\hat{x}_c^E = \hat{x}_c^H = (1 - \hat{\tau}_m)x_c^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L.$$

When $e \in \{C, L\}$, there is a coup threat and the lower class is the median voter. Let τ_l be the tax rate that the lower class sets when $e \in \{C, L\}$ in a stable democracy. Then the income of a c-class agent is given by

$$\hat{x}_c^C = \hat{x}_c^L = (1 - \tau_l)x_c^L + (\tau_l - C(\tau_l))w^L.$$

When $e \in \{C, L\}$, the utilities under this regime are calculated as follows:

$$x_u(D; e) = \hat{x}_u^e + \beta[\pi^L \hat{x}_u^L + (1 - \pi^L)\hat{x}_u^E],$$

$$\begin{aligned} x_m(D; e) = {} & \hat{x}_m^e + \beta\pi^L[\eta_m^L \hat{x}_l^L + (1 - \eta_m^L)\hat{x}_m^L] \\ & + \beta(1 - \pi^L)[\eta_m^E \hat{x}_l^E + (1 - \eta_m^E)\hat{x}_m^E], \end{aligned}$$

and

$$\begin{aligned} x_l(D; e) = {} & \hat{x}_l^e + \beta\pi^L[\eta_l^L \hat{x}_m^L + (1 - \eta_l^L)\hat{x}_l^L] \\ & + \beta(1 - \pi^L)[\eta_l^{\mathrm{E}} \hat{x}_m^E + (1 - \eta_l^E)\hat{x}_l^E] \end{aligned}$$

If a successful coup is mounted, then the regime switches to autocracy and $(1 - \delta_C)w^L$ of the income is destroyed, the upper class sets the tax rate to zero since there is no revolution threat after the transition. In this case, the utility of an upper-class and middle-class agents under this regime are given by

$$x_u(Coup) = \delta_C x_u^L + \beta[\pi^L \hat{x}_u^T + (1 - \pi^L)x_u^E]$$

$$\begin{aligned} x_m(Coup) = {} & \delta_C x_m^L + \beta\pi^L[\eta_m^L \hat{x}_l^T + (1 - \eta_m^L)\hat{x}_m^T] \\ & + \beta(1 - \pi^L)[\eta_m^E x_l^E + (1 - \eta_m^E)x_m^E]. \end{aligned}$$

The next period, e is C with probability π^L then the upper class extends the franchise and a c-class agent's net income is $\hat{x}_c^T$, and e is E with probability $1 - \pi^L$, then the upper class sets the tax rate to zero and a c -class agent's net income is x_c^E.

For $c \in \{u, m\}$, let δ_C^c solve

$$(Coup)\ x_c(Coup) = x_c(D; e),$$

when $\delta_C = \delta_C^c$ is substituted in $x_c(Coup)$ and $\tau_l = \hat{\tau}_c$ in $x_c(D; e)$ and $\hat{x}_c^C = \hat{x}_c^L$. Then,

Proposition 10: $\dfrac{\partial \delta_C^m}{\partial \eta_m^L} < 0$ and $\dfrac{\partial \delta_C^m}{\partial \eta_m^E} > 0$.

Proof: To solve for δ_C^u, substitute $\tau_m = 0$ in (*Coup*). Then for $e \in \{C, l\}$,

$$\delta_C^u x_u^L = x_u^L + \beta[\pi^L x_u^L + (1-\pi^L)\hat{x}_u^E] - \beta[\pi^L \hat{x}_u^T + (1-\pi^L)x_u^E].$$

Then $\dfrac{\partial \delta_C^u}{\partial \eta_m^e} = 0$ since the equation is independent of η_m^e.

To solve for δ_C^m, substitute $\tau_l = \hat{\tau}_m$ in (*Coup*). Then

$$\begin{aligned}\delta_C^m x_m^L = {} & (1-\hat{\tau}_m)x_m^L + (\hat{\tau}_m - C(\hat{\tau}_m))w^L \\ & + \beta\pi^L[\eta_m^L \hat{x}_l^L + (1-\eta_m^L)\hat{x}_m^L] + \beta(1-\pi^L)[\eta_m^E \hat{x}_l^E + (1-\eta_m^E)\hat{x}_m^E] \\ & - \beta\pi^L[\eta_m^L \hat{x}_l^T + (1-\eta_m^L)\hat{x}_m^T] - \beta(1-\pi^L)[\eta_m^E x_l^E + (1-\eta_m^E)x_m^E],\end{aligned}$$

