

Why Do Governments Operate Schools?*

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Abstract

Around the world, education is overwhelmingly publicly provided. This paper argues that democratic societies will prefer that education be publicly provided, rather than simply publicly financed, since under a voucher system, parents may send their children to schools teaching ideologies that are similar to their own. Over a series of generations, this leads to a more ideologically polarized society. There may be two steady states: one in which an ideologically homogeneous society votes for a public education system, thus maintaining ideological homogeneity, and another in which a more ideologically diverse society votes for school choice, thus maintaining ideological diversity. A quick survey of the empirical evidence suggests that school choice contributes to ideological and cultural segregation, but that the extent to which this creates costly conflict varies among societies.

1 Introduction

Around the world, education is overwhelmingly conducted in the public sector. ? finds that across a sample of twelve industrialized societies, the median proportion of students attending private primary schools was 10 percent, and the median proportion of students attending private secondary schools was 13.5 percent¹. Moreover, choice of school within the public sector

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¹Across 38 developing countries, the median proportion attending private primary schools was 11 percent, and the median proportion attending private secondary schools was 27.5 percent. The mean proportion attending private schools is higher than the median proportion, but this is due in large part to small country outliers, such as the Netherlands and Belgium among industrial countries, and Lesotho among developing countries.

is often limited. ? finds that across ten countries, citizens have more choice in selecting public doctors or hospitals than in choosing public schools.

This paper seeks to explain why governments operate schools instead of providing parents with vouchers and allowing them to choose among private schools. We argue that governments operate schools because people have preferences about non-contractible aspects of the education of other people's children. The most important of these non-contractible aspects of education is likely to be ideology.

This paper is organized as follows: Section 1.1 argues that it is unclear why governments operate schools, and that standard explanations based on union power or the danger of segregation by income in voucher schools are not fully satisfactory. Section 1.2 argues that an explanation should focus on non-contractible differences in objectives between individual parents and the median parent, and that the role of schools in shaping preferences is likely to be the most important source of these non-contractible differences. A voucher system is likely to provide better incentives for teachers to serve parents, and while this will improve pedagogy, it also provides schools with an incentive to cater to extreme ideological tastes. Section 2 analyzes the dynamics of the distribution of ideology in a model in which children's ideology depends on that of their parents, their schools, and society as a whole. In the model, adults have to interact with other adults, and with their children. Interaction between two parties is more costly if they differ in their ideology. Under a system of public schools the median voter determines the ideology taught. Under a voucher system, parents would choose to educate their children in schools with an ideology similar to their own. This creates a negative externality for some people with different ideologies. For some parameter values, there are multiple steady states. If the initial distribution of ideology is dispersed enough, the population will vote for a voucher system, and the distribution of ideology will remain dispersed. If the initial dispersion of ideology is small, the population will vote for a public system, and the dispersion of ideology will remain small. Section 3 discusses evidence on the effect of school choice, focusing on the experience of the U.S. and the Netherlands. Section 4 concludes and discusses limitations of the model.

The idea that one purpose of public education is to influence ideology has been a staple of the historical literature on the development of public education². ? argue that American schools indoctrinate children to turn

²? cites many sources on this: ? claims that history "indicate(s) very clearly that

them into obedient workers within a capitalist system. [?] is in some sense an ideological opposite of [?], arguing that politicians indoctrinate children in public schools to make fiscal transfers easier. This paper follows [?; ?] in arguing that education is publicly provided because of its impact on children's ideology. However, whereas Lott sees indoctrination as pernicious and imposed by politicians, we seek to explain why public education would be chosen by voters in a democratic system. Our model suggests that a system of education choice based on vouchers may lead to extremism.

This paper also draws on the extensive and fascinating empirical work by ? [?; ?] who demonstrates the importance of ideology, and religious ideology in particular, in private education in a number of countries. James makes clear that debates over public education are part of larger debates between ideological impulses towards integration and segregation of religious and cultural groups. This paper differs from James' work in formally modeling why governments are likely to have much more control over ideology under a public system than under school choice, and in modeling the evolution of ideology under public education and vouchers.

Finally, the dynamics of this paper are similar to those in [?; ?]. While agents with low endowments of human capital are attracted to the richer neighborhoods in [?], and price mechanisms keep neighborhoods segregated, in our model the differences are self-propelling.

1.1 The Puzzle: Why Do Governments Operate Schools?

Almost every nation operates public schools, and in the United States and most other countries there are strong financial incentives for students to attend public schools rather than private schools. The preponderance of public education is a mystery, since there are fairly strong a priori reasons to believe that the quality of education would be higher under a voucher

Americanization and improving the quality of the votes cast by citizens were major motives (for public education)." ? wrote, "Education is one mechanism through which the shared norms and common experiences that contributed to social cohesion and stability are inculcated." ? wrote: "The state however derives no inconsiderable advantage from their instruction. The more they are instructed, the less liable they are to the delusions of enthusiasm and supposition, which among ignorant nations, frequently occasion the most dreadful disorders." ?, also cited by ?, argues that "What makes the voucher approach unique is that parents will be able to send their children to schools that will reinforce in the most restrictive fashion, the family's political, ideological, and religious views."

system, and the limited available empirical evidence supports this view [?; ?]. Standard rationales for public support of education – positive externalities from education and credit constraints that prevent human capital investment – do not explain why the state operates schools, rather than simply financing schools through vouchers.

Popular explanations of the preponderance of public schools are not fully convincing. Some argue that public schools predominate because of the power of teachers' unions. However, it is not clear why teachers, rather than other occupations, have been so successful in obtaining state support. After all, auto workers also have powerful unions, but they have not been able to ensure that automobiles are overwhelmingly produced by the state.

Some opponents of vouchers argue that they would lead to rich and poor children attending separate schools, and that children are influenced by their peers, so this segregation will exacerbate inequality. This argument is not fully satisfactory. If parents are not credit constrained, school assignment will generally be efficient under vouchers and inefficient under a public school system without choice. Public policy could address credit constraints directly, rather than by eliminating school choice.

Nor is it clear that segregation by race or income need be greater under vouchers than under many existing public school systems. Segregation could be limited by prohibiting parents from adding to vouchers with their own funds, and requiring schools to accept students by lottery, as in most existing U.S. school choice programs. Public education does not seem to be designed to reduce segregation. Historically, many U.S. public schools were legally segregated by race, and today public schools in the U.S. are segregated by neighborhood, often a close proxy for income and race. Until recently, many European students were tested to determine what type of secondary school they would attend. Outcomes on the tests were highly correlated with socioeconomic status.

Even if publicly-provided education redistributes income to the poor, this would not explain its near universality, since the poor typically do not have much political power. Did the government of Indonesia create a nationwide public school system rather than a voucher system because it cared about the welfare of the poor? A more likely explanation is that the government of Indonesia wants to control separatist tendencies and build nationhood through a single national education system. Moreover, outside the United States, preferences between public and private schools do not seem correlated with distributional views. The Netherlands, which has an extensive voucher

system, is fairly egalitarian. Public support of private schools in Australia was introduced by a labor government [?].

1.2 Control over Ideology in Public and Private Systems

Schools teach both cognitive skills and ideology. There may be externalities associated with both activities, creating a potential rationale for public financing of education. This section argues that it is likely to be much easier to regulate teaching of cognitive skills within a voucher system than to regulate ideology. Controlling the ideology taught in schools may require public ownership of schools.

Externalities associated with learning cognitive skills could conceivably create inefficiencies under a voucher system. Parents will prefer to obtain only the privately optimal amount of education, and this may be much less than is socially optimal. Under a voucher system, therefore, some parents might send their children to schools that pay kick-backs to the parents instead of spending the voucher funds on education.³

While kick-backs may be a serious problem in some countries with weak administrative systems and many parents who feel they face much more pressing needs than their children's education, kick-backs could probably be kept under control in most developed countries. The state could require institutions to be licensed in order to accept vouchers. (Typically, in countries with voucher systems, inputs such as teacher-pupil ratios and teacher salaries and qualifications are regulated.) Licenses could also be made conditional on outcomes such as test scores. For example, schools in which less than half the students pass a physics test could be decertified and barred from accepting vouchers.

³In response to a voucher program established by the Michigan legislature, the Romulus public school system opened a voucher school within the neighboring Detroit school district, and offered a \$50 signing bonus to students. Twenty-two hundred students enrolled, but these included many dropouts, and only a fifth of the students continued to attend the school. The following year, the Michigan legislature outlawed this practice, and the school closed [?]. More subtly, schools may supply consumption or entertainment to children instead of providing education that creates positive externalities. In fact, American schools, which share some characteristics of voucher schools, since they are locally operated, seem to reflect the preferences of children. American students have more freedom and are entertained with more spectator sports than students in many other countries.

