

**Mobilizing the Private Sector: A Theoretical Overview**

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Even in the absence of any government efforts to support private schools, we observe a substantial number of private schools operating successfully alongside nominally “free” public schools. When evaluating possible channels through which the private sector can be more effectively mobilized to meet the needs of families, a necessary first step is therefore to identify the existing channels through which private schools manage to compete in public school environments despite charging non-trivial levels of tuition to parents. Put differently, private schools must have *some* competitive advantages that they currently leverage to attract parents and compete with public schools, and these advantages determine the ways in which private schools form and the types of families they attract. When designed with these competitive advantages in mind, public policy can then alter how the private sector evolves in a public school environment, which families it attracts and how the nature of public schools changes as a result of this evolution of the private sector.

The conceptual overview in this paper is therefore organized around the types of competitive advantages that can potentially explain the existence of private schools alongside public schools in the absence of explicit government support for private schools. Specifically, I focus on four types of competitive advantages. First, private schools may enjoy greater *resource efficiency* – i.e. they may, for a variety of reasons, be more effective at translating dollars into outcomes valued by parents. Second, private schools may be able to serve niche markets by more effectively *targeting their pedagogical approach* to the needs of particular subsets of families they aim to attract. This may lead to private schools that aim to differentiate themselves “horizontally” from other public and private schools. Third, private schools may derive an advantage from the fact that they can choose among applicants and can thus *skim the cream* of students and then employ positive peer effects among these selected

students to their advantage. This may lead to “vertical” rather than horizontal differentiation. Finally, private schools may derive an advantage from offering parents an opportunity to *unbundle schooling and housing choices* within a metropolitan area.

We do not, at this point, have a firm consensus regarding how these potential advantages of the private sector combine to explain the existence of private schools in different settings. It seems likely that each of these advantages plays some role, but the fact that we are not able at this point to place particular weights on each of these potential advantages may in part be due to different settings leading to different weights. Private schools in Brazil are likely to exist for different reasons than private schools in the U.S., and even within the U.S., private schools in the more Catholic northeast may exist for different reasons than private schools in the more Protestant south. This implies that the challenges for mobilizing the private sector in positive ways may take different forms in different regions, and the optimal design of public policies (such as vouchers) may therefore differ depending on the context. In each case, however, a thoughtful analysis should begin with an understanding of how the different channels through which private schools can compete impact the costs and benefits of different ways of mobilizing the private sector.

Our analysis begins in Section 1 with an overview of the complexity faced by education policy makers – and the resulting complexity of an economic approach to analyzing the policy makers’ problem. I then proceed in Sections 2 through 5 to a discussion of how each of the four types of private school advantages relate to the benefits and costs of mobilizing the private sector in particular ways. In Section 6 I present results from a model in which different private school advantages are modeled and illustrate how different assumptions we make about private school advantages (and public school responses to

competition) can alter our conclusions about the impact of mobilizing the private sector. Finally, Section 7 concludes with some final comments.

## **I. The Complex Challenges for Education Policy**

The challenges faced by education policy makers derive in large part from the many different features of the underlying economic environment that might ultimately play an important role in predicting the impact of policy on outcomes that policy makers care about. A focus on only a subset of these features may lead different policy makers with identical policy preferences to different conclusion regarding the tradeoffs involved in policy design. In addition, policy makers differ in terms of their preferences over what outcomes to emphasize. Before discussing the conceptual issues involved in mobilizing the private sector, I therefore discuss briefly the relevant features of the underlying economic environment in which policy is made and the different outcomes that might be emphasized by different policy makers.

### *1.1. The Underlying Economic Environment*

A typical economic model begins with an outline of the types of *economic agents* that make decisions and respond to incentives, the *endowments*, *tastes* and *production possibilities* that these agents bring to their economic decisions, and the mechanism by which individual choices lead to an *equilibrium* in which every agent is doing the best she can given the circumstances she faces. Policy plays a role in defining the constraints that individuals face – and thus impacts the decisions individuals make which then aggregate to the equilibrium outcomes we observe.

### 1.1.a. The Relevant Economic Agents

We can then begin by asking: Who are the decision-making agents whose choices are relevant for predicting how education policy translates into real world outcomes? First, *parents* decide where to send their children and how much they are involved in monitoring what happens to their children at home and at school. They bring to this decision some notion of what they consider important in the rearing of their children, and they face resource constraints given the financial resources they have available to them.<sup>1</sup> Thus, they combine their tastes and their income to arrive at the choices they make on behalf of their children, and they may face informational constraints to the extent to which it is not transparent how different schools match with the goals they have in mind for their children.

