# Social Mobility and the Demand for Public Consumption Expenditures

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**Abstract**

The collective choice of public consumption expenditure is reconsidered when voters are socially mobile. In accordance with previous work on social mobility and political economics, the analysis concerns a class of mobility processes that induce increasing and concave mappings from initial income to expected future income. The paper abstracts from the explicitly redistributive role of government and concentrates on public consumption which is modeled as a classical public good. In a majority-rule political equilibrium, provision is sensitive to the degree of social mobility, theoretically linking social mobility with public consumption expenditures through the political process. Further, empirical puzzles about the impact of voting franchise extensions on the growth of government spending are addressed within the context of social mobility. Finally, using data on subjective perceptions of social mobility, the paper finds support for the model's main prediction that more socially mobile economies spend a smaller fraction of national income collectively.

**Keywords**: Collective Decision-Making, Majority Rule, Public Goods, Social Mobility, Franchise Extension

**JEL Classifications**: D70, H41

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# 1 Introduction

One of the most salient features to differentiate developed economies is the percentage of national income spent on collective consumption expenditures by democratically elected governments. Another prominent factor which distinguishes economies is the degree of social mobility that individuals perceive in the economy. To the extent that the percentage of the real economy under governmental control is relatively static, then to explain preferences for collective consumption one must consider how the incomes of individuals, upon which preferences are based, evolve over time. After incorporating income dynamics into a standard collective choice model of public expenditure, a median voter political equilibrium is identified and characterized in terms of social mobility perceptions.

There has been convincing work that relates social mobility to the demand for income redistribution.[1] The link between social mobility and real government expenditures, however, has not been addressed in the literature. Economists often argue that public provision of goods and services is nothing more than inefficient income redistribution.[2] Such conventional wisdom implies that public choice results concerning income redistribution apply to the public choice of collective consumption. That public consumption merely redistributes income is only true to the extent that the market can supply perfect substitutes for governmental provision. Of course this cannot be satisfied in the limit since a democratic society, at a minimum, has administrative needs that the market cannot supply, which rely on public financing and from which *all* voters benefit and hence demand to some extent. Furthermore, in a median-voter equilibrium, there is good reason to concentrate on the demand for collective consumption rather than pure redistribution. In reality, voters in the neighborhood of the median do not receive lump-sum income transfers, but *are* directly affected by collective consumption.[3] In distinguishing between income redistribution and public consumption, this paper strengthens the theoretical link between social mobility and political outcomes.

[1] The classic in this literature is Hirschman [1973]. Subsequent analyses have been provided by Piketty [1995], Lokshin and Ravallion [2000], Bénabou and Ok [2001] Alesina and Glaeser [2004], and Alesina and Ferrara [2005]. Perhaps the first to discuss the relationship between social mobility and politics was de Tocqueville [2000], originally published in 1835.

[2] See Currie and Gahvari [2008] for a recent survey of the theoretical and empirical literature on cash versus in-kind transfers by the government.

[3] It is well acknowledged that real public expenditures have a redistributive element, but not in the sense that voters with income below the median prefer complete income taxation, as they would when taxation is not distortionary and revenues finance lump-sum transfers.

Social choice theories of the size of government are widely available. Arguably, one of the most influential has been the model of Meltzer and Richard [1981], which predicts that societies with more income inequality will have larger governments (as a percentage of national income). Briefly, since the median-to-mean income ratio is smaller in a less equal (more skewed) distribution, the median-income voter has a lower implicit price of public consumption with proportional taxation and demands a larger public sector. Whereas Meltzer and Richard [1981] take the income distribution as analytical primitive, the current analysis focuses on the degree of social mobility in the economy, for a given initial income distribution. Loosely speaking, if the median voter is upwardly (downwardly) mobile when mean income is constant, then his implicit price of consuming publicly is higher (lower) in expectation and he demands less (more) real expenditure when policy choices are lasting. The effect is magnified in more mobile economies, which is to preview the main result: *ceteris paribus*, economies where upward social mobility is perceived to be greater collectively choose, by majority rule, less public consumption as a percentage of the economy's income. Furthermore, the paper identifies how social mobility considerations may help to understand empirical puzzles in the literature on the impact on government spending levels of voting franchise extensions.

Social mobility is a broad concept, and a consensus about its proper measurement has yet to emerge in the economics literature.[4] This paper considers social mobility in terms of the degree of state-dependence in the economy's income dynamics. A mobility process consists of conditional probability distributions, which describe the *ex-ante* future income prospects of individuals. As individuals form expectations of future income, conditional on their initial (endowed) income, the mobility process induces a transition function that maps initial income into expected future income. A more mobile economy in this conception is associated with a less state-dependent mobility process. The process by which individuals form future income expectations is similar to expectation formation in the seminal contribution of Bénabou and Ok [2001] to the politics of income redistribution.

In the paper's empirical section, the degree of social mobility in the economy is approximated by subjective responses to questions about social mobility and social justice in the *World Values Survey* (1990, 2000). The subjective data reveal, for example, that a majority of Europeans view one's future income as dependent on income at birth, whereas a much smaller percentage of Americans view economic success to be state-

[4]Fields and Ok [1999] review the literature on the measurement of income mobility.

dependent in this sense. The survey responses suggest a lower degree of social mobility in the economies of Europe; at least that seems to be the perception among Europeans on average. This paper does not attempt to explain differences in mobility perceptions, but considers their political implications.[5]

# 2 Preliminaries

## 2.1 Income distribution

An endowment economy is populated by a continuum of individuals with initial income, denoted by $x \in X \equiv [0, \infty)$. Individuals along the continuum are indexed by $i \in [0, 1]$ according to initial income, which has c.d.f. $F$ over support $X$ such that $F(0) = 0$, $F(\infty) = 1$. Mean income, denoted by $\bar{x}$, is given by the first moment of the distribution, i.e., $\bar{x} = \int_{x=0}^{\infty} x dF(x)$. The initial income of an individual in the $i$th quantile, $i \in [0, 1]$, of the distribution is given by $x^i$, where $x^i = F^{-1}(i) \equiv \inf \{x \in X : F(x) \geq i\}$. Specifically, the income of the median individual in the distribution is denoted $x^{med}$, where $x^{med} = F^{-1}(1/2) \equiv \inf \{x \in X : F(x) \geq 1/2\}$. In accord with the empirical regularity that income distributions are right-skewed, I assume that median income is less than mean income.