There may also be externalities associated with ideological instruction. To take a trivial but expositionally useful example, parents might prefer that other people's children be taught not to litter, but that their own children spend more time learning physics and less time learning not to litter. In fact, public schools in the U.S. spend considerable time teaching children to take care of the environment. Under a voucher system, parents might prefer schools that spent more time on physics and less time on environmentalism. To take another, more serious, example, each parent may prefer that other people's children are taught that it is noble to die for one's country.

It is likely to be far more difficult for governments to regulate ideology than teaching of cognitive skills. It is possible to require schools to teach evolution, but not to specify the emphasis the teacher places on the word "theory" when referring to the "theory" of evolution. Governments can require that the Civil War be taught, but not whether the teacher emphasizes the superiority of Southern soldiers on the battlefield, the text of the Gettysburg Address, or Lincoln's plan to send former slaves to Africa.

Testing children's ideology is likely to be much more difficult than testing their cognitive achievement. A child who does not know that force equals mass times acceleration will find it difficult to pretend that she does, but a child who does not care about the environment may be able to successfully mislead a school inspector.

The remainder of this section formalizes the argument that governments have less control over ideology in a voucher system than under publicly provided education. Consider a model along the lines of Hart, Shleifer and Vishny [1997] in which civil servants have very weak incentives, and operators of private schools would have stronger incentives. Suppose that governments can lay down minimal observable requirements for either public or voucher schools. For example, governments could require that teachers have college degrees, that students have 180 days of instruction a year, that there be no prayer in school, and that children either be required to dress according to Islam, or not be allowed to wear Islamic head scarves (as has sometimes been the case in Turkey and France). Beyond these minimal bounds, the ideology taught in a school is observable, but not contractible.

Schools make two investment decisions: one on improving pedagogy and one on changing ideology. Schools can invest in improving pedagogy using a standard diminishing returns production function, $Q(I)$, where $Q' > 0$ and $Q'' < 0$. In addition, at some cost, ε , they can dream up a creative way to escape the rules and teach another ideology. Teachers who do not

pay the cost ε simply teach what is in the textbook without a sarcastic tone of voice, without asking students questions that invite them to find objections, and without introducing supplemental texts that convey another ideology. Similarly, principals who do not pay the cost ε simply hire the first set of academically qualified teachers that come along, rather than spending time searching among applicants to find an ideologically homogeneous set of teachers.

We assume that although pedagogical quality and ideology are not contractible, they are observable. In particular we assume that parents can observe the pedagogical quality and ideology of schools, and are willing to pay Q^B for a school of quality, Q , plus a premium for schools close to their ideological preference. Ideology is represented by numbers on a real line, and there is assumed to be a continuous distribution of preferred ideologies in the population.

Consider two different types of ownership structures. In the first ownership structure, the voucher system, the government cannot shut down or change management of schools as long as they abide by verifiable aspects of their charters. Schools invest, and then sell services to parents in a competitive market for schools. Voucher schools therefore obtain all returns from investments, as long as they do not violate the charter. In this case, the schools will invest in pedagogy as well as in providing the type of ideology that attracts students. Schools maximize $Q(I) - I$, and hence set I so that $Q'(I^*) = 1$. Define the surplus from optimal investment in pedagogy as p , where $p = Q(I^*) - I^* - Q(0)$.⁴

Given free entry, schools will serve students of every ideological hue. Schools which seek to attract students whose preferred ideology is more than some cutoff distance away from the official ideology will incur the cost of deviating from the official ideology, but schools that wish to attract students whose preferred ideology is within a band around the official ideology will not find it worthwhile to make this investment.

In the second ownership structure, public schools, the state has the right to shut down schools or replace headmasters unilaterally. For convenience, I will assume that the state can make ex post take-it-or-leave-it offers to principals, and can therefore extract all surplus from principals, so principals

⁴Schools which seek to attract students more than some minimum distance away from the official ideology will incur the ε cost of deviating from the official ideology, but schools that wish to attract students within a narrow band around the official ideology will not find it worthwhile to make this investment.

have no incentive to invest at all in either ideology or pedagogy. Thus, public schools will set $I = 0$ and will teach the ideology of the median voter.

This model is similar to that of ? in that weak incentives created by government control may sometimes be preferable to strong incentives created by private control. This model differs from that of ? in that incentives to please citizens individually may differ from incentives to please the population as a whole.⁵

2 Dynamics of Ideology

This section examines the dynamics of the distribution of ideology under vouchers and public schools. We consider the case in which ϵ approaches zero, so all schools teach the preferred ideology of the parents, even if this is only slightly different than the ideology of the median voter.

2.1 Definitions

We represent ideology by numbers on the real line. Denote the ideology of a generic adult agent in period t by x_t . The distribution of ideology at time t is given by its cdf $F_t(y)$, where we use y to index the ideology distribution. We make no assumption about $F_t(y)$ at this time except that it is symmetric. We show below that given the optimal choice function of parents, the symmetry of the distribution is preserved over time, as is its mean.

We assume that children's ideology equals a linear combination of the ideology of their parents, the mean ideology in the population, and their school's ideology, plus a symmetrically distributed stochastic disturbance. Denote the ideology of the school of a person who becomes adult in period $t + 1$ as s_{t+1} . The mean of the distribution at time t is denoted by $\mu_t =$

⁵Under this model, school choice would not lead to ideological dispersion if incentives for schools to attract students were smaller than the cost ϵ of deviating from official ideological requirements. A voucher system could presumably be designed in which schools had only weak incentives to attract students. Although schools would not have strong incentives to improve pedagogy either, students would still tend to choose to attend better schools, and hence the average student would attend a better school than if all students were assigned to schools. However, it might be difficult to provide the optimal level of support per student while keeping incentives to attract additional students modest. Moreover, if schools differ in the cost of providing education, low-cost providers will always have strong incentives to attract additional students.

$\int_{-\infty}^{\infty} y dF_t(y)$. The stochastic component is denoted by ε_{t+1} . Thus,

$$x_{t+1} = \alpha x_t + \beta s_{t+1} + \gamma \mu_t + \varepsilon_{t+1},$$

where $\alpha + \beta + \gamma = 1$.⁶

In each period, every adult interacts with one or more other adults randomly drawn from the population. We assume that it is costly for agents to interact with others with different ideologies. The cost to each interacting party is quadratic in the ideological difference between them. The expected cost of interaction when the distribution is $F_t(y)$ is given by $E_y [(x_t - y)^2 | F_t(y)]$.

Adults also interact with their children, and bear a cost that is quadratic in the ideological difference between them and their children. This cost is incurred by parents only and is given by $E [(x_t - x_{t+1})^2 | x_t]$. The term under the expectation operator is random because it contains the idiosyncratic disturbance ε_{t+1} .

Denote the weight adults put on their interactions with other adults as ψ and the weight they put on their interactions with their children as $1 - \psi$, where $0 < \psi < 1$. Then the instantaneous felicity at any moment t is given by $-\psi E [(x_t - x_{t+1})^2 | x_t] - (1 - \psi) E_y [(x_t - y)^2 | F_t(y)]$. The welfare of the dynasty then is the discounted sum of expected felicities from “now” to infinity.

2.2 Optimal Choice of School Under Vouchers: The Case of a Symmetric Distribution of Ideology

Consider the case of school vouchers. Under free entry there will exist schools teaching every possible ideology. Parents will thus effectively have a choice of ideology for their children.

⁶The sum of these three components could be different from unity. In this case there would be an exogenous trend toward either greater ideological uniformity or greater dispersion. We choose to consider only the benchmark case, but the relevant instances of the two other cases could be analyzed in an essentially similar manner.

2.2.1 Determination of Children's Ideology

We assume that adults choose schools to maximize discounted dynastic welfare⁷:

$$\begin{aligned} \max_{\{s_{t+k}\}_{k=1}^{\infty}} \quad & \sum_{k=0}^{\infty} \rho^k \left(-\psi E \left[(x_{t+k} - x_{t+k+1})^2 \mid x_{t+k} \right] \right. \\ & \left. - (1 - \psi) E_y \left[(x_{t+k} - y)^2 \mid F_t(y) \right] \right) \\ \text{s.t.} \quad & x_{t+k+1} = \alpha x_{t+k} + \beta s_{t+k+1} + \gamma \mu_{t+k} + \varepsilon_{t+k+1}, \quad \varepsilon_{t+k+1} \sim I(0, \sigma_{\varepsilon}^2) \end{aligned} \quad (1)$$

where the stochastic terms ε_{t+1} are independent both across time and across agents, and ρ is a discount factor.