Second, *children* may also be viewed as economic agents (in the sense of agents who make choices). While parents and schools may constrain the extent to which children have access to different types of peers, children themselves may exercise some choice over which peer groups within schools and neighborhoods to join. Similarly, they may play an active role in determining their own level of effort toward advancing their education, and that in turn may be influenced by the types of peer relationships they form.<sup>2</sup> Their relevant endowments are the characteristics they bring to the school (and to their peer relationships), endowments such as innate ability, and their tastes may be shaped by a combination of parental, school and peer influences.

Third, *school officials* – both teachers and administrators, may respond to changes in incentives as policy institutions are altered. While their tastes may align to some extent with those of parents who signal what they would like to see at their school, they may also care

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<sup>1</sup> For evidence on what characteristics parents in the U.S. value when choosing schools, see Hoxby (1999).

<sup>2</sup> Harris (1998) provides evidence on the potential importance of peer choices, and Cooley (2005) develops a theoretical and empirical approach to analyzing equilibria when peers choose peers.

about personal “rents” that may be constrained in part by the degree of competition they face, the types of accountability measures that are in place, and other incentives shaped by policy makers.<sup>3</sup>

Fourth, *school entrepreneurs* operate in both the public and the private sector. As with school officials, their tastes may take a variety of forms and may include a desire to serve children of particular types as well as to achieve personal rents of some form. In the private sector, the motive may in fact be the usual economic profit motive, with school entrepreneurs finding ways of attracting parents by offering packages that parents are willing to pay for. Parental tastes then become a constraint that profit maximizing private school entrepreneurs face as they design schools, and the degree of competition that such entrepreneurs face places the usual bounds on the levels of economic profit they can earn. In the public sector, the same entrepreneurs may face different constraints – some shaped by the degree of competition, and others by the explicit incentives contained in policy institutions. In addition, all school entrepreneurs (and school officials) face technological constraints – the mapping of inputs to outputs that is handed to them by the nature of education production.<sup>4</sup>

Finally, as I will discuss in more detail toward the end of this paper, *homeowners and developers* may play an important role, particularly as private schools are mobilized by policy makers. When school access is determined primarily by where parents live (as it is in many public school sectors), parental decisions regarding schools are inherently bundled with decisions regarding housing, whereas when school access is divorced from residential

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<sup>3</sup> The notion that school officials seek private rents features heavily in Chubb and Moe (1990), Manski (1992) and McMillan (2004). Hoxby (1996) provides evidence on the empirical role of unions in this process, and Hoxby (2000a,b) provides empirical evidence suggesting positive efficiency effects from competition.

<sup>4</sup> The school production function literature continues to engage in a vigorous debate on what measurable inputs are associated with measurable outputs. See, for instance, Hanushek (1999) and Krueger (1999).

location, these decisions are, at least to some extent, unbundled.<sup>5</sup> This, as we will see, impacts both the evolution of housing prices within established housing markets and the incentives by suppliers of new housing of where and how to build.

## 1.2. *Equilibrium*

In *equilibrium*, some mechanism must then exist to ration parents and students into neighborhoods and schools and to determine how many and what kinds of private schools operate. Since public schools typically do not charge tuition, other prices – in particular those associated with the cost of housing in different neighborhoods that provide access to local public schools, adjust to equilibrate supply and demand for such schools.<sup>6</sup> Alternatively, part of the “price” of choosing a public school may involve a cost to parents in the form of spending time monitoring schools or supplementing school production with home production of education. In private schools, on the other hand, explicit pricing governs much of the rationing of children into schools, although private schools may use additional screening mechanisms to select among applicants. In addition, an equilibrium may well have a political dimension as well, with resources provided to public schools resulting from voting by residents – both those who attend public and private schools (as well as those without children). School policies – including those seeking to mobilize the private sector – thus result in observable outcomes as individuals do the best they can given their circumstances which arise in part from *equilibrium in housing, private school and political markets*.<sup>7</sup>

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<sup>5</sup> The close connection between school and housing choices was first empirically addressed by Oates (1969) and has been replicated in a large number of capitalization studies since. More direct methods of empirically investigating the link between schools and neighborhoods have added further policy relevant evidence recently, as in Bayer, Ferreira and McMillan (2003).

<sup>6</sup> In some circumstances which we will not emphasize in this paper, non-price rationing mechanisms (such as lotteries to determine access to oversubscribed charter schools) may also play a role.