**Assumption 1.** *Right-skewness:* $x^{med} = F^{-1}(1/2) < \bar{x}$.

Future income is uncertain due to social mobility and individuals form future income expectations conditional on their initially endowed income. Denoting second period income by $y \in X$, let $\mathrm{E}(y|x^i)$ express the expected future income of an individual initially in the $i^{th}$ quantile of the income distribution. Denote by $M(y|x^i) = \int_{s=0}^{y} m(s|x^i)ds$ the probability that an individual initially in the $i^{th}$ quantile of the distribution will have at most a future income of $y$. The *ex-ante* expected future income of individual $i$ for a given mobility process, $M$, is the first moment of the conditional distribution, i.e.,

$$\mu_M(x^i) \equiv \mathrm{E}_M(y|x^i) = \int_{y=0}^{\infty} y dM(y|x^i) = \int_{y=0}^{\infty} y m(y|x^i) dy,$$

[5] Alesina and Glaeser [2004] compellingly argue that ideological distinctions between Europeans and Americans follow from over a century of indoctrination through the tools available to those in political control, such as socially-charged educational curriculums and class rhetoric, that have shaped beliefs about social justice. Furthermore, social classes in America were not inherited from a feudal or monarchical system, as in many European countries, so state-dependence of economic rank was less culturally ingrained in the American mind-set from the outset.

where $\mu_M(\cdot)$ is the implied transition function from current period income to expected future income for a given mobility process, $M$. After introducing the policy environment, the mechanics of social mobility are made more explicit. For now, simply assume that the distribution's mean income is expected to grow at a natural growth rate, $\gamma$, where $0 \leq \gamma < \infty$.

**Assumption 2.** *Natural rate of economic growth:*

$$\bar{y} = \int_{x=0}^{\infty} \left[ \int_{y=0}^{\infty} y dM\left(y|x\right) \right] dF(x) = \int_{x=0}^{\infty} \mu_M(x) dF(x) = (1+\gamma)\bar{x}$$

## 2.2 Policy environment and voter utility

For its part, the government raises tax revenues via proportional income taxation at rate $t$ to finance the provision of pure public goods, $g$. Mobility considerations impact voter preferences for $g$ if the vote over the public choice has lasting effects or, if there is *policy persistence.* Policy persistence is a procedural reality of legislation in representative democracies. In a natural sense as well, policy persistence characterizes long-term government projects, such as building and maintaining infrastructure. I take policy persistence as given and, for simplicity, assume there are two periods, initial and future. Individuals vote in the initial period for a policy that gets implemented in both the current and the future periods. When forming preferences for the lasting policy, individuals consider future income, which is uncertain due to social mobility.

A voter's future utility is defined over private market consumption and public consumption, $U\left(c, g\right)$ with $U_c > 0$, and $U_g > 0$. Assume that risk-neutral individuals consume their entire net income in private markets, so that $c_1^i = (1-t)x^i$ is first period consumption and $c_2^i = (1-t)\mu_M(x^i)$ is future consumption. The expected future utility of individual $i$ is taken to be quasi-linear.

$$U(c^i, g) = (1-t)\left[x^i + \mu_M(x^i)\right] + 2H(g), \tag{1}$$

where $H\left(\cdot\right)$ is an increasing and concave function. The quasi-linearity of equation (1) ensures that individuals with different income levels get the same marginal benefit from collective consumption, which is reasonable when describing public consumption expenditures at large.[6] Individuals differ in their preferred level of $g$, however, due

[6]Some government services may hold greater marginal values for the relatively rich, such as health care and public opera houses, but the opposite may be true for other services, such as public transporta-

to the higher tax burden of the relatively rich in financing $g$ through proportional taxation. Voters weigh the benefits and costs on the margin to determine their demand for collective consumption.

# 3 Social mobility and majority-rule equilibrium

## 3.1 Policy preferences with income uncertainty

Normalize the population's measure to one, so that aggregate income in the economy equals mean income in each period. Assuming the government must balance the budget, per capita tax revenue equals aggregate public spending, or

$$t(\bar{x} + \bar{y}) = t(2 + \gamma)\bar{x} = 2g. \quad (2)$$

Rearranging (2) and substituting into (1) yields the lifetime expected indirect utility of individual $i$, which can be written as

$$W(g; x^i) = [(2 + \gamma)\bar{x} - 2g] \left[ \frac{x^i + \mu(x^i)}{(2 + \gamma)\bar{x}} \right] + 2H(g). \quad (3)$$

As a voter, the *preferred policy* of individual $i$ maximizes equation (3) by equating the marginal cost of government spending with its marginal benefit:

$$\frac{x^i + \mu_M(x^i)}{(2 + \gamma)\bar{x}} = H_g(g),$$

where $H_g(\cdot)$ is the derivative of $H$ with respect to government expenditure. Note the marginal cost of collective consumption is an increasing function of the individual's expected lifetime income relative to the total mean income, so the rich have a higher relative tax burden in financing public consumption. The first-order condition implies that an individual's most preferred level of government spending, $g^i$, is an implicit function of his initial income:

$$g^i = H_g^{-1} \left[ \frac{x^i + \mu_M(x^i)}{(2 + \gamma)\bar{x}} \right] \equiv h \left[ x^i + \mu_M(x^i) \right], \quad (4)$$

tion and transition programs for the structurally unemployed. Still others, such as the maintenance costs of democratic elections and the rule of law, should be marginally valued by all equally.

where $h(\cdot) > 0$ and $h'(\cdot) < 0$ by the concavity of $H$. One's income relative to the mean is a "price" for public consumption in terms of the numeraire private market consumption. Equation (4) then can be naturally interpreted as a social demand curve for public consumption; *ceteris paribus*, the relatively rich have a higher price of collective consumption and demand less than the relatively poor.[7] Noting that

$$\frac{\partial h}{\partial x^i} = h'(\cdot)\left[1 + \mu_M'(x^i)\right],$$

the most preferred levels of government spending are monotonic in initial income whenever $\mu_M'(\cdot)$ is monotonic. Furthermore, most preferred levels of spending are monotonically decreasing in initial income whenever $\mu_M{}'(\cdot) > -1$.