Here $(x_{t+k} - x_{t+k+1})^2$ is the term representing the cost of interaction with children. $E_y (x_t - y)^2$ stands for the cost of interacting within the society for an adult with ideology x_t in time t , and the expectation is taken over the contemporaneous ideology distribution $F_t(y)$. Adult agents cannot control their own cost, nor the distribution parameters. Expanding this expression, we get $E_y [(x_t - y)^2 \mid x_t] = x_t^2 - 2x_t\mu_t + \mu_t^2 + \sigma_x^2(t)$, where $\sigma_x^2(t) = \int_{-\infty}^{\infty} y^2 dF_t(y)$.

As discussed in section 1.2, voucher schools will generically have pedagogical benefits over the public schools. We assume that the utility function is additively separable in these benefits, so there will be an additional term p in the instantaneous utility function of the agents attributable to these benefits. Summing up these benefits for all future generation with appropriate discounting would give us a fixed term $P = \frac{p}{1-\rho}$ in the welfare expression of a dynasty. Since these benefits arise equally at all voucher schools, they do not influence the choice of schools.

In formulation (1) an agent chooses over the path of school ideology for the entire future dynasty. Note that the distribution $F_t(y)$ varies over time, and the rational agent takes that into account. A pagan forbearer foresees that his remote scions will choose between Zen and Maoism. This distribution is not exogenous; it is shaped by private decisions period after period. For ease of analysis we reformulate the problem in terms of the value function, using notation $\tilde{x}_{t+1} = Ex_{t+1}$, so $x_{t+1} = \tilde{x}_{t+1} + \varepsilon_{t+1}$:

$$\begin{aligned} U_t(x_t) &= \max_{s_{t+1} \in \mathbb{R}} \left\{ -\psi E(x_t - \tilde{x}_{t+1} - \varepsilon_{t+1})^2 \right. \\ &\quad \left. - (1 - \psi) [x_t^2 - 2x_t\mu_t + \mu_t^2 + \sigma_x^2(t)] + \rho EU_{t+1}(\tilde{x}_{t+1} + \varepsilon_{t+1}) \right\} + P \\ \text{s.t.} \quad \tilde{x}_{t+1} &= \alpha x_t + \beta s_{t+1} + \gamma \mu_t, \quad \varepsilon_{t+1} \sim I(0, \sigma_{\varepsilon}^2) \end{aligned} \quad (2)$$

⁷Individual indices are suppressed.

The last component in the curly brackets represents the altruistic concern of parents for their offspring, and the F_t as an argument in the value function expresses its possible dependence on the current ideology distribution. Implicit in this value function are expectations of future ideology distributions. We treat them according to the Nash paradigm: in equilibrium, expectations must be self-fulfilling.

Under a voucher system, parents can choose a school anywhere in the ideological spectrum. In order to find the optimal choice, we use the method of undetermined coefficients and conjecture the form of the value function as⁸:

$$U_t(x_t) = ax_t^2 + cx_t\mu_t + d\mu_t + e\mu_t^2 + f\sigma_x^2(t) + g\sigma_\varepsilon^2 + \text{const.} \quad (3)$$

Using this conjectured $U(\cdot)$, we follow the utility maximization of a parent with ideology x_t . We obtain the sufficient first and second order conditions of the maximum in terms of the target level of x_{t+1} , \tilde{x}_{t+1} :

$$\begin{aligned} 2(a\rho - \psi)\tilde{x}_{t+1} + 2\psi x_t + c\rho\mu_{t+1} &= 0 \text{ (FOC),} \\ \text{and } a\rho - \psi &< 0 \text{ (SOC).} \end{aligned}$$

The target⁹ level of x_{t+1} , $\tilde{x}_{t+1} = \frac{\psi}{\psi - a\rho}x_t + \frac{c\rho}{2(\psi - a\rho)}\mu_{t+1}$, or, defining $\theta = \frac{\psi}{\psi - a\rho}$,

$$\tilde{x}_{t+1} = \theta \left(x_t + \frac{c\rho}{2\psi}\mu_{t+1} \right).$$

(This can be equivalently restated in terms of school choice s_{t+1} .) By virtue of this representation, one can think of parents as directly choosing the ideology of their offspring, and of $\theta = \frac{\psi}{\psi - a\rho}$ as the inheritance parameter.

Note that the individual best response depends on the value that the future mean of the ideology distribution takes in a Nash equilibrium. This value is however, fully determined by the choice of agents as a whole:

$$\mu_{t+1} = E\tilde{x}_{t+1} = \theta Ex_t + \theta \frac{c\rho}{2\psi}\mu_{t+1} = \frac{2\psi\theta}{2\psi - \theta c\rho}\mu_t. \quad (4)$$

⁸Only x_t is shown as an explicit argument to emphasize that this is the only choice variable.

⁹Of course, x_{t+1} is a random variable.

We substitute the expression for optimal \tilde{x}_{t+1} back into the value function to get the identities characterizing the undetermined coefficients. The expressions for the coefficients of the value function $U(\cdot)$ are derived in appendix A. The policy function of a parent is given by

$$\tilde{x}_{t+1} = \theta \left(x_t + \frac{c\rho}{2\psi} \mu_{t+1} \right), \quad (5)$$

$$\text{where } \theta = \frac{\rho + \psi - \sqrt{(\rho + \psi)^2 - 4\rho\psi^2}}{2\rho\psi} < 1,$$

$$c = \frac{2\psi(1 - \theta)}{\theta\rho}.$$

Another property of the best response is that it is, in fact, mean-neutral. Therefore, $\mu_{t+1} \equiv \mu_t$, and so we are able to make a normalization $\mu_t \equiv 0$ in what follows. After this simplification, the optimal choice of schools generates a convenient autoregressive process for ideology: $x_{t+1} = \theta x_t + \varepsilon_{t+1}$.

2.2.2 Dynamics of the ideology distribution

For any agent in period $t + 1$, $x_{t+1} = \theta x_t + \varepsilon_{t+1}$. The variance of the ideology distribution then evolves according to

$$\sigma_x^2(t + 1) = E(\theta x_t + \varepsilon_{t+1})^2 = \theta^2 \sigma_x^2(t) + \sigma_\varepsilon^2. \quad (6)$$

2.2.3 Comparative statics of the inheritance parameter

From (22) the inheritance parameter θ is a function of ρ and ψ . Partial derivatives of θ are $\frac{\partial\theta}{\partial\rho} < 0$ ¹⁰ and $\frac{\partial\theta}{\partial\psi} > 0$ ¹¹.

¹⁰

$$\frac{\partial\theta}{\partial\rho} = -\frac{\psi(1 - \theta)}{\rho(\rho + \psi - 2\theta\rho\psi)} < 0$$

¹¹

$$\frac{\partial\theta}{\partial\psi} = \frac{\theta\rho}{\psi(\rho + \psi - 2\theta\rho\psi)} > 0$$

Note that θ does not depend at all on α , β , or γ , the relative importance of parents, the general population, and schools in influencing children's ideology. This is because parents can and will neutralize the effect of society in automatically bringing their children closer to the mean ideology by choosing appropriate schools for their children. This result is analogous to that found earlier by [?].

A lower discount rate (higher ρ) raises parents' concern about their children's utility, making the proximity of their children's ideology to the mean ideology more valuable. Higher costs of interacting with children, ψ , make parents more willing to hold their children's ideology closer to their own.

2.3 Dynamics of Ideology with Public schools

For now we will simply assume that under public school system, all schools teach the ideology of the median voter, zero. Below we establish conditions under which this maximizes social welfare subject to the unobservability of parental ideology. If all schools teach the ideology of the median voter, the inheritance parameter is equal to α : $x_{t+1} = \alpha x_t + \varepsilon_{t+1}$ and the evolution of the ideology distribution is

$$\sigma_x^2(t+1) = E(\alpha x_t + \varepsilon_{t+1})^2 = \alpha^2 \sigma_x^2(t) + \sigma_\varepsilon^2. \quad (7)$$

2.4 Social welfare

2.4.1 Discounted aggregate welfare on the transition path with vouchers

Referring back to equation (2), denote the aggregate instantaneous cost¹² of interaction with others by C_{str} , and the aggregate instantaneous cost of interaction with children by C_{chi} . At period t , with the inheritance parameter

¹²The aggregation in our context is the integration of a variable over the entire distribution of ideology. Implicitly, we make interpersonal utility comparisons, assuming equal weights. In the rest of subsection 2.4 we will be dealing solely with the aggregates.