<sup>7</sup> Yet another component of the overall equilibrium that is not emphasized in this paper involves equilibrium in the teacher labor market. See, for instance, Loeb and Page (2000).

### *1.3. Outcomes and Policy Preferences*

Once a policy is implemented and a new equilibrium is reached, we can observe a number of outcomes that depend on the particulars of the policy, the way in which individuals respond to the changed incentives from that policy and the mechanisms by which equilibrium is reached. A policy that aims to mobilize the private school market – such as a voucher policy – can potentially result in the emergence of new (and potentially quite different) schools, the movement of households to different areas, a change in the public school population and in public school resources, and a change in behavior of school officials. These changes in behavior may then result in different outcomes for children, typically the main object of interest for policy makers.

However, even if agreement is reached on how a policy will affect behavior and how this change in behavior translates into changes in observable equilibrium outcomes, it is far from obvious that this in itself is sufficient for consensus on which type of policy is optimal. Such a judgment ultimately requires not only an understanding of the unfolding of the new equilibrium under new policies but also a yardstick by which to measure which set of outcomes is “better”. Put differently, the objective of the policy maker needs to be well defined, and policy makers disagree as to the appropriate objective for education policy. Are we attempting to maximize average achievement or achievement of those with the least initial opportunities or the achievement of the “cream” that might become the engine of economic growth? Is achievement as measured through standardized exams the most important variable of interest? Is one of the aims of the education system to internalize externalities not taken into account by parents? It is one thing to mobilize the private sector in education but quite another to do so in such a way that it is consistent with competing social aims.

#### *1.4. Beginning Simple and Introducing Complexity*

The aim of this paper is ultimately not to arrive at a grand unifying thesis as to the best ways in which the private sector can be mobilized to achieve the most desirable social outcomes. As the discussion above suggests, education policy faces a number of complex challenges, and there is little hope of unraveling all of these at one time. It is most productive, therefore, to begin with simple and admittedly unrealistic settings and to investigate the most salient forces that may be unleashed by a greater fostering of private school markets. In the following sections, I will therefore discuss particular issues raised by particular private school advantages – and how this translates into different ways of thinking about how private school markets can be mobilized most effectively given particular social aims.

## **II. A Simple Economic Environment: The Role of Resource Efficiency**

Suppose we begin, then, by restricting ourselves to a world in which parents and children are identical, in which there are no geographical constraints that limit access to schools (and thus no role for housing markets) and in which we can think of public schools as a single entity. Parents in this world agree on what makes a good school, and peer effects – to the extent to which they exist – are the same in all schools. Of our four possible channels through which private schools can attract parents and students, we have thus eliminated three – with no private school advantage resulting from grouping (identical) peers either by ability or through pedagogical targeting, and no advantage to private school attending parents from unbundling housing and school decisions (given the lack of geographical constraints).

All that remains, then, is the possibility that private schools may arise as a result of inefficient use of resources in the public school as school officials maximize rents or do not have sufficient incentive to use resources innovatively to maximize school quality.<sup>8</sup> Private schools may then arise to the extent to which private school entrepreneurs find sufficiently more innovative and efficient uses of resources to produce sufficiently higher school quality that parents are then willing to pay for despite their access to the free public school. This may, for instance, involve less rent-seeking behavior or less wasteful use of resources. Alternatively, even with identical peers, private school entrepreneurs may find ways to harness peer pressures and thus coordinate students (who pay attention to what their peers think) on “higher effort” peer equilibria.<sup>9</sup>

### *2.1. Voice Versus Exit and the Free Rider Problem*

In our simple world, parents now have a choice: They can either exercise pressure (“voice”) at the public school in an attempt to extract greater effort from school officials while supplementing their children’s education at home, or they can seek out private school alternatives. The former, however, gives rise to a free rider problem as each parent would prefer to have other parents undertake the costly task of monitoring the public school, and in the absence of parents solving the resulting coordination problem, economic theory suggests that a sub-optimal level of overall pressure will be exerted within the public school. In the presence of a competitive private school market, on the other hand, competition by private schools with one another reduces (or, under perfect competition, eliminates) inefficiencies

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<sup>8</sup> The role of teacher unions, for instance, is often cited as one of the possible ways in which public school officials attempt to maximize rents in non-competitive environments (Hoxby, 1996).