## 3.2 Social mobility processes and monotonic policy preferences

The final feature of the economy is the mobility process, which is described in terms of conditional probability distributions. Recall that $M(y|x^i) = \int_{s=0}^{y} m(s|x^i)ds$ gives the probability that individual with initial income $x^i$ will have at most income $y$ in the future, and that $\mu_M(x^i)$ gives the *ex-ante* expected future income of an individual with initial income $x^i$ for a given mobility process $M$.

To compare different mobility processes in terms of conditional distributions, it is useful to distinguish between the extreme cases of *no* mobility and *perfect* mobility. Complete state dependence represents the case of *no* mobility, so $m(y|x^i) = 1$ when $y = x^i$ and $m(y|x^i) = 0$ for all $y \neq x^i$. In the case of *perfect* mobility, there is complete state *in*dependence, so for any future income $y \in X$, $m(y|x^i) = m(y|x^j)$ for any $x^i, x^j \in X$. Every income quantile draws next period's income from the same (unconditional) distribution, so future expected income equals the mean of the distribution in the case of perfect mobility. Quite simply then, say that there is social mobility in the economy when there is not complete state dependence in future income dynamics.

The following assumption is a stochastic dominance criterion for the conditional distributions of *individuals* within any given mobility process, which describes the nature

[7] This is standard in models where government spending is financed with proportional income taxation, such as Meltzer and Richard [1981] and Persson and Tabellini [2000]. Note that the monotonicity of $h$ in relative income follows from the quasi-linearity of the utility function because it rules out any income effects. There is only a substitution effect in the model. More generally, the result that the relatively rich prefer lower spending levels than the relatively poor holds whenever the (uncompensated) price elasticity of demand for public consumption is greater (in magnitude) than the income elasticity of demand. See Kenny [1974] and Husted and Kenny [1997].

of state dependence in income dynamics.

**Assumption 3.** *Monotonicity: For a given mobility process $M$, the conditional distribution of a relatively rich individual stochastically dominates the conditional distribution of a relatively poor individual, i.e.,*

$$\text{for } x, x' \in X, \text{ if } x < x' \text{ then } M(y|x) \geq M(y|x') \text{ for all } y \in X,$$

*with strict inequality for at least one $y \in X$.*

The assumption ensures that mobility processes preserve the rank of individuals in the distribution of *ex-ante* expected future incomes, i.e., for $x, x' \in X$,

$$x < x' \quad \Rightarrow \quad \mu_M(x) = \int_{y=0}^{\infty} ydM(y|x) \leq \int_{y=0}^{\infty} ydM(y|x') = \mu_M(x').$$

Loosely, the assumption takes account of the social and economic advantages of those born in the upper socio-economic classes, or the disadvantages of those born poor. In other words, rank at birth determines rank at maturity, so *ex-ante* future income prospects depend on one's initial rank in the distribution. Technically, the assumption implies that for a mobility process $M$, expected future income, $\mu_M(x)$, is monotonically increasing and continuous in initial income, $x$. Denote by $\Phi(F, X)$ the class of mobility processes that satisfy Assumptions 2 and 3. Summarizing the assumptions, if $M \in \Phi(F, X)$, then $\mu_M(x)$ has the following properties:

1. *Economic growth*: $\mathrm{E}[\mu_M(x)] = (1+\gamma)\bar{x}$

2. *Monotonicity*: $\mu'_M(x) > 0$

Due to the monotonicity of *ex-ante* future income expectation in initial income and the monotonicity of the policy preference function $h$ in lifetime expected income , most preferred policies are monotonic in initial income. As such, the individual with the initial median income in the distribution will be decisive for *any* mobility process $M \in \Phi(F, X)$.

**Proposition 1.** *For any mobility process $M \in \Phi(F, X)$, the future policy most preferred by the initial median income voter, $g_M^{med}$, is the winning policy $g_M^*$, i.e.,*

$$g_M^* = g_M^{med} = h\left[x^{med} + \mu_M(x^{med})\right].$$

*Proof.* See Appendix. □

## 3.3 Comparing political equilibria under different upward mobility processes

The analysis is concerned more specifically with *upward* social mobility, which would reasonably require that the poorest member of society be upwardly mobile, or require that

$$\left.\frac{d\mu_M(x)}{dx}\right]_{x=0} > 1.$$

If the second derivative of $\mu(\cdot)$ does not change signs, then concentrating on upward social mobility then requires that the transition function is *concave* in $x$ due to the finite growth assumption if the second derivative does not change signs. The final assumption on the mobility process is a sufficient condition to ensure the concavity of the transition function. For any $M \in \Phi(F, X)$, let $M(y|x) = p \in [0, 1]$. Denote the inverse of the conditional probability by the function $\varphi_x(p)$, i.e., $y = M^{-1}(p|x) \equiv \varphi_x(p)$.

**Assumption 4.** Sufficient Condition for Concavity: *For any* $\delta > 0$,

$$\varphi_{x+\delta}(p) - \varphi_x(p) < \varphi_x(p) - \varphi_{x-\delta}(p).$$

Denote by $\Phi^+(F, X)$ the class of mobility processes that satisfy Assumptions 2, 3 and 4, so that $\Phi^+(F, X) \subset \Phi(F, X)$.

**Lemma 1.** *The transition function* $\mu_M(x)$ *that is induced by any mobility process* $M \in \Phi^+(F, X)$ *is increasing and concave, i.e., if* $M \in \Phi^+(F, X)$, *then for any* $\delta > 0$

$$\mu_M(x + \delta) - \mu_M(x) < \mu_M(x) - \mu_M(x - \delta). \tag{5}$$

*Proof.* See Appendix. □

Focusing attention on concave transition functions aids the comparison to the influential work on social mobility and the politics of income redistribution by Bénabou and Ok [2001]. Concavity of the transition function is a natural property to impose when considering upward social mobility, as it ensures that the relatively poor expect a larger percentage change in income than the relatively rich. Heuristically, higher initial income has a greater marginal impact on future income prospects for the relatively poor.