θ given by the voucher system,

$$\begin{aligned}
C_{str} &= \int_{-\infty}^{\infty} [x_t^2 + \sigma_x^2(t)] dF_t = 2\sigma_x^2(t), \\
C_{chi} &= \int_{-\infty}^{\infty} E(x_t - x_{t+1})^2 dF_t = \int_{-\infty}^{\infty} E[x_t - \theta x_t - \varepsilon_{t+1}]^2 dF_t = (1 - \theta)^2 \sigma_x^2(t) + \sigma_\varepsilon^2
\end{aligned} \tag{8}$$

It is appropriate to introduce some new notation here. Denote the initial variance of ideology $\sigma_x^2(0)$ as δ^2 . Fixing arbitrary δ^2 , consider the subsequent path of the population under vouchers. Starting at time 0, the inheritance parameter is θ . Using (8), at any point in time the instantaneous utility is given by

$$\begin{aligned}
W_t &= -((1 - \psi) 2\sigma_x^2(t) + \psi(1 - \theta)^2 \sigma_x^2(t) + \psi\sigma_\varepsilon^2) \\
&= -(2 - \psi + \psi\theta^2 - 2\psi\theta) \sigma_x^2(t) - \psi\sigma_\varepsilon^2
\end{aligned}$$

The former component is linear in the (non-constant) variance of the ideology distribution out of steady state $\sigma_x^2(t)$. The coefficient is $\eta = 2 - \psi + \psi\theta^2 - 2\psi\theta$. The evolution of $\sigma_x^2(t)$ is given recursively by

$$\sigma_x^2(t + 1) = E x_{t+1}^2 = E(\theta x_t + \varepsilon_{t+1})^2 = \theta^2 \sigma_x^2(t) + \sigma_\varepsilon^2.$$

Solving this simple difference equation,

$$\sigma_x^2(t) = \delta^2 \theta^{2t} + \frac{1 - \theta^{2t}}{1 - \theta^2} \sigma_\varepsilon^2 \tag{9}$$

Thus, the discounted welfare on the transition path is:

$$\begin{aligned}
U_{vouchers} &= \sum_{t=0}^{\infty} \rho^t W_t = - \sum_{t=0}^{\infty} \eta \rho^t \left(\delta^2 \theta^{2t} + \frac{1 - \theta^{2t}}{1 - \theta^2} \sigma_\varepsilon^2 \right) - \sum_{t=0}^{\infty} \rho^t \psi \sigma_\varepsilon^2 + (R0) \\
&= - \frac{\eta}{1 - \rho \theta^2} \left(\delta^2 + \frac{\sigma_\varepsilon^2 \rho}{1 - \rho} \right) - \frac{\psi \sigma_\varepsilon^2}{1 - \rho} + P.
\end{aligned}$$

2.4.2 Discounted aggregate welfare on the transition path with public schools

Again start with an arbitrary variance of ideology $\sigma_x^2(0) = \delta^2$ and consider the subsequent path of ideology in the population, this time under public

schools. The inheritance parameter is α . Using the result (10) above and substituting α we obtain the expression for the discounted welfare with public schools (note that there is no P term):

$$U_{public} = -\frac{\eta}{1-\rho\alpha^2} \left(\delta^2 + \frac{\sigma_\varepsilon^2 \rho}{1-\rho} \right) - \frac{\psi \sigma_\varepsilon^2}{1-\rho}. \quad (11)$$

2.4.3 Aggregate welfare comparison

The difference between the expressions in (10) and (11) is

$$\begin{aligned} \Delta &= U_{public} - U_{vouchers} = \left(\frac{\eta}{1-\rho\theta^2} - \frac{\eta}{1-\rho\alpha^2} \right) \left(\delta^2 + \frac{\sigma_\varepsilon^2 \rho}{1-\rho} \right) - P \\ &= \rho\eta \frac{\theta^2 - \alpha^2}{(1-\rho\theta^2)(1-\rho\alpha^2)} \left(\delta^2 + \frac{\sigma_\varepsilon^2 \rho}{1-\rho} \right) - P \end{aligned} \quad (12)$$

Recall that

$$\begin{aligned} \eta &= (1-\psi) + 1 - 2\psi\theta + \psi\theta^2 > (1-\psi) + 1 - 2\psi\theta + \psi^2\theta^2 \\ &= (1-\psi) + (1-\psi\theta)^2 > 0. \end{aligned}$$

Therefore, for $P = 0$ or small Δ in (12) is positive whenever $\theta > \alpha$. There is no ambiguity here: whenever the privately optimal ideology inheritance parameter is greater than α , vouchers produce an inferior intertemporal ideological structure. This can be mitigated by the additional pedagogical benefits of voucher schools, as (12) shows.

Empirically, mapping the reality onto our stylized model, there is a strong presumption that θ is indeed greater than α , otherwise parents would be observed sending their children to the schools of the opposite ideological camp. We will indeed assume $\theta > \alpha$ in what follows.

2.4.4 First best

Reconsidering expressions for social welfare along an arbitrary transition path (10) and (11) we note that they essentially depend (monotonically) on the extent to which children inherit the ideology of their parents, θ in the former, and α in the latter case. Thus in the model, it would be socially optimal to take all children to the ideological mean in expectation: $x_{t+1} = \varepsilon_{t+1}$

(zero inheritance parameter). This could only be achieved either by complete alienation of children from their parents at birth¹³, or by introducing family-specific education: sending children to the school exactly offsetting their parents' influence. The latter option is infeasible if parents' ideology is unobservable. Thus, another way to characterize public education is as a feasible second-best solution to the social welfare maximization problem subject to the unobservability of parents' beliefs.

2.5 Coalitions

2.5.1 Cut-off level

This section argues that people towards the center of ideological distribution will tend to favor public schools, while those at the extremes will favor vouchers. As discussed in subsection 3.3, in the current U.S. debate over vouchers, people further away from the political center seem more supportive of vouchers. Start in period 0 and consider the expected utility of an adult of type x_0 , given today's distribution of ideology with variance $\sigma_x^2(0) = \delta^2$, under the alternative education systems with or without vouchers. Using the results of subsections 2.2 and 2.3, we summarize the dynamics of ideology¹⁴ of the dynasty and of the variance $\sigma_x^2(t)$:

| Vouchers | Public education |
|--|--|
| $x_t = \theta^t x_0$ | $x_t = \alpha^t x_0$ |
| $\sigma_x^2(t) = \delta^2 \theta^{2t} + \frac{1-\theta^{2t}}{1-\theta^2} \sigma_\varepsilon^2$ | $\sigma_x^2(t) = \delta^2 \alpha^{2t} + \frac{1-\alpha^{2t}}{1-\alpha^2} \sigma_\varepsilon^2$ |

Start with the voucher system. In parallel to the equations (8) of subsection 2.4, express the **individual** costs of a dynasty head at time t :

$$\begin{aligned} C_{str} &= x_t^2 + \sigma_x^2(t), \\ C_{chi} &= E(x_t - x_{t+1})^2 = (1 - \theta)^2 x_t^2 + \sigma_\varepsilon^2 \end{aligned} \tag{13}$$

¹³In Russia, young children of certain nomad tribes of Siberia are sent to boarding schools for most of the year while their families are migrating over large distances. Presumably, at least a part of the purpose is to bring these nationalities closer to the main-stream.

¹⁴We regard future x_{t+1} as deterministic under certainty equivalence.