<sup>9</sup> Models with peer interactions often give rise to multiple equilibria. In the context of school peer effects, students can for instance coordinate on low-effort or high-effort equilibria (Cooley, 2005).

within that sector, leaving parents free to substitute costly monitoring efforts (and home production) with tuition payments. Such pressure may also result in additional constraints faced by public school officials to the extent to which they seek private rents at the expense of school quality.

## *2.2. Equilibrium*

An equilibrium with a co-existence of private and public schools can then emerge in a number of ways. As private schools enter, the public school shrinks in size – thus reducing the free rider problem and increasing the pressure felt by public school officials as parents can more effectively coordinate.<sup>10</sup> If efficient private schools can be easily replicated, the resulting equilibrium would be one in which no rents are possible (due to competition) in the private sector, and all parents are indifferent between the lower quality public school and the higher quality private schools (that charge tuition). Alternatively, if entrepreneurial talent in the private sector is scarce, each new private school would be less efficient than existing private schools, and rents within the private school sector would remain for more efficient entrepreneurs who can charge higher tuitions for higher school quality. Any equilibrium, however, would be one in which private schools would provide higher quality education than the public school, with the possibility that private schools themselves can be hierarchically ordered based on the quality they offer (due to the entrepreneurial skill differences in the private sector). Parents would be uniformly happier, with some children (whose parents pay higher tuition) experiencing higher school quality than others (whose parents pay lower tuition).

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<sup>10</sup> The mere outflow of students from the public school might in itself provide additional political pressure on public school officials to behave more efficiently.

### *2.3. Mobilizing the Private Sector in this Simple Economic Setting*

Policy aimed at mobilizing the private sector in such a setting – either through the removal of barriers to entry for private schools or through explicit tuition subsidies in the form of vouchers, then gives rise to relatively straightforward changes in outcomes that are almost certainly positive from most policy perspectives. All students experience an improvement in school quality as a result of such mobilization as competition from the private sector serves to reduce resource inefficiencies. Unless one places sufficiently high negative weight on the emergence of variance in outcomes, fostering private school markets is unambiguously positive.<sup>11</sup>

### *2.4. Introducing Income Heterogeneity*

Now suppose that households differ in one respect: their income. Higher income households then have a higher opportunity cost of time (and thus face a higher cost per unit of time devoted to monitoring a school), and they place lower marginal value on money. Both these characteristics of higher income households make them more willing to pay tuition in private schools. Private school markets then result qualitatively in the same equilibrium hierarchy of school quality across private and public schools, but now a potentially more disturbing feature of the equilibrium emerges as well: Educational quality for children is now correlated with parental income, with children from higher income households disproportionately benefiting from increased overall educational quality. Put differently, the

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<sup>11</sup> One caveat to this arises from potential negative impacts on public schools in the presence of teacher quality differences. If a growing private sector removes good teachers from public schools – a form of cream skimming that we do not emphasize in this paper, then public school quality may decline even in the presence of increased pressure on public schools to use resources more efficiently.

introduction of income heterogeneity results in an equilibrium in which the public school (producing the lowest quality) serves the poor while the private school sector serves higher income households.<sup>12</sup>

With the introduction of income heterogeneity, however, different ways of fostering private school markets emerge as well. In particular, tuition subsidies might now be set in inverse proportion to household income, thus empowering the poor in the public school to exert greater competitive pressure through the creation of a private school market that serves the poor.

### *2.5. Introducing Politics*

We have implicitly assumed above that per pupil public resources are exogenously fixed as private school markets are mobilized. This gives the result that school quality for all children increases as a result of more efficient resource use in both public and private schools (with private school attending children experiencing disproportionately larger increases in school quality – offset by disproportionately higher tuition costs for their parents.)

It is unlikely, however, that public school resources are unaffected by increasing activity in the private sector. In particular, several competing forces emerge: First, to the extent to which policies aimed at mobilizing private school markets induce private school attending parents to supplement public subsidies with their own resources, more resources may be available (on a per-pupil basis) in the public sector. Second, to the extent to which the political voting equilibrium changes as private school attending parents reduce their political

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<sup>12</sup> McMillan (2004) demonstrates in addition, however, that public school quality may suffer if parents differ systematically in their ability to monitor schools. In particular, if pressure from parental monitoring reduces private rents of public school officials, one possible strategy for such officials is to encourage the exit of high-monitoring parents in order to be able to extract greater private rents when overall monitoring decreases.

support of public schools, the overall resources allocated to public schools may shrink. Depending on which of these forces dominates, public schools may experience either an increase or a decrease in per pupil school resources when such resources are determined through majority rule voting.<sup>13</sup>

In addition, a more complex (and, in some circumstances, more realistic) model of the politics surrounding public school funding might grant disproportionately more political power to higher income parents. To the extent to which the private sector focuses disproportionately on higher income families, public schools that serve the poor might therefore be much more adversely affected than suggested by a simply “one-man, one-vote” model. This may arguably be precisely what has happened in countries like Brazil where notoriously inefficient and under-funded public schools serve only the poor while middle and high-income families almost universally attend private schools.