**Lemma 2.** *For any mobility process $M \in \Phi^+(F, X)$, the median-income voter is upwardly mobile in expectation, i.e.,*

$$\text{if } M \in \Phi^+(F, X)\,, \text{ then } \mu_M(x^{med}) > x^{med}.$$

*Proof.* See Appendix. □

Note that the induced transition function gives a mapping of current income into expected future income that is "between" the extreme cases of complete state dependence and state independence. The more concave is the transition function, the closer it is to the extreme case of state independence. Refer to a "more mobile" process as one where the induced transition function is more concave, or can be obtained from an increasing and concave transformation of the transition function induced by the less mobile process. Social mobility in this conception has the effect of inducing a distribution of *ex-ante* expected future incomes that is *less skewed* than the initial income distribution. Use the binary ordering $\succeq$ to rank mobility processes, so that $M \succeq N$ reads mobility process $M$ is "more mobile" than process $N$.

**Definition 1.** Mobility Ordering: *For any mobility processes $M, N \in \Phi^+(F, X)$, $M \succeq N$ if and only if $\mu_M(x)$ is more concave than $\mu_N(x)$. In other words, for an increasing and concave function $\phi(\cdot)$,*

$$M \succeq N \quad \textit{if and only if } \mu_M(x) = \phi\left[\mu_N(x)\right]$$

**Proposition 2.** *Within the class of mobility processes considered, economies that have more mobile processes will have a smaller level of collective consumption in a majority rule equilibrium, i.e., for $M, N \in \Phi^+(F, X)$,*

$$\text{if } M \succeq N, \text{ then } g^*_M < g^*_N.$$

*Proof.* See Appendix. □

When the median voter expects to be upwardly mobile, his expected price of public consumption relative to market consumption increases and he substitutes out of public provision on the margin.

# 4 Comparison with the politics of income redistribution

The continuity of demand for public expenditure in relative income strengthens the relation between income dynamics and political outcomes established by Bénabou and Ok [2001], which considers the demand for income redistribution. In the deterministic case they consider, Bénabou and Ok [2001] conclude that in order for the median to prefer no redistribution to perfect redistribution, the transition function must be sufficiently concave to make the future income distribution negatively-skewed. In the current analysis, an arbitrarily small degree of concavity decreases the level of public consumption preferred by the median voter, as any increase in his future income raises the cost of public consumption in terms of private market consumption.

To facilitate comparison with Bénabou and Ok [2001], modify the above model slightly so that (i) there is no economic growth ($\gamma = 0$) and (ii) the policy that is voted upon in the initial period does not get implemented until the future period. With pure income redistribution via proportional taxation and lump-sum transfers $T$, the expected future utility of individual $i$ is written

$$U(c^i; x^i) = (1 - t)\,\mu(x^i) + T. \tag{6}$$

Balanced budget requires that per capita revenues equal per capita expenditures:

$$t\bar{x} = T. \tag{7}$$

Plugging (7) into (6) implies an indirect utility function given by

$$W(t; x^i) = \mu(x^i) + t\left[\bar{x} - mu(x^i)\right] \tag{8}$$

If $\mu(x^i) < \bar{x}$, then the transfer is positive and rational voter $i$ prefers *complete redistribution*, so that everyone gets $\bar{x}$ in the next period. In a skewed distribution, the median voter has income less than the average, so in the absence of social mobility, $\mu(x^{med}) = x^{med} < \bar{x}$. With no mobility, the median voter prefers complete redistribution and $t = 1$ is theoretically elected since the median voter is decisive due to single-peaked preferences. What about with social mobility? Proposition 1 tells us that the median voter will still be decisive for mobility processes satisfying Assumptions 2 and 3. If

$\mu(x^{med}) < \bar{x}$, then the equilibrium tax rate is still $t = 1$, even when the median voter is (to some degree) upwardly mobile.

In order for the median voter to prefer no income redistribution in the future, the transition function must be concave enough to give him a future expected income greater than the mean income, i.e., it must be that $\mu(x^{med}) > \bar{x}$ for the median to prefer no income redistribution. Note well that the monotonicity assumption then requires that the transition process reverse the skew of the distribution if $\mu(x^{med}) > \bar{x}$. In the politics of public consumption, on the other hand, the median voter's policy preference is sensitive to an arbitrarily small degree of mobility. All that is required for the median voter to prefer a smaller government, and hence lower taxes, is that $\mu(x^{med}) > x^{med}$. Intuitively, the difference between the two public choice issues is that the demand for public expenditure is continuous and decreasing in relative future income, whereas the demand for income redistribution is a step function from $t = 1$ when $\mu(x^{med}) \leq \bar{x}$ to $t = 0$ when $\mu(x^{med}) > \bar{x}$. Thus, the following corollary to Proposition 2 has been established.

**Corollary 1.** *The collective choice of public expenditure is "more sensitive" to the degree of social mobility in the economy than the collective choice of income redistribution. In other words, over a range,* $\mu(x^{med}) \in [0, \bar{x}]$ *social mobility* does not *affect the politics of income redistribution, whereas social mobility* does *affect the politics of public expenditure for* any *mobility process such that* $\mu(x^{med}) \neq x^{med}$.

# 5 Relation to the literature on voting franchise extension

While the current paper primarily addresses a cross-section of government growth experiences, there is also a vibrant literature on the times series of government growth. A popular idea in this literature is that voting franchise extensions can explain governments expansions. The central dynamic is that franchise extensions result in a new median voter, whose income is lower than the original median voter, since it has historically been the literate, land-owning, rich, male members of society who have extended voting rights to those lower in the income distribution. The result is that the new lower-income median voter has a smaller tax price for public expenditures, demands more of it, and the level of government services increases following an extension of the voting franchise. However, the evidence on this prediction is mixed.

Documenting the experience of voting franchise expansions in U.S. states from the twentieth century, Husted and Kenny [1997] find that franchise extension cannot significantly account for increases in the level of government expenditures that are not directly redistributive. Husted and Kenny [1997] explain the result in terms of the elasticities of demand for government expenditures, arguing that their result is evidence that the (uncompensated) price elasticity is less than (in absolute value) the income elasticity of demand for government services.

On the other hand, for a panel of European economies, Aidt et al. [2006] find that government spending increased following franchise extension in Europe. One theoretical explanation may be that accords with Husted and Kenny [1997] would be that Europeans have a different elasticity of substitution between collective and private consumption. For the European franchise extensions, perhaps the income elasticity was weaker than the price elasticity. But, there is no reason to believe estimates of these elasticities should be culturally sensitive.