At any time the negative of instantaneous utility is given by

$$\begin{aligned} -W_t &= \psi \left((1 - \theta)^2 x_t^2 + \sigma_\varepsilon^2 \right) + (1 - \psi) \left(x_t^2 + \sigma_x^2(t) \right) \\ &= (1 - \psi (2\theta - \theta^2)) \theta^{2t} x_0^2 + \left(\psi + (1 - \psi) \frac{1 - \theta^{2t}}{1 - \theta^2} \right) \sigma_\varepsilon^2 + (1 - \psi) \delta^2 \theta^{2t} \end{aligned}$$

We can compute intertemporal welfare at time 0, summing discounted W_t to infinity and adding the extra benefit of improved school quality P :

$$\begin{aligned} U_{voucher}(x_0) &= \sum_{t=0}^{\infty} \rho^t W_t + P \\ &= P - \frac{(\rho + \psi - \rho\psi(1 + \theta^2)) \sigma_\varepsilon^2}{(1 - \rho)(1 - \rho\theta^2)} - \frac{(1 - \theta\psi(2 - \theta)) x_0^2 + (1 - \psi) \delta^2}{1 - \rho\theta^2} \end{aligned} \quad (14)$$

Analogously,

$$U_{public}(x_0) = -\frac{(\psi + \rho - \rho\psi(1 + \alpha^2)) \sigma_\varepsilon^2}{(1 - \rho)(1 - \rho\alpha^2)} - \frac{(1 - \psi\alpha(2 - \alpha)) x_0^2 + (1 - \psi) \delta^2}{1 - \rho\alpha^2}. \quad (15)$$

For fixed δ^2 , compare the dynastic welfare under voucher and public education:

$$\begin{aligned} G &\doteq U_{public}(x_0) - U_{vouchers}(x_0) \\ &= \frac{\theta - \alpha}{(1 - \rho\theta^2)(1 - \rho\alpha^2)} \left(\frac{(\theta + \alpha) \rho^2 \sigma_\varepsilon^2}{(1 - \rho)} + (1 - \psi)(\theta + \alpha) \rho \delta^2 + \lambda x_0^2 \right) - P \end{aligned} \quad (16)$$

where $\lambda = (\theta + \alpha)(\rho + \psi) - 2\psi(1 + \theta\alpha\rho)$. By a simple optimality argument it follows that λ must be negative¹⁵. Hence, for any fixed initial variance δ^2 this difference is decreasing in x_0^2 .

¹⁵Suppose for a moment that the government issued a sole school voucher and gave it to some individual i . Consider i 's maximization problem (1) under $P = 0$. Since the rest of the population is schooled in public schools, the ideology variance evolves according to (6). However, the optimal θ is independent of this evolution and given by (5).

Suppose this sole voucher is taken away from person i . Obviously, the discounted welfare of that person must weakly fall. Comparing the expressions (14) and (15), we see that the only difference is in the term containing x_0^2 : $\frac{(1 - \psi(2\theta - \theta^2)) x_0^2}{1 - \rho\theta^2}$. Therefore, $\forall x_0$,

$$U_{public} - U_{voucher} = \frac{(1 - \psi(2\theta - \theta^2)) x_0^2}{1 - \rho\theta^2} - \frac{(1 - \psi(2\alpha - \alpha^2)) x_0^2}{1 - \rho\alpha^2} < 0.$$

But this implies $\lambda = (\theta + \alpha)(\rho + \psi) - 2\psi(1 + \theta\alpha\rho) < 0$.

Now, consider personally his majesty the median voter. It may be the case that $U_{public}(0) - U_{vouchers}(0) < 0$. In this case the society unanimously prefers a voucher system, since the difference in welfare G is symmetric in x_0 and falling in $|x_0|$. For the same reason, if $U_{public}(0) - U_{vouchers}(0) > 0$, there exists a threshold value of $|x_0|$, such that all agents who in period 0 are more extreme, will prefer voucher system¹⁶. This cut-off level is characterized by

$$\tilde{x}^2(\sigma_\varepsilon^2, \delta^2) = P \frac{(1 - \rho\alpha^2)(1 - \rho\theta^2)}{(\theta - \alpha)\lambda} - \frac{\rho(\theta + \alpha)}{\lambda(1 - \rho)} [\sigma_\varepsilon^2 \rho + \delta^2(1 - \rho)(1 - \psi)]. \quad (17)$$

Whenever this expression is positive, it defines two coalitions of agents who prefer vouchers and public education, respectively. If, however, it is negative, all agents prefer private education because its pedagogical benefits outweigh the ideological advantages of public education, even for the median voter who would otherwise control the ideology of the entire population.

2.5.2 Popular vote

Assuming that cut-off level in (17) exists, people with extreme ideological beliefs will face the largest losses from having their children taught in public schools. The model predicts that if publicly-provided education is not mandatory, such people will be willing to pay for a private education for their children. In order to find the total vote of the agents preferring public schools, assume that the initial distribution of the ideology is Gaussian, as are the stochastic disturbances ε . Then ideology will be normally distributed at any point in time. Integrating over the real line gives the pro-public education vote

$$\begin{aligned} V_{public} &= \frac{1}{\sqrt{2\pi}\delta^2} \int_{-\tilde{x}(\sigma_\varepsilon^2, \delta^2)}^{\tilde{x}(\sigma_\varepsilon^2, \delta^2)} f\left(\frac{x}{\delta}\right) dx \\ &= 2F\left(\sqrt{P \frac{(1 - \rho\alpha^2)(1 - \rho\theta^2)}{(\theta - \alpha)\lambda\delta^2} - \frac{\rho(\theta + \alpha)}{(1 - \rho)\lambda} \left[\frac{\sigma_\varepsilon^2}{\delta^2}\rho + (1 - \rho)(1 - \psi)\right]}\right) - 1 \end{aligned} \quad (18)$$

¹⁶We know from subsection 2.4 that for zero or small pedagogic benefits P , the aggregate welfare under public education is higher. Then it must be the case that $U_{public}(0) > U_{vouchers}(0)$.

where $f(\cdot)$ and $F(\cdot)$ are pdf and cdf of the standard normal distribution, respectively¹⁷. Omitting the radicand, we write

$$\frac{\partial V_{public}}{\partial \delta} = \frac{2f(\sqrt{\dots})}{\lambda \delta^3 \sqrt{\dots}} \left(\frac{\sigma_\varepsilon^2 \rho^2 (\theta + \alpha)}{(1 - \rho)} - P \frac{(1 - \rho \alpha^2) (1 - \rho \theta^2)}{(\theta - \alpha)} \right). \quad (19)$$

This expression may be of either sign¹⁸. However for small enough values of P (or $P = 0$) this is negative. In this case, increasing ideological dispersion reduces the size of this coalition supporting public education. However, $\frac{\partial \bar{x}^2(\sigma_\varepsilon^2, \delta^2)}{\partial \delta} = -\frac{2\rho\delta(\theta+\alpha)(1-\psi)}{\lambda} > 0$. When ideological variance increases, while people with more and more extreme ideology turn to support public education, their number will actually decline, as the tails of the distribution become thicker. This may explain why the social welfare gain from public education increases with initial dispersion, moving in opposite direction with the size of the coalitions supporting public education.

When P is large, however, the dispersion does not grow as fast as to offset farther off agents switching to support public education, so the vote for public education actually rises with δ^2 . However, one can speculate that a different choice of distribution function of stochastic component ε might lead to different results regarding the sign of $\frac{\partial}{\partial \delta} V_{public}$. Thus, this sign is not generally robust. For a normal distribution, though, increases in initial ideological dispersion increase support for public education if P is large, and reduce support if P is small.

Straightforward observation shows that increasing uncertainty about children's ideology due to higher σ_ε^2 leads more people to support public education.

It is not clear whether positive predictions about the existence of voucher versus public system should be based on aggregate welfare comparisons or on the proportion of agents preferring a voucher system. If agents vote on each issue separately, then the preferences of the majority of agents will determine public policy. On the other hand, if political candidates or parties

¹⁷It may seem that the vote in favor of public education is related to the social welfare gap, i.e. that it should be unequivocally be greater than 1/2. This is not true. In fact, considering expressions (12) and (18) at the limit when δ^2 tends to infinity, we may construct cases when $\lim_{\delta \rightarrow \infty} \Delta(\delta) = +\infty$, and $\lim_{\delta \rightarrow \infty} V_{public}(\delta) \ll 1/2$.

¹⁸because we should consider all cases where \tilde{x}_0^2 is well defined, and these do not preclude the expression in parentheses in (19) from being positive.

propose packages of policies, and citizens vote over these packages, perhaps it makes more sense to think that the education system will be chosen which maximizes social welfare.

2.5.3 Effect of the discount rate on the support for public education

One can also assess how the support of public education varies with the discount rate: the pro-public vote is monotone function of the threshold level \tilde{x} . The latter, in turn, is a solution to $G(\rho, \theta(\rho), x_0) \doteq U_{public} - U_{vouchers} = 0$. By the implicit function theorem, $\frac{d\tilde{x}}{d\rho} = -\frac{dG}{d\rho} / \frac{\partial G}{\partial \tilde{x}}$.¹⁹ We already noted in a comment to equation (16) that G is decreasing in \tilde{x} , so $\frac{\partial G}{\partial \tilde{x}} < 0$. Consider $\frac{dG}{d\rho}$. Even though $G = G(\rho, \theta(\rho), x_0)$, we do not need to consider how θ varies with ρ . To see this, recall that the dynasty head maximizes $U_{vouchers}$ with respect to the whole path of school parameters, which results in an optimally chosen inheritance parameter θ . Therefore, $U_{vouchers}(\rho, \theta(\rho)) = \max_{\omega} \{U_{vouchers}(\rho, \omega)\}$. At the same time, U_{public} is independent of θ . Therefore, $G(\rho, \theta(\rho)) = \min_{\omega} \{U_{public}(\rho) - U_{vouchers}(\rho, \omega)\}$. Using the envelope theorem, we obtain $\frac{dG}{d\rho} = \frac{\partial G}{\partial \rho}$.