### **III. Pedagogical Targeting and Horizontal Differentiation**

Now suppose we return to the simple setting at the beginning of the previous section but we introduce to this setting “horizontal” heterogeneity of children. By “horizontal” heterogeneity, I will mean for now simply that different children respond differently to alternative pedagogical approaches or that parental tastes on particular characteristics of schools (such as the degree of religious education) differ. Placing all children in the public school might then be inefficient if that school has to commit to a single or a limited set of pedagogical approaches, and private schools gain a competitive advantage by being able to

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<sup>13</sup> Simulation results suggest that the latter force dominates for initial expansions of the private sector while the former dominates for larger expansions of this sector (Nechyba, 2003a).

target their pedagogy to particular types of children with particular pedagogical needs or to parental tastes that emphasize particular characteristics such as religious training.<sup>14</sup>

In some sense, this could be viewed as a special case of the resource efficiency advantage of private schools that I discussed in the previous section. Now, however, this emerges not as a result of rent seeking in the public school but rather because of the constraint that the public school is limited in the number of different pedagogical approaches it can employ effectively (or by constitutional constraints that limit the presence of religion in public schools). Conditional on such constraints, the public school may in fact make optimal use of the resources it has, but private schools can enhance efficiency by selecting on the type of student they seek to attract and targeting their approach to that student (and parent) type.

### *3.1. Equilibrium without Peer Effects*

Let us begin with the case where there are no cross-type peer effects – i.e. conditional on a particular pedagogical approach being used, a student of type A neither benefits nor is hurt by having a student of type B in the same classroom. Separation of types is then unambiguously positive for all students since it allows a more targeted (and thus more effective) pedagogical approach for each student type. Some types might benefit more from this separation than others – implying that some (of the otherwise identical) parents are willing to pay more for their child to separate than others.<sup>15</sup> Each parent then makes a choice of whether to attend a private school targeted to her type of child and pay the corresponding

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<sup>14</sup> The potential for such horizontal differentiation in the private sector has long been held out as one possible advantage of mobilizing private schools and has recently been included in formal theoretical and empirical models by Ferreyra (2005) and Cohen-Zada and Justman (2005).

<sup>15</sup> Some child types might also respond more to home investments than other children, giving those parents a choice of investing at home to overcome the lower quality of public school as opposed to paying private school tuition to achieve the desired separation.

private school tuition, or to send her child to public school that is less targeted (and thus of lower quality for her child) but free.

In equilibrium, we would then expect private schools to target those types of children that benefit the most from separation, with the remaining children attending public school. Those children attending private schools will experience higher school quality given the targeted pedagogical approaches, while those in the public school will experience no decline in school quality and potentially an increase if the public school can target more effectively given that some student types have exited to the private sector. At the same time, it is important to note that the higher “quality” of horizontally targeted private schools refers to quality as subjectively judged by parents – and this may in some instances be at odds with how policy makers define quality. To take an extreme example, some parents may view racial homogeneity of a school as an important dimension of subjectively defined quality, causing schools to erect racial barriers to entry into the school. Policies aimed at mobilizing the private sector to offer a greater set of horizontally differentiated schools might therefore require particular demographic mixes of private schools if larger social aims (outside maximizing parental satisfaction with schools) are to be achieved.

### *3.2. Cost Differences of Different Types*

It may also be the case, however, that the pedagogical needs of different types of children require different levels of per-child resources. For instance, learning disabled children, or children with different native languages, may require more investment than others. As a result, the private sector would be more likely to attract parents of “low cost” children first, leaving “high cost” children in the public school. At the same time, policies to

mobilize the private sector might be designed to take these cost differences into account, offering, for instance, higher voucher levels for children with special needs. Thus, potential equity concerns might be addressed through policy design as the private sector is mobilized through policy.<sup>16</sup>

### *3.3. Introducing Cross-Type Peer Effects*

The efficiency and welfare implications of mobilizing the private sector become murkier, however, once we introduce the possibility of “cross-type” peer effects. Such peer effects arise when, conditional on a particular pedagogical approach, students of type A benefit from the presence of students of type B (or vice versa), or alternatively if students of type A are hurt by the presence of students of type B (or vice versa). To the extent to which these peer effects are always negative, the case for separation of types becomes even more compelling – increasing the potential for efficiency enhancements from mobilizations of the private sector. If the effects are positive in both directions (in ways recognized by parents), some mixing of types may be optimal – but private schools would have an incentive to structure schools accordingly since parents of both types would prefer mixing over separation.