As an alternative theoretical explanation for the empirical puzzle of the effect of franchise extension on growth in government spending, consider differences in social mobility perceptions as discussed above. Since the franchise extension results in a pivotal voter with a lower income and thus a lower tax price per unit of spending, extending the franchise results in an increase in government spending with the utility structure from above. However, when one considers social mobility as a concave transition function, the impulse for government growth following franchise extension will be muted. The reason is simple. Despite the lower initial income of the new median voter, he will be more upwardly mobile in expectation than the original median voter due to the concavity of the mobility process.

Therefore, the change in government spending in response to a franchise extension is lower when there is social mobility in the economy. To see this, compare the 2-period incomes of the new and original median voters both with and without social mobility. Denote the income of the median voter before the franchise extension by $x_1^m$ and the income of the median voter after the franchise extension by $x_2^m < x_1^m$. Without social mobility, the change in the median-voter's income is $2x_2^m - 2x_1^m = 2(x_2^m - x_1^m)$. With social mobility, the change in the median-voter's income is $x_2^m + \mu(x_2^m) - [x_1^m + \mu(x_1^m)]$. The concavity of $\mu(\cdot)$ implies that $x_1^m - x_2^m \geq \mu(x_1^m) - \mu(x_2^m)$, whenever $\mu'(x_2^m) \leq 1$.[8]

[8]The individual for whom $\mu'(x^i) = 1$ is the individual who expects the biggest gross increase in his income as this is where the difference between the transition function and the 45 degree line is maximized. Since $\mu(\cdot)$ is a process which benefits the relatively poor more than the relatively rich, it is

If $x_1^m - x_2^m \geq \mu(x_1^m) - \mu(x_2^m)$, then

$$2(x_1^m - x_2^m) \geq x_1^m + \mu(x_1^m) - [x_2^m + \mu(x_2^m)].$$

In other words, the change in the lifetime income of the median voter following a franchise extension is greater when it is assumed that there is no social mobility in the economy. As a result, the new median voter demands less growth in government when he perceives mobility compared to the case when he perceives no mobility. In this way, allowing for social mobility adds another dimension to the theoretical link between franchise extension and the growth of government.

Considering the effect of social mobility can rationalize why Husted and Kenny [1997] find an insignificant impact of the franchise extension on public consumption in the United States, where as Aidt et al. [2006] uncover a positive impact in European economies. If there is a perception of greater social mobility in the U.S. than in Europe, then it may be differences in social mobility which account for the different impacts of franchise extension that have been identified in the econometric results.

Within the framework of the model, to understand the finding that spending in the U.S. was insensitive to the franchise extension, imagine that the new median voter in the U.S has an expected lifetime income that is roughly the same as that of the initial median-voter, i.e., imagine that $x_2^m + \mu_{US}(x_2^m) \approx x_1^m + \mu_{US}(x_1^m)$. In this case, moving the pivotal voter down in the income distributions results in a reduction in the pivotal voter's initial income that is essentially made up for by the greater mobility expectations associated with the lower quantiles of the distribution. The net effect would be no change in government spending in that scenario. On the other hand, if the mobility process is less concave, then the effect of higher expected future income of the new median voter cannot outweigh the change in initial income affected by the franchise extension. If Italy, for example, has a lower degree of mobility perception, then the change in the lifetime expected income of the pivotal voter affected by franchise extension is larger, i.e., $x_2^m + \mu_I(x_2^m) < x_1^m + \mu_I(x_1^m)$. Ceteris paribus, the franchise extension affects a greater change in the lifetime expected income of the pivotal voter in the less mobile economy, i.e.,

$$\mu_I(x_1^m) - \mu_I(x_2^m) > \mu_{US}(x_1^m) - \mu_{US}(x_2^m).$$

likely that individual with the median income of the population's distribution will not have $\mu'(x^m) \geq 1$. Since the new median voter after the franchise extension can be no poorer than than the median of the population, the condition that $\mu'(x_2^m) \leq 1$ is satisfied.

The apparent differences, between American and European experiences, in the responsiveness of government spending to franchise extension can be rationalized in terms of differences in social mobility.

## 6 Perceptions of social mobility in survey data

Contrary to popular opinion, the empirical evidence suggests that American and European societies have similar degrees of fluidity between social classes in estimations of transition matrices using panel data, particularly among the middle income quantiles.[9] Responses to a *World Values Survey* (1990, 2000) question about social justice support the popular opinion, however, that income dynamics in European society are viewed as more *state-dependent* (i.e., less mobile) than in America. Thus, univariate measures of social mobility based on mobility realizations, such as those derived from estimated transition matrices, cannot entirely capture how mobility considerations affect future income expectations and hence political preferences.[10] In other words, perceptions matter.

There is a strong perception among Europeans that economic success is random, essentially determined at birth. Averaging across European respondents, 54% believe that luck is more important than hard work in achieving economic success, whereas only 30% of Americans gave this response. Believing economic success is due to luck connotes greater relevance of birth-right which connotes that future income is more state-dependent. A lower percentage of "luck determines income" responses (*Luck*) corresponds to a higher degree of perceived mobility in a society. The model then predicts a positive monotonic relation between government size and the percentage of *Luck* responses. To test the monotonicity prediction, a nonparametric procedure is applied to data from OECD countries. Two reasonable restrictions of the sample are then considered. The first restriction excludes transition economies, and the second restriction further excludes Scandinavian economies.

Table 1 gives within country averages for the percentage of *World Values Survey* respondents who believe that luck determines economic success in their respective societies, and ranks societies from lowest perceived mobility to highest for a sample of 26

[9] Alesina and Glaeser [2004] review this literature.

[10] Alesina and Glaeser [2004] find that subjective mobility assessments can explain different preferences for redistribution across countries. Alesina and Ferrara [2005] find the same across American states.