so that

$$\begin{aligned}x_m^L \frac{\partial \delta_C^m}{\partial \eta_m^L} = {} & -\beta\pi^L[(\hat{x}_m^L - \hat{x}_l^L) - (\hat{x}_m^T - \hat{x}_l^T)] \\ = {} & -\beta\pi^L[(1-\hat{\tau}_m)(x_m^L - x_l^L) - (1-\hat{\tau}_l)(x_m^L - x_l^L)] \\ = {} & -\beta\pi^L(\hat{\tau}_L - \hat{\tau}_m)(x_m^L - x_m^L) < 0\end{aligned}$$

where the last inequality follows from $\hat{\tau}_l > \hat{\tau}_m$.

Similarly,

$$\begin{aligned}x_m^L \frac{\partial \delta_C^m}{\partial \eta_m^E} = {} & -\beta(1-\pi^L)[(\hat{x}_m^E - \hat{x}_l^E) - (x_m^E - x_l^E)] \\ = {} & -\beta(1-\pi^L)[(1-\hat{\tau}_l)(x_m^E - x_l^E) - (x_m^E - x_l^E)] \\ = {} & \beta(1-\pi^L)\hat{\tau}_l(x_m^E - x_l^E) > 0.\end{aligned}$$

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Notes

1. For Tunisia, see El-Naggar (2011) Slackman and for Egypt see Remnick (2011).
2. See Schenker (2011).
3. See Lustick (1996) for a critical discussion of Moore's work, in particular about selection bias in use of the English Civil War to illustrate the main parts of his argument.
4. Epstein et al. (2006) retest the modernization theory with new data, new techniques, and a three-way (autocracy, partial democracy, and democracy) classification of political regimes and find that the modernization hypothesis stands up well.
5. For the effect of the relative size of competing groups on political transitions, see Rosendorff (2001). Rosendorff studies a static model in which only one transition from autocracy to democracy is possible. Therefore, his comparative statics on the relative size of groups does not reflect the effect of social mobility on transitions through the society's prospects toward mobility.
6. This may be, for example, due to the loss of human capital accumulated by the upper class as in Acemoğlu and Robinson (2001).
7. Empirical literature provides support for the ability of individuals to calculate their objective probabilities of social mobility (e.g., see Alesina and La Ferrera, 2005). However, there is also an argument about people being confused about what is in their best interest (Bartels 2005).
8. For a similar discussion on Markov strategies, see Maskin and Tirole (2001).
9. For example, Dearden, Machin, and Reed (1997) show that, in Britain, the highest ratio of sons in the same quartile of the income distribution as their fathers is in the top of the income distribution. That is, downward mobility from the top is very rare.
10. This happens if $\bar{x}(R) < x_m(A)$ holds when $\tau_u = 0$ is substituted in $x_m(A)$ and $\bar{x}_m(A)$.
11. $\delta_R \leq \delta_R^l$ implies that a solution $\tau^l \leq \hat{\tau}_l$ exists.
12. This happens if $x(\text{Coup}) < x_m(D)$ holds when $\tau_l = 0$ is substituted in $x_m(D)$ and $\bar{x}_m(D)$.
13. Also $\frac{\partial \delta_C^u}{\partial \gamma_u^d} > 0$ and $\frac{\partial \delta_C^u}{\partial \gamma_u^D} < 0$. However, since $\delta_C^u < \delta_C^m$ under my parametric restrictions, regime transition under democracy is determined by middle-class support for a coup, that is, δ_C^m, so that I do not highlight upper-class behavior here.
14. I thank an anonymous referee for pointing out that the result that the social mobility reduces demands by the poor for democracy and redistribution is not an insight that has made it into the democratization literature and might be worth highlighting. The cases of South Korea and China illustrate this insight.
15. *Yangban* is the traditional landed or unlanded upper class in South Korea (Steinberg 1995, 381).
16. Since $\lambda_m^H + \lambda_l^{\mathrm{H}} = \lambda_m^L + \lambda_l^L$, this equation also implies $\lambda_l^H = (1 - \eta_l^E)\lambda_l^L + \eta_m^E \lambda_m^L$.
17. Since $\lambda_m^H + \lambda_l^H = \lambda_m^L + \lambda_l^L$, this equation also implies $\lambda_l^L = (1 - \eta_l^C)\lambda_l^H + \eta_m^C \lambda_m^H$.

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