There are, however, two types of scenarios under which the private sector might induce separation of types that is sub-optimal. The first arises when peer effects are positive in one direction and negative in the other, a case I discuss in more detail in Section 4. The second arises if the peer effects take the form of a larger externality that parents themselves have no incentive to internalize.

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<sup>16</sup> This is similarly true for the case where student types are correlated with parental income when voucher policies could be designed with voucher amounts varying inversely with parental income.

Consider, for instance, the possibility that interaction of types results in a greater awareness of the needs of others, a greater respect for diversity and, in the long run, a better equipped citizenry that can result in a more harmoniously functioning society. Parents themselves may place limited value on their own child developing characteristics that lead to such an outcome and may be more focused on the greater academic achievement and production of personal human capital that a targeted pedagogical approach can offer. Put differently, such externalities result in a classic “free rider” problem, where each parent would like to free ride on the benefits from diversity in other schools while maximizing her own children’s human capital accumulation. Thus, parents may place sub-optimal value on the positive externality that results from interactions with other types. Under this scenario, a mobilization of the private sector will result in too much separation – separation that maximized production of human capital at the expense of other social goals.<sup>17</sup>

This is not, however, to say that mobilizing the private sector per se will inevitably result in too much separation in the presence of these larger externalities. Rather, to the extent to which policy makers believe that broader social goals might be achieved through mixing of student types, policies aimed at mobilizing the private sector would have to be designed more specifically with this goal in mind. For instance, private school voucher amounts could depend on the demographic mix of students within the private schools that accept the voucher.

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<sup>17</sup> This, in fact, is one of the main arguments in favor of public education that is often put forth – that schools are about more than maximizing the private rents accruing to children as they accumulate marketable human capital.

#### **IV. “Cream Skimming” and Vertical Differentiation**

Suppose now that student ability varies in a “vertical” rather than a “horizontal” fashion – i.e. some students have higher ability than others, with no gains from differentiating pedagogical approaches as in the previous section but potential gains from offering different curricula to different types of children. While the optimal pedagogical approach may then be the same for all students, higher ability students may benefit, for instance, from a more accelerated curriculum than low ability students.

##### *1.5. Equilibrium without Peer Effects*

In equilibrium, we would then expect private schools to differentiate themselves based on the curriculum they offer, much as was the case for private schools differentiating themselves based on their pedagogical approach in the previous section. In the absence of peer effects that we introduce next, this simply results again in more specialized schools that serve different student types more effectively, with parents whose children benefit disproportionately from separation (all else being equal) first in line to attend private schools. As in the previous section, the introduction of household income differences gives rise to equity concerns as high-income parents become more able to take advantage of targeted private schools, and this concern is exacerbated when parental income is inversely correlated with the costliness of curriculum needs. In principle these concerns can again be addressed through careful design of voucher policies that vary voucher levels based on household income and student type.

#### *4.2. Introducing “Vertical” Peer Effects and “Cream Skimming”*

The case for increasing the role of private schools becomes more problematic, however, in the presence of what I will call “vertical” peer effects. Such effects arise when students can be hierarchically ordered in such a way that students of type A, for instance, benefit students of type B but students of type B hurt the achievement of students of type A. Most often, this is modeled as students of high ability benefiting students of low ability and students of low ability hurting the achievement of students with high ability.<sup>18</sup>

The presence of such peer effects now introduces an incentive for private schools to erect barriers to “low peer quality” students. Such barriers are not needed in the absence of peer effects since separation of types in such a case arises from the decentralized decisions that individuals make as they choose schools. In the presence of such peer effects, on the other hand, parents with low ability children may find private schools aimed at high ability children attractive because of the positive peer effects from high peer quality in those schools. Thus, schools have an incentive in deliberately choosing whom to admit – and thus attempting to “skim the cream” off the public schools.