Table 1: Luck, economic success, and the fraction of GDP spent collectively

| *Country* | *Luck* | *OECD* 2004 | *UN* 2002 | *UN*(*PPP*) 2000 |
|---|---|---|---|---|
| Denmark[c] | 77.1 | 26.7 | 26.1 | 23.3 |
| Portugal | 66.0 | 21.4 | 21.2 | 23.9 |
| Netherlands | 62.9 | 25.0 | 24.3 | 20.9 |
| Poland[b] | 61.1 | 17.6 | 18.0 | 17.9 |
| Spain | 56.1 | 17.4 | 17.6 | 16.6 |
| Belgium | 53.5 | 22.6 | 21.4 | 18.9 |
| Germany | 53.4 | 18.4 | 19.1 | 15.9 |
| Italy | 52.5 | 19.2 | 18.8 | 15.4 |
| Sweden[c] | 51.6 | 27.7 | 28.0 | 24.5 |
| Hungary[b] | 51.1 | 22.6 | 12.0 | 13.9 |
| United Kingdom | 51.0 | 21.2 | 20.1 | 18.1 |
| Slovakia[b] | 49.7 | 20.3 | 19.9 | 26.6 |
| France | 49.0 | 23.9 | 23.9 | 21.0 |
| Ireland | 44.9 | 16.0 | 13.3 | 11.9 |
| Czech Republic[b] | 44.1 | 22.9 | 21.4 | 29.7 |
| Japan | 41.4 | 17.7 | 17.9 | 16.3 |
| Slovenia[b] | 41.2 | ... | 20.5 | 23.7 |
| Switzerland | 41.1 | 11.8 | 15.2 | 11.3 |
| Austria | 39.8 | 18.0 | 19.1 | 16.1 |
| Finland[c] | 39.3 | 22.4 | 21.6 | 19.8 |
| New Zealand | 39.0 | 17.5 | 18.3 | 8.5 |
| Australia | 38.7 | 17.9 | 18.0 | 16.2 |
| Iceland[c] | 35.1 | 26.6 | 25.1 | 8.6 |
| Canada | 33.4 | 19.7 | 19.0 | 13.4 |
| Korea | 33.1 | 13.5 | 10.6 | 9.2 |
| United States | 30.2 | 15.6 | 18.9 | 13.9 |

*Note*: Developing economies[b] and Scandinavian economies[c]
*Sources*: World Values Surveys (1990, 2000), OECD (2005), UN (2005).

OECD countries. Three measures of public sector size as a percentage of total output are also presented in the table. The first measure, labeled $OECD$ 2004, uses 2004 data from the OECD on the ratio of final government consumption expenditures to total output. The second measure, labeled $UN$ 2002, uses data from the United Nations National Accounts for the same ratio from 2002. The third measure of public sector size, labeled $UN(PPP)$ 2000, gives the ratio from year 2000 United Nations data adjusted for different prices of public provision, correcting for differences in efficiency of public provision.

Following the nonparametric procedure employed by Bernhardt et al. [2005], the monotonicity prediction of the model is empirically tested. The null hypothesis is that government size and mobility perceptions are independently distributed against the alternative of positive rank correlation. The data is treated as a sample from a bivariate distribution, with observation pairs for each country $i$ of the form $(Luck_i, g_i)$. A distribution-free test for independence of $Luck$ and $g$ is performed using Kendall's tau statistic. The test statistic is calculated by first counting the number of "concordant" and "discordant" pairs, denoted by $N_c$ and $N_d$, respectively. Two observation pairs are concordant if $(Luck_i - Luck_j)(g_i - g_j) > 0$ and are discordant otherwise. For example, the pairs $(1,3)$ and $(2,4)$ are concordant, while the pairs $(4,1)$ and $(2,3)$ are discordant.

When the sample contains $n$ countries, the maximum possible number of concordant pairs is $N = (n(n-1)/2)$. Kendall's tau statistic is calculated as $\tau = \left(\frac{N_c - N_d}{N}\right)$. The statistic provides an estimate of the correlation between mobility perceptions and the size of the public sector. If the two variables are perfectly correlated, then all pairs are concordant and $\tau = 1$. On the other hand, if the two variables are independent, then the number of concordant pairs equals the number of discordant pairs and $\tau = 0$. The null and alternative hypotheses are as follows:

**H0.** Mobility perceptions and public expenditures are mutually independent: $(\tau = 0)$.

**H1.** Higher perceptions of immobility (state-dependence) are associated with greater public expenditure: $(\tau > 0)$.

It is also simple to calculate a $z-$test statistic to provide a large sample approximation to the standard normal test statistic. Letting $K = N_c - N_d$, Hollander and Wolfe [1973] define

$$Z = \frac{K - \mathrm{E}_0(K)}{[var_0(K)]^{1/2}} = \frac{K}{[n(n-1)(2n+5)/18]^{1/2}}.$$

Under the null hypothesis of mutual independence, a concordant pair is just as likely as a discordant pair, so $\mathrm{E}_0(K) = 0$. When the null is true, the statistic has an asymptotic

$N(0,1)$ distribution, giving a "normal theory approximation" to the rank correlation procedure using Kendall's tau statistic.

Table 2 presents the results of the nonparametric tests of the monotonicity prediction using the three measures of public consumption discussed above. Panel C considers a subset of the sample from panel B, which is a subset of the whole sample of OECD countries, considered in panel A. Restricted samples are considered to limit attention to countries that are institutionally similar. For instance, the sample considered in panel B excludes transition economies, while panel C further excludes the economies of Scandinavia. In a cross-section of countries, the rank correlation test is most suitable for comparing similar economies. The nonparametric procedure sacrifices the ability to control for other distinguishing characteristics of countries, such as a history of communism and centrally-determined allocations (in the case of the transition economies) or a socially-conscious political environment (in the case of the Scandinavian economies). Excluding countries from the sample to make the rank comparisons between more similar countries is a way to control for fundamental institutional or cultural differences. In each panel of Table 2, the first row shows the number of countries under comparison. The second row shows the maximum possible number of concordant pairs and the third row gives the calculated number of concordant pairs. The fourth row in each panel presents Kendall's $\tau-$statistic and the last row presents the $z-$test statistics.

The results in panel A show that for the sample as a whole, the null hypothesis is rejected, though at different levels of significance. The null can be rejected with 95% confidence when the nonparametric test is performed on the OECD data, with 90% confidence on the United Nations data and with 99% confidence on the price-adjusted United Nations data. Restricting the sample to perform the test on more similar groups of countries increases the confidence with which the null hypothesis is rejected. The monotonic relationship between social mobility perceptions and government size is stronger among the developed economies that do not have a history of communism and are not in Scandinavia. The null hypothesis is rejected with 95% confidence for all measures of government size after restricting the sample. As a test for robustness, the analysis further considers the average yearly percentage of public spending since 1996 for each country, and for each measure of government size. This ensures the monotonicity test results are robust to sampling errors, or dramatic one year deviations from "steady-state" policy. Table 3 presents the test results with the averaged data, and shows that the null is rejected in each case, with very similar levels of confidence.