For simplicity, let us first concentrate on the ideological aspect of welfare ignoring the valuation of pedagogic benefits. In equation (16) the fraction standing outside of the parentheses is increasing in ρ . For the expression within the parentheses, \tilde{G} , computing the derivative is easy. Recalling the expression for λ (2.5.1), we find

$$\begin{aligned} \frac{\partial \tilde{G}}{\partial \rho} &= (\theta - \alpha)(\theta + \alpha) \left(2\rho \frac{\sigma^2}{1 - \rho} + \rho^2 \frac{\sigma^2}{(1 - \rho)^2} + (1 - \psi) \delta^2 \right) \\ &\quad + \tilde{x}^2 (\theta - \alpha)(\theta + \alpha - 2\theta\psi\alpha). \end{aligned}$$

This is the component of the derivative $\frac{\partial G}{\partial \rho}$ associated with the former term in (16) and it is obviously positive. The latter term is simply $-P = -\frac{p}{1-\rho}$. Obviously, $\frac{d(-P)}{d\rho} = -\frac{p}{(1-\rho)^2}$. Thus there are two effects of a decrease in the discount rate on G : and consequently the sign of $\frac{d\tilde{x}}{d\rho} = -\frac{dG}{d\rho} / \frac{\partial G}{\partial \tilde{x}}$ is in general

¹⁹The reason we use notation $\frac{dG}{d\rho}$ is that we want to emphasize the dependence of θ on ρ : $\theta = \theta(\rho)$. By the chain rule, $\frac{dG}{d\rho} = \frac{\partial G}{\partial \rho} + \frac{\partial G}{\partial \theta} \frac{d\theta}{d\rho}$.

indeterminate. Since V_{public} is increasing in \tilde{x}^2 , $\frac{d}{d\rho} V_{public} \leq 0$ as well. A lower discount rate (higher ρ) affects the support for public education because dynasty heads place greater weight on the utility of farther-off generations. Insofar as the ideological considerations dominate (if p is small) the support for public education increases. When p is large, the effect is the reverse.

2.6 Multiple equilibria

The results of the preceding subsection suggest that there may exist multiple equilibria in a jurisdiction where majority vote determines the choice of education system. Indeed, if $\frac{\partial V_{public}}{\partial \delta} < 0$, voucher system leads to higher steady-state variance of ideology, which in turn reduces the size of the coalition supporting public education. In the remainder of this subsection we show that multiple equilibria can indeed arise. We assume $P = 0$ as it guarantees $\frac{\partial V_{public}}{\partial \delta} < 0$. By continuity we can be assured of the existence of multiple equilibria when P is positive but small. (If one takes the model seriously, the prevalence of publicly provided education suggests that P cannot be too large, or else we would not observe public education.)

Since the vote $V_{public}(\delta^2)$ is monotone in the variance δ^2 , we need only to check that in the steady states corresponding to either system, the majority indeed supports that regime.

The steady state variances under both regimes are given by:

$$\sigma_{vouchers}^2 = \frac{\sigma_\varepsilon^2}{1 - \theta^2}, \quad \sigma_{public}^2 = \frac{\sigma_\varepsilon^2}{1 - \alpha^2}$$

As $\theta > \alpha$, $\sigma_{vouchers}^2 > \sigma_{public}^2$. Therefore, since $P = 0$, $V_{public}(\sigma_{public}^2) > V_{public}(\sigma_{vouchers}^2)$. Explicitly,

$$V_{public}(\sigma_{vouchers}^2) = 2F\left(\sqrt{\frac{\rho(\theta + \alpha)[1 - \rho\theta^2 - \psi(1 - \rho)]}{\lambda(1 - \rho)}}\right) - 1$$

$$V_{public}(\sigma_{public}^2) = 2F\left(\sqrt{\frac{\rho(\theta + \alpha)[1 - \rho\alpha^2 - \psi(1 - \rho)]}{\lambda(1 - \rho)}}\right) - 1$$

In order to have agents vote in favor of the existing regime, we need that $V_{public}(\sigma_{vouchers}^2) < \frac{1}{2} < V_{public}(\sigma_{public}^2)$, so that in the steady state with vouchers they vote in favor of vouchers, and vice versa.

Taking the following parameter values we obtain the desired inequality:

| | |
|-----------|--------|
| ρ | 0.5 |
| ψ | 0.9 |
| α | 0.15 |
| θ | 0.908 |
| λ | -0.442 |

$$V_{public}(\sigma_{vouchers}^2) = 0.435 < \frac{1}{2} < 0.744 = V_{public}(\sigma_{public}^2).$$

By continuity, there exists a threshold value of $\tilde{\delta}^2$ such that for all greater values of δ^2 , the system will converge to the voucher steady state, while for all lower δ^2 it will converge to the public education steady state.

So far, we have assumed a stark contrast between a public education system completely controlled by the median voter and a voucher system with complete choice. However, it may be possible to form a coalition that would support publicly-provided education by allowing some range of choice of ideology within the public schools. This ensures that voters who are some distance away from the median voter will still support public education. In fact, systems fall between the extremes of pure public system without choice and a pure voucher system. For example, Ontario finances schools operated by a few institutions, such as the Catholic church, without allowing free entry into education. In the United States, schools are locally operated so parents can choose between schools to the extent that moving costs are low.

3 Empirical Evidence

This section reviews evidence suggesting that voucher systems and school choice systems reinforce ideological or cultural splits, but that the cost of this seems to vary across countries. In Israel, school choice has probably reinforced splits between religious and secular Jews, which are an important source of tension, and even violence. In Canada, school choice may have reinforced divisions between French and English speakers, and while it is possible this will lead to the dissolution of the country, it is not clear that this is a terrible outcome. In the Netherlands, school choice has led to religious segmentation of education, and this religious division has permeated many

institutions throughout society, but does not seem to have been particularly costly. In the U.S., school voucher programs have led to at least a few incidents of ideological indoctrination in extremist views.

The evidence also suggests that if there are institutions in society which can be counted on to teach an ideology that is acceptable to the population, then the government can allow these institutions to operate schools even if it cannot allow free entry into the operation of schools. The most obvious candidates are hierarchical churches which can be counted on to provide some ideological uniformity, and which have a bureaucracy in place to control their member schools. This may help explain why many countries, such as France and Canada, have state financed Catholic schools.

3.1 International Evidence on the Ideological Role of Private Education

Evidence from around the world suggests that private schools are chosen in large part for ideological and cultural reasons. ? finds that the percentage of students attending private schools depends much more on ideological, cultural, ethnic and religious divisions than on economic disparities. She examines the share of private education among states and provinces in the U.S., Japan, Holland and India. A regression of the percentage of private education across 11 Dutch provinces had an R^2 of 0.82 with the single independent variable of the proportion of Catholics plus Calvinists in the provincial population. In the United States, the percentage Catholic and Black were by far the most important factors explaining the share of private education across states. James interprets this as indicating a desire for religious homogeneity by Catholics and for racial homogeneity by whites.

Similarly, ? finds that across a sample of 12 industrialized and 38 developing countries, the degree of religious and linguistic heterogeneity is the most important factor explaining variation across countries in the percentage of students attending private schools. James interprets causality as running from heterogeneity to private education, whereas this analysis would suggest that there may be at least some effect in the opposite direction, with private education increasing religious and linguistic heterogeneity. In contrast, measures of income distribution are not significant determinants of private education.

3.2 The Netherlands

School choice in the Netherlands reinforced ideological segregation, but this did not seem to create very costly conflict in Dutch society. As discussed by James [1984]XXX, the right of Catholics to establish schools was severely restricted from the Netherlands' war of independence from Catholic Spain in the 16th century to the French Revolution.²⁰ In the election of 1889, which was fought explicitly over the issue of education, an alliance between Calvinists and Catholics against the official Dutch Reformed Church won a narrow majority. Eventually, this led to support for private religious schools at full parity with state schools.