While the concern that voucher policies might lead to a decline in resources for public schools is often raised in debates surrounding voucher policy, it is not always made explicit that perhaps the most important of these “resources” in fact have little to do with financing and much more to do with the types of students and parents that are attracted away from

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<sup>18</sup> Within the empirical literature on peer effects, there is some debate as to whether such peer effects are symmetric – i.e. whether the negative impact in one direction is exactly offset by the positive impact in the other direction, or whether the effect is primarily in one direction. In the symmetric case, overall achievement is unaffected by the distribution of peers, but lower ability children do better at the expense of higher ability children. If the negative impact of low ability children is less than the positive impact of high ability children, on the other hand, overall achievement is maximized by mixing students; whereas if the reverse holds, overall achievement is maximized by separating students. This debate is separate from a debate on whether peer effects arise directly from the characteristics that peers bring to peer relationships or from behavioral choices on which peer groups coordinate ( see Cooley (2005) and references therein).

public schools. This is not a concern in a world without peer effects – if students themselves (and indirectly their parents) are not inputs into the production of school quality through peer effects, the public school is unaffected by the exit of high ability students. But with the introduction of vertical peer effects, it is likely that private schools would use the advantage of being able to select peers as one of their tools for competing with the public sector (and with each other).

#### 4.3. *Different Means of “Cream Skimming”*

As we already discussed, cream skimming by private schools in the absence of peer effects takes the simple form of private schools targeting pedagogical and curriculum approaches to the specialized needs of different students, with parents self-selecting into schools based on what schools offer. Without peer effects, private schools do not need to explicitly choose students or erect barriers to “undesirable” students, and the public school is unaffected (other than through political economy effects on per pupil resources). But in the presence of peer effects, there is an incentive for parents of low ability students to “free ride” on the higher peer quality in private schools, and this in turn creates an incentive for private schools to erect barriers to such students and for public schools to be concerned about the exit of high peer quality children.

Private schools then have two types of approaches at their disposal. First, they can design tuition policies with the aim of forcing parents of lower peer quality children to face the costs they are imposing on the school by placing their children there.<sup>19</sup> Under this approach, we would expect private schools to price discriminate based on student types, potentially offering scholarships to high ability children and high tuition to low ability

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<sup>19</sup> This is investigated by Epple and Romano (1998) and Caucutt (2001).

children. In equilibrium, this would imply that the only low ability children that end up in high peer quality private schools will be those whose parents have high incomes and can afford the higher tuition – leaving the public school with a mix of different student types with parents that are disproportionately poor. The private sector would then be characterized by a hierarchy of schools ordered on the peer quality they offer, with each of the schools being of higher quality than the public school. And private school pricing would “internalize” the peer externalities in the private sector, thus enhancing efficiency (at the expense of raising genuine equity concerns).

Alternatively, if differential pricing is not feasible for some reason, private schools can simply choose to screen students and admit only those that satisfy some minimum peer quality level.<sup>20</sup> A similar hierarchy of schools would be expected to emerge, but the composition of students within any given school would be more homogeneous as pricing is not used to compensate for the presence of high cost students.

#### *4.4. Ability Tracking as a Response by Public Schools*

In the absence of peer effects, the public school may be concerned about losing students to the private sector and may thus attempt to use resources more efficiently to minimize such exit. In the presence of horizontal peer effects (such as those discussed in Section 3), this may cause public schools to increase the types of pedagogical approaches offered, although it is likely that there are political constraints to how much of this can be done within the public sector. But in the presence of vertical peer effects, a much stronger incentive emerges for public schools to respond to private school “cream skimming” since the

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<sup>20</sup> This method of explicit screening (as opposed to the implicit screening through price discrimination) has been modeled by Nechyba (1999, 2000, 2003a,b,c) and Ferreyra (2005).

exit of high ability students and households carries with it a negative externality for the remaining students.

A possible (and perhaps likely) response by the public sector is then to target resources more directly on those students that are most likely to exit – i.e. students of high ability and high income parents. For instance, one might expect an equilibrium response to result in increased ability tracking combined with high income parents exerting disproportional influence on which track their children are assigned to. This, in essence, could result in “schools within schools” where public schools respond to the private school advantage (created by the ability of such schools to choose peer quality) by selecting peer quality within the public school tracks.<sup>21</sup>

In the absence of such tracking, we have said that one would expect an equilibrium hierarchy of school quality, with private schools differentiated by peer quality, and the public school offering lower quality than all private schools. With the emergence of tracking, on the other hand, this hierarchy of school quality may take on a different form, with the lowest track in the public school offering the lowest quality, but with some private schools offering school quality below the higher public school tracks. This is worrisome from an equity perspective since the logic again predicts that those who end up with the lowest school quality are poor households with relatively low ability children. And, with the introduction of vertical peer effects, school quality for such children may well fall as a result of the mobilization of private schools unless there are sufficiently strong positive effects from increased resource efficiency and enhanced horizontal pedagogical targeting.