Table 2: Nonparametric test of monotonicity prediction

| Panel A: OECD countries | | | |
|---|---|---|---|
| | $OECD$ 2004 | $UN$ 2002 | $UN(PPP)$ 2000 |
| $n$ | 25 | 26 | 26 |
| $N$ | 300 | 325 | 325 |
| $N_c$ | 190 | 194 | 225 |
| $\tau-$statistics | 0.267** | 0.194* | 0.385*** |
| $z-$statistics | 1.87** | 1.39* | 2.75*** |

| Panel B: Excluding transition economies | | | |
|---|---|---|---|
| | $OECD$ 2004 | $UN$ 2002 | $UN(PPP)$ 2000 |
| $n$ | 21 | 21 | 21 |
| $N$ | 210 | 210 | 210 |
| $N_c$ | 138 | 133 | 160 |
| $\tau-$statistics | 0.314** | 0.267** | 0.524*** |
| $z-$statistics | 1.99** | 1.69** | 3.32*** |

| Panel C: Excluding transition and Scandinavian economies | | | |
|---|---|---|---|
| | $OECD$ 2004 | $UN$ 2002 | $UN(PPP)$ 2000 |
| $n$ | 17 | 17 | 17 |
| $N$ | 136 | 136 | 136 |
| $N_c$ | 95 | 91 | 104 |
| $\tau-$statistics | 0.397** | 0.338** | 0.529*** |
| $z-$statistics | 2.22** | 1.90** | 2.97*** |

*Note*: *,** , and *** denote significance at the 10%, 5%, and 1% levels, taken from Hollander and Wolfe [1973], p. 384.

Table 3: Nonparametric test of monotonicity prediction with averaged data

Panel A: OECD countries

| | $OECD\ avg_{1996-2004}$ | $UN\ avg_{1996-2002}$ | $UN(PPP)\ avg_{1996-2000}$ |
|---|---|---|---|
| $n$ | 25 | 26 | 26 |
| $N$ | 300 | 325 | 325 |
| $N_c$ | 189 | 191 | 208 |
| $\tau-$statistics | 0.260** | 0.175 | 0.280** |
| $z-$statistics | 1.82** | 1.26 | 2.01** |

Panel B: Excluding transition economies

| | $OECD\ avg_{1996-2004}$ | $UN\ avg_{1996-2002}$ | $UN(PPP)\ avg_{1996-2000}$ |
|---|---|---|---|
| $n$ | 21 | 21 | 21 |
| $N$ | 210 | 210 | 210 |
| $N_c$ | 138 | 134 | 144 |
| $\tau-$statistics | 0.314** | 0.276** | 0.371*** |
| $z-$statistics | 1.99** | 1.75** | 2.36*** |

Panel C: Excluding transition and Scandinavian economies

| | $OECD\ avg_{1996-2004}$ | $UN\ avg_{1996-2002}$ | $UN(PPP)\ avg_{1996-2000}$ |
|---|---|---|---|
| $n$ | 17 | 17 | 17 |
| $N$ | 136 | 136 | 136 |
| $N_c$ | 94 | 91 | 98 |
| $\tau-$statistics | 0.382** | 0.338** | 0.441*** |
| $z-$statistics | 2.14** | 1.90** | 2.47*** |

*Note*: *,**, and *** denote significance at the 10%, 5%, and 1% levels, taken from Hollander and Wolfe [1973], p. 384.

# 7 Conclusion

The possibility of upward social mobility has for long been recognized as an important determinant of political sentiment in capitalistic societies, but has formalizations in economics have only recently occurred. In terms of the politics of income redistribution, when the median-income voter is decisive in a one-dimensional election over the degree of income redistribution, and the income distribution is right-skewed, the median-income voter (and all with income below the mean) has an incentive to support perfect redistribution, *ceteris paribus*. Of course, we do not observe this outcome in reality. Bénabou and Ok [2001] have provided conditions on the mobility process that rationalize this fact. Simply, if the median-income voter expects to have an income greater than the mean in the future, then he will not support perfect redistribution, but should support no redistribution at all. This is achievable with a concave mobility process, but it requires that the income distribution be left-skewed in the future, at least in expectation. Bénabou and Ok [2001] reluctantly dismiss, therefore, the role that social mobility has on political outcomes, but the dismissal is less convincing in other realms of public policy.

This paper has considered collective consumption, rather than income redistribution, as the policy choice variable over which candidates form one-dimensional political platforms. In doing so, it is immediate that the elected policy will never be a tax-rate of unity, as man cannot live on public services alone. When considering collective consumption, rather that income redistribution, it is no longer the case that the median-income voter must expect a future income greater than the mean to change his policy preference. The continuity of demand for collective consumption in the ratio of one's income to the economy's mean income ensures that an arbitrarily small degree of mobility changes one's most preferred policy because the expected price of public consumption changes when there is mobility in the economy. For the median-income voter, mobility affects public consumption preferences in instances when it would not affect preferences for income redistribution. The story of American Exceptionalism, it seems, is better told within collective choice models in terms of public consumption.

This paper argues that, *ceteris paribus*, economies with higher degrees of social mobility will choose smaller levels of public consumption expenditures in equilibrium. The result is intuitive, and can be applied in comparing the U.S., with its reputation for social fluidity and relatively small public sector, to Europe, with it reputation for social rigidity and relatively large public sectors. Subjective data on social mobility perceptions support the popular notion that social mobility is higher in the U.S. than in Europe and indeed, every other OECD country. While the U.S. does not have the smallest public sector in the sample, the monotonicity prediction of the model is empirically supported.

It is clear that one's perception of social mobility in society should affect one's policy preferences, but a related question is *why* do perceptions of mobility differ across societies? Piketty [1995] suggests that trans-generational observations of the elasticity of mobility to effort formulate one's perception of social mobility, which is certainly an acceptable hypothesis. It seems, however, also reasonable to think that perceptions are formed at a marco-level by the institutional characteristics of labor markets and culture. An interesting avenue for future research will be to investigate the institutional factors that co-vary with subjective mobility perceptions, and to develop a model that can explain the formation of mobility perceptions. It is interesting, especially in relation to the U.S., where even the abjectly poor have the perception that America is the "land of opportunities," when in the realities of most, the American dream will always remain a dream.