Groups of as few as 50 parents can set up a school and demand that the state provide them with a building and pay teacher salaries. In practice, however, 95% of the schools are church related. In 1979, 31% of primary pupils attended public schools, 66% attended private religious schools, and only 3% attended secular independent schools.

Although the government regulates private schools' student-faculty ratios, teacher salaries, and ability to fire teachers, schools have considerable ideological freedom. They can choose texts and hire their own teachers, using religion as a hiring criteria. Each denomination runs its own teacher-training colleges.

Table 1, taken from an anthropological study of a Dutch town in the 1950's by [?], shows history texts differ sharply between Catholic, Calvinist, and Dutch Reformed Schools.

James notes that "the extensive reliance on private schools in Holland has reinforced the religious segmentation within society." Dutch society is heavily influenced by the Protestant-Catholic split, with political parties organized by religion, television stations allocated to religious groups, and even soccer clubs organized on a religious basis. However, this does not seem to have had horrible consequences for the Netherlands.

Contrary to the fears of many opponents of school vouchers, Dutch schools are no more stratified by social class than schools in many other European countries. Like many other European countries, there is stratification into academic and non-academic schools in the Netherlands, but this occurs within each denomination (although children of guest workers tend to be concentrated in public schools, and data from the 1950's suggest a slight

²⁰ All information on the role of private education in the Netherlands is taken from James [1984].

tendency for upper class students to attend public schools).

In Israel, there are secular government schools, religious government schools, and private religious schools which receive government support, as well as Arab schools. Fundamentalist Jewish schools educate a substantial minority of the population, and it seems reasonable to think that this has increased political divisions within Israel. Note that because religious voters are the swing voters in Israel's proportional representation system, public support of religious schools has been strong, even though the median voter is not religious.

In Sweden, private education is strongly discouraged for children, but there is a voucher system for adult education. In 1981 there were almost 3,000,000 participants in adult education programs. Adult education is dominated by churches, unions, and political parties, and these institutions take advantage of the subsidies to promote their own ideologies [James, 1989].

Some countries allow religious schools only for a subset of religions. Canada has state-supported Catholic schools in English-speaking provinces, but not Jewish or fundamentalist Protestant schools. In England, the state supports Protestant, Catholic, and Jewish schools, although not at quite the level of public schools. However, applications for state-supported Muslim schools have been denied until recently. Such distinctions would be unconstitutional in the United States.

In 1963, Australia began subsidizing private education, although not at the same level as public education. Initially, restrictions on entry of new schools were modest, and of the new schools opened, one-third were Catholic, one-third were non-denominational or secular, and one-third were affiliated with some other religious community, including many small sects. Many of the small sect schools operated at small levels, were not financially stable, and went out of business after imposing costs on the government.

The government then adopted much more restrictive rules, requiring that new private schools give two years' notice to the government before obtaining subsidies and that during this period they meet minimum enrollment guidelines and show prospects of financial viability. Moreover, priority for new schools was given to those being set up in new suburbs where they would not adversely affect existing schools by drawing away enrollment. James notes that this restriction on entry eliminates many of the benefits of school choice, and sees the restriction on entry as stemming from the desire of existing public and private schools to insulate themselves from competition. However, another interpretation is that restrictions limit the extent to which non-

mainstream ideologies can establish new schools. In fact, as ? notes, “These criteria limit the ability of the system to accommodate minority groups and changing tastes. For example, fundamentalist Christians, Moslems or those espousing a secular Rudolph Steiner pedagogy will now face obstacles if they try to get government support for new schools, particularly if they live in the old established neighborhoods.”

Concomitantly with the introduction of subsidies for private education came the growth of large private bureaucracies for religious schools, first Catholic schools, and later Lutheran and Seventh-Day Adventist schools. About 80 percent of Australian private schools belong to bureaucratic systems. The Australian Schools Commission subsidizes the cost of administration of these systems. Moreover, these systems are represented on the commission which recommends priorities for capital grants to establish new schools. Block grants were made through these bureaucracies, which then had authority to suballocate funds to various schools. These bureaucracies also developed curriculum and trained teachers in in-service courses, thus influencing the content of schools. Such bureaucracies may help standardize ideological instruction.

3.3 United States

Some historians argue that one reason for the growth of public education in the U.S. was the desire to Americanize new immigrants.

In the United States, political support for voucher education has traditionally come from Catholics and Protestant fundamentalists, but recently these groups have made common cause with some African-Americans. For example, in Wisconsin, one of the states where school choice experiments have gone the farthest, the program was the result of an unusual political alliance between a conservative republican governor and a liberal state legislator representing impoverished inner-city Milwaukee. This alliance of groups on the right wing of the Republican party and the left wing of the Democratic party may seem unusual, but makes perfect sense in the context of this model, in which public education is most appealing to moderates, and least appealing to those at the ideological extremes.

This pattern of support for vouchers is mirrored among academic economists working on education. Lott and the team of Bowles and Gintis, who come from the ends of the U.S. ideological spectrum, favor vouchers.

At least some of the recently established charter schools in the United

States seem to be teaching non-mainstream ideology. For example, [?] reports that at Sankofa Shule, an African-centered charter school in Michigan, instead of observing Labor Day, Memorial Day, and Presidents' Day, students observe holidays such as African Independence Day and Malcolm X Remembrance Day. According to the school newsletter, "The traditional concept of Thanksgiving, like the Fourth of July, really has nothing to do with us." A daily affirmation by the entire school begins, "I pledge to my African nation. . ." Contrast this with the Pledge of Allegiance traditionally made in public schools, which stresses the "indivisibility" of the nation.

Heritage Academy Inc., a charter school in Arizona, teaches creationism in its science classes. According to the Arizona Republic (1996), a spokesman for the State Department of Education said the Board for Charter Schools was not likely to take any action "since it had not received complaints about teaching of creationism at this school." Of course, parents who send their children to this school are not likely to complain. Later, this was held to be in violation of the law. When state funding was threatened, the school decided to teach neither creationism nor evolution. However, it is not clear whether this regulation was effective.

The most extreme case comes from Washington, D.C. A white reporter went to write a story on the Marcus Garvey School, an Afrocentric school. The principal had students beat up the reporter [Davis, 1996; Kull, 1996; Miller, 1996; Washington Post, 1996; Wilgoren, 1996].

Of course, there are also cases of non-mainstream ideological indoctrination in public schools. This is not surprising, since local control of education in the U.S. allows parents considerable choice between school systems.

One problem with this theory is that it is not clear why local governments in the United States do not create mini-voucher systems. Most of the costs of any ideological extremism generated by this would be borne by outsiders, since many of the children would leave the school district after being educated. However, the benefits of improved education and of closer ideological links between parents and children will accrue to town residents. One possibility is that if a single school district allowed vouchers on its own, it would attract extremists from all around the country. This might create costs for current residents.

4 Conclusion and Limitations of the Model

One limitation of the model is that we model tendencies toward extremism in voucher schools as coming from the preferences of parents, but in part, they may be due to preferences of teachers with strong ideological beliefs who are willing to subsidize ideological schools by working cheaply. For example, teachers in Catholic schools earn much less than those in public schools. Teachers with stronger ideological beliefs can also work in public schools, but public schools pay sufficient wages that their pool of available teachers will include both ideologically motivated and non-ideologically motivated teachers.

Another reason why it may be difficult to prevent ideological instruction under a voucher system is that the best monitors of ideology may be students and parents, and if students sort into schools by ideology, no one in the school has an incentive to report deviations from the ideology of the median voter.

Although we model people as preferring that others have similar ideologies because ideological differences make interaction more costly, people may also prefer that others have similar ideologies because they want to move the balance of political power in society closer to their ideological preferences. If the distribution of ideology is not the symmetric, continuous distribution assumed in this paper, imposition of ideology by the median voter may seem less innocuous because it affects the mean ideology as well as the dispersion. For example, suppose 70% of the population is Protestant and 30% is Catholic, or 70% is secular and 30% is religious. By having the public school system teach the majority ideology, and not supporting private schools, the majority can either levy a tax on people with ideological beliefs counter to that of the majority or indoctrinate them in an alien ideology.

Another limitation of the model is that we assume that people will regress to the mean of the distribution of ideology of the population as a whole. In reality, regression to the mean may take place only within a subgroup. For example, in Canada much of the regression to the mean may take place within the sets of French and English speakers respectively. If some Canadian schools teach an extreme Quebec nationalism and others teach a very Anglo-oriented history and inculcate antipathy towards French speakers, then it seems likely that regression to the mean would take place within each language group, with radical positions becoming more acceptable among both French and English speakers, rather than regression to the mean taking place towards the mean of the entire Canadian population, with moderate French

and English speakers pulled in opposite directions by the development of extremism on both sides, and therefore not changing their position. This suggests that tendencies toward ideological dispersion under voucher schools may be even stronger than is suggested by the model.