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<sup>21</sup> This is investigated theoretically by Epple, Newlon and Romano (2002) and empirically by McHugh (2005).

#### *4.5. Implications for Voucher Design*

As before, concerns raised by the equilibrium predictions of vouchers under different assumptions can, in principle, be addressed by the way in which such vouchers are designed. In particular, one can design vouchers again to be inversely related to household income and vary depending on student type – thus offering increased school resources to those who find it disproportionately difficult to afford private school tuition and those whose children are disproportionately costly.<sup>22</sup>

### **V. Unbundling of Schooling and Housing Choices**

In everything we have discussed thus far, we have explicitly assumed away any geographical considerations which in turn has permitted us to treat the public sector as if it consisted of a single public school competing against a private sector consisting of different types of schools that the market can offer without incurring negative profits. This has furthermore permitted us to focus on three types of private school advantages – increased resource efficiency, targeted (horizontal) pedagogical targeting and (vertical) cream skimming.

As is abundantly clear to even the most casual observer of school policy debates, however, a model in which all public schools are treated as if they are the same public school does not match empirical reality in contexts such as the U.S. where the public sector is characterized by vastly different schools in different geographically defined neighborhoods and districts. All public schools are nominally “free”, which would imply that, in a frictionless world where parents can freely choose among public schools, public school quality should

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<sup>22</sup> Epple and Romano (2002) investigate this explicitly. Hoxby (2001) similarly argues that, through varying voucher amounts, private school voucher policies can in principle internalize externalities and a variety of policy goals.

indeed equalize across schools. The presence of substantial (vertical) differences in public school quality then suggests the presence of important frictions that result in an equilibrium sorting of parents and students into different public schools. And the main such friction undoubtedly arises from the addition of geographical constraints that impact the choice set from which parents of different types can choose.

### *5.1. Sorting into Heterogeneous Public Schools through Housing Markets*

The underlying conceptual reasons for vastly different school quality within the public sector can be classified into two categories: First, it may be that parental preferences for school quality differ, with some parents placing less value on school quality for their children than others. This by itself, however, is not sufficient for differences in school quality to emerge when entry into all public schools is “free”. Even if parent A places less value on school quality than parent B, she would choose a higher quality school over a low quality school if both are equally costly just as consumers will always choose higher quality cars over lower quality cars if all cars are equally priced (even if they differ in terms of how much value they place on car quality.) Thus, even when parental tastes for school quality differ, some sorting mechanism must be in place that results in some children ending up in better public schools and others in worse public schools.<sup>23</sup>

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<sup>23</sup> It is in principle possible that this mechanism involves different information sets for different parents, with some parents incorrectly processing information to lead them to conclude that bad schools are in fact as good as good schools. Even if this is the case, however, it seems unlikely that some parents can be consistently confused about this in the long run, and the evidence suggests that parents in low quality public schools are in fact aware of the fact that other public schools are of higher quality.

This sorting mechanism, at least in the U.S., is closely related to how parents gain access to different public schools.<sup>24</sup> The right to attend a particular public school is typically given to those who reside within some geographically defined region that is served by that public school. In some states (such as New Jersey, for instance), school districts are small and typically contain a small number of schools to choose from. In other states, school districts are larger, with each district divided into neighborhoods that are served by particular schools.<sup>25</sup> But in each of these cases, the choice of attending a particular public school is *bundled* with the choice of residential location and thus linked to housing markets that price not only the quality of housing but also the associated amenities (including access to schools).

As a result, public schools are in practice not free to parents who have to pay for access to schools through the housing prices (or rental rates) required to gain such access. Housing options that are tied to good public schools are then priced higher in the market than housing options that are tied to bad public schools.<sup>26</sup> In addition, just as private schools have an incentive to “cream skim” in the presence of (vertical) peer effects, residents in particular neighborhoods have an incentive to erect barriers (in addition to those emerging from housing prices set by market forces). In practice, this may result in *exclusionary zoning* regulations that limit access to the poor whose peer characteristics are judged on average to be “bad”, or it may result in the setting of neighborhood