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# A Proof of propositions

## Proposition 1

*Proof.* First, consider $x' < x^{med}$. $x' < x^{med}$ implies $M(y|x') \geq M\left(y|x^{med}\right)$ for any $M \in \Phi(F, X)$ by the third assumption, which implies

$$\int_{y=0}^{\infty} y dM(y|x') < \int_{y=0}^{\infty} y dM\left(y|x^{med}\right).$$

By definition then, $\mu_M(x') < \mu_M(x)$ for any $M \in \Phi(F, X)$. This implies $h[x' + \mu_M(x')] > h\left[x^{med} + \mu_M(x^{med})\right]$ since $h$ is a decreasing function. Therefore, all voters with initial income less than the median income prefer more collective consumption than that preferred by the median voter for any degree of mobility. An analogous argument establishes that all voters with initial income greater than the median income prefer less collective consumption than that preferred by the median voter for any $M \in \Phi(F, X)$. Thus, for a given degree of mobility, the most preferred policy of the initial median-income voter is the Condorcet winner because it is preferred by a majority to any feasible policy alternative. □

## Lemma 1

*Proof.* Putting $\mu(x)$ in terms of $\varphi_x(p)$, we have $\mu(x) = \int_0^1 \varphi_x(p)\,dp$. Putting equation (5) in terms of $\varphi_x(p)$, we have

$$\begin{aligned} \int_0^1 \varphi_{x+\delta}(p)\,dp - \int_0^1 \varphi_x(p)\,dp &< \int_0^1 \varphi_x(p)\,dp - \int_0^1 \varphi_{x-\delta}(p)\,dp, \text{ or} \\ \int_0^1 [\varphi_{x+\delta}(p) - \varphi_x(p)]\,dp &< \int_0^1 [\varphi_x(p) - \varphi_{x-\delta}(p)]\,dp, \quad \text{or} \end{aligned}$$

$$\int_0^1 \{[\varphi_{x+\delta}(p) - \varphi_x(p)] - [\varphi_x(p) - \varphi_{x+\delta}(p)]\}\,dp < 0. \tag{9}$$

Assumption 3 (monotonicity) ensures that whenever $x' > x$, $\varphi_{x'}(p) > \varphi_x(p)$, so the condition is satisfied by Assumption 4. Therefore, Assumption 4 is sufficient to ensure that equation (5) is satisfied. □

## Lemma 2

*Proof.* When future expected income is plotted against current income and upward social mobility is a concave transition function, $\mu_M(x)$ begins above the 45 degree line, crosses the 45 degree line only once at $x_M^*$ and is below the 45 degree line for all $x > x_M^*$. Since $\mu_M(\cdot)$ is an increasing and concave function, $x_M^*$ is unique. Using Jensen's inequality, we have that

$$\mu_M(\bar{x}) = \mu_M\left[\int_{x=0}^{\infty} x\,dF(x)\right] \geq \int_{x=0}^{\infty} \mu_M(x)\,dF(x) = (1+\gamma)\bar{x} > \bar{x} \tag{10}$$

Equation (10) shows that the voter with the initial mean income is upwardly mobile in expectation. If there is a unique $x_M^*$ that satisfies $\mu_M\left(x_M^*\right) = x_M^*$ and $\mu_M\left(\bar{x}\right) > \bar{x}$, then it is clear that $x_M^* > \bar{x}$. In other words, for a mobility process $M \in \Phi^+(F, X)$, there exists a unique $x_M^* > \bar{x}$ such that all agents with initial income $x \in [0, x_M^*)$ have $\mu_M\left(x\right) > x$ and all agents with initial income $x \in [x_M^*, \infty]$ have $\mu_M(x) \leq x$. The interpretation is that all with an initial income less than $x_M^*$ are upwardly mobile in expectation. Moreover, since $\mu_M(\bar{x}) > \bar{x}$ for any $M \in \Phi^+\left(F, X\right)$, it must be that $x_M^* > \bar{x}$. Skewness of the distribution implies that $\bar{x} > x^m$, which implies that $\mu_M(x^m) > x^m$, so the voter with the initial medial income is upwardly mobile in expectation. □

## Proposition 2

*Proof.* $M \succeq N$ implies $\mu_M\left(x\right) = \phi\left[\mu_N\left(x\right)\right]$, where $\phi$ is an increasing and concave function. First, we must establish the claim that $\mu_M\left(\bar{x}\right) > \mu_N\left(\bar{x}\right) > \bar{x}$. To prove the claim, apply Jensen's inequality and the growth rate assumption in a similar way as above.

$$\begin{aligned}
\mu_M\left(\bar{x}\right) &= \phi\left[\mu_N\left(\bar{x}\right)\right] = \mu_N\left[\phi\left(\bar{x}\right)\right] = \mu_N\left[\phi\left(\int_{x=0}^{\infty} x dF\left(x\right)\right)\right] \\
&\geq \mu_N\left[\int_{x=0}^{\infty} \phi\left(x\right) dF\left(x\right)\right] = \mu_N\left(\bar{x}\right) = \mu_N\left[\int_{x=0}^{\infty} x dF\left(x\right)\right] \\
&\geq \int_{x=0}^{\infty} \mu_N\left(x\right) dF\left(x\right) = (1+\gamma)\bar{x} > \bar{x}.
\end{aligned}$$

Thus, $\mu_M\left(\bar{x}\right) > \mu_N\left(\bar{x}\right) \geq \bar{x}$. Since $\mu_M\left(x\right)$ crosses $\mu_N\left(x\right)$ only once and from above, for any $x < \bar{x}$, we have that $\mu_M\left(x\right) > \mu_N\left(x\right)$. The assumption of skewness implies that $x^{med} < \bar{x}$, so $\mu_M(x^{med}) > \mu_N(x^{med})$. Since an individual's policy preferences are a decreasing function of expected lifetime income, we have that

$$g_M^{med} = h\left[x^{med} + \mu_M(x^{med})\right] < h\left[x^{med} + \mu_N(x^{med})\right] = g_N^{med}.$$

Since the policy preferred by the median voter is the unique Condorcet winner for any mobility process in $\Phi^+(F, X)$ by Proposition 1, for $M, N \in \Phi^+(F, X)$, if $M \succeq N$ then $g_M^* < g_N^*$. □