In summary, the analysis suggests that vouchers lead to ideological sorting, but that the cost of this sorting differs across societies. Societies may not be significantly harmed by this sorting if contact across groups is sufficient to restrain extremism, or established hierarchical churches prevent ideological differences from widening indefinitely, or the legal environment allows the state to deny funding to schools merely suspected of advocating non-mainstream views. The U.S. probably does not meet any of these criteria. At a minimum, the analysis suggests that one potential danger of vouchers is that they may breed extremism and separatism, and that introduction of vouchers should be accompanied by careful thought about how voucher schools could be regulated to prevent extremism. One potential method would be requirements for racial and religious diversity among students in voucher schools.

Davis, Marcia. "Two Journalists File Assault Complaints" Washington Post, December 20, 1996: D3.

Kull, Randy. "Creationism Gets Equal Treatment: School Flouts Court, State Law" Arizona Republic, September 30, 1996.

Miller, Bill. "D.C. Charter School Principal Indicted in Clash with Reporter" Washington Post, December 20, 1996: A1.

"The Nasty Marcus Garvey Incident" Washington Post, December 6, 1996: A30.

Wilgoren, Debbi. "Prosecutor to Probe Alleged Assault at D.C. Charter School" Washington Post, December 5, 1996: A26.

Sikkink, Christian and David. "Is Private School Privatizing?" First Things, April 1999, pp. 16-20

Holmes, Mark. Educational Policy for the Pluralist Democracy: The Common School, Choice, and Diversity. Washington, DC: Falmer Press, 1992.

A The solution to the school choice problem

A.0.1 Characterizing a

Substituting the expression for optimal \tilde{x}_{t+1} back into the value function (2), we obtain the identities characterizing the undetermined coefficients²¹:

$$\begin{aligned}
U(x_t) &= -\psi E \left((1 - \theta) x_t - \frac{c\theta\rho}{2\psi} \mu_{t+1} - \varepsilon_{t+1} \right)^2 & (20) \\
&\quad - (1 - \psi) (x_t^2 - 2x_t\mu_t + \mu_t^2 + \sigma_x^2(t)) \\
&\quad + \rho a E \left(\theta x_t + \frac{c\theta\rho}{2\psi} \mu_{t+1} + \varepsilon_{t+1} \right)^2 \\
&\quad + \rho c E \left[\left(\theta x_t + \frac{c\theta\rho}{2\psi} \mu_{t+1} + \varepsilon_{t+1} \right) \mu_{t+1} \right] \\
&\quad + \rho d \mu_{t+1} + \rho e \mu_{t+1}^2 + \rho f \sigma_x^2(t+1) + \rho g \sigma_\varepsilon^2 \\
&\equiv a x_t^2 + c x_t \mu_t + d \mu_t + e \mu_t^2 + f \sigma_x^2(t) + g \sigma_\varepsilon^2
\end{aligned}$$

²¹Note that we do not use expectation operators in the terms $\rho d \mu_{t+1} + \rho e \mu_{t+1}^2 + \rho f \sigma_x^2(t+1)$ as if they were deterministic as in fact they are given the best response strategies of agents.

To describe the optimal choice we need the conditions on a and c . Collect coefficients at all quadratic terms x_t^2 in (20) to get:

$$-\psi(1-\theta)^2 x_t^2 - (1-\psi)x_t^2 + \rho a \theta^2 x_t^2 \equiv a x_t^2.$$

This must hold for all x_t^2 . Hence, $\rho a \theta^2 - \psi(1-\theta)^2 - (1-\psi) = a$. Recalling that $\theta = \frac{\psi}{\psi - a\rho}$, we find two roots of this equation:

$$a_{1,2} = \frac{\psi - \rho \pm \sqrt{(\psi - \rho)^2 + 4\rho\psi(1-\psi)}}{2\rho} \geq 0. \quad (21)$$

One of the roots is positive, another is negative. The corresponding ideology inheritance parameter is

$$\theta_{1,2} = \frac{\rho + \psi \pm \sqrt{(\rho + \psi)^2 - 4\rho\psi^2}}{2\rho\psi} \geq 1. \quad (22)$$

A simple check shows that both solutions to (21) satisfy the second order conditions of the maximization problem in the functional form (2). However, only $a_2 < 0$ and $\theta_2 < 1$ maximize the discounted dynastic utility (1). This can be seen by comparing (2) and (1). Assuming that $a_1 > 0$ is optimal, the value function $U(\cdot)$ increases in $|x_t|$, but both components of the instantaneous utility are decreasing in $|x_t|$, for all generations. Hence, the infinite sum must also be decreasing in $|x_t|$.

A.0.2 Characterizing c

Now collect coefficients at all product terms $x_t \mu_t$ and $x_t \mu_{t+1}$ to get:

$$c\rho(1-\theta)\theta x_t \mu_{t+1} + 2(1-\psi)x_t \mu_t + \frac{ac\rho^2\theta^2}{\psi} x_t \mu_{t+1} + \rho c \theta x_t \mu_{t+1} \equiv c x_t \mu_t. \quad (23)$$

Using $\mu_{t+1} = \frac{2\psi\theta}{2\psi - \theta c\rho} \mu_t$ from (4), this becomes

$$\frac{2c\rho\theta^2}{2\psi - \theta c\rho} [2\psi - \theta\psi + a\rho\theta] + 2(1-\psi) = c \quad (24)$$

The roots are: $\begin{cases} c_1 = \frac{2\psi(1-\theta)}{\theta\rho} \\ c_2 = 2\psi\frac{1-\theta\rho}{\theta\rho} \end{cases}$.

A.0.3 Characterizing e

How do we know which c_j defines a consistent Nash equilibrium? We check another equality that has to hold as identity collecting coefficients at all terms μ_t^2 in (20):

$$-\psi \frac{c^2 \theta^2 \rho^2}{4\psi^2} \mu_{t+1}^2 - (1 - \psi) \mu_t^2 + \rho a \left(\frac{c\theta\rho}{2\psi} \right)^2 \mu_{t+1}^2 + \rho c \frac{c\theta\rho}{2\psi} \mu_{t+1}^2 + \rho e \mu_{t+1}^2 = e \mu_t^2$$

Using $\mu_{t+1} = \frac{2\psi\theta}{2\psi - \theta c\rho} \mu_t$ from (4), this becomes

$$\left(-\psi \frac{c^2 \theta^2 \rho^2}{4\psi^2} + \rho a \left(\frac{c\theta\rho}{2\psi} \right)^2 + \rho c \frac{c\theta\rho}{2\psi} + \rho e \right) \frac{2\psi\theta}{2\psi - \theta c\rho} - (1 - \psi) = e \quad (25)$$

For $c_1 = \frac{2\psi(1-\theta)}{\theta\rho}$, the solution for (25) exists and is given by $e = \frac{\psi - \theta - \psi\theta(1-\theta)}{\theta(1-\rho)}$. In contrast, for $c_2 = 2\psi \frac{1-\theta\rho}{\theta\rho}$, e term in (25) cancels out, and we are left with a false identity: $\frac{\psi - \psi\theta\rho + \psi\theta^2\rho^2 - \theta\rho}{\theta\rho} = 0$. Thus, only c_1 is valid.

Now we check if the ideology evolution is mean-neutral. Substituting expression for c_1 into (4), we find that $\mu_{t+1} = \frac{2\psi\theta}{2\psi - \theta c\rho} \mu_t \equiv \mu_t$. So, the mean ideology is indeed constant conforming to our intuition.

A.0.4 Consistency

To check for the consistency of our conjecture (3) we write down the remaining identities from (20) for coefficients d , f , and g , using (6)²²:

$$\begin{cases} \rho d \mu_{t+1} = d \mu_t \\ (-\psi + \rho a + \rho f) (\theta^2 \sigma_x^2(t) + \sigma_\varepsilon^2) - (1 - \psi) \sigma_x^2(t) = f \sigma_x^2(t) \end{cases}$$

The following coefficients make this an identity: $d = 0$, $f = -\frac{-\psi\theta^2 + \theta^2 a\rho - 1 + \psi}{\theta^2 \rho - 1}$, $g = \frac{-\psi + a\rho - \rho + \rho\psi}{\rho^2 \theta^2 - \rho - \theta^2 \rho + 1}$.

²²Note that this calculation is dependent on the assumption of voucher system. The coefficients a, θ, c are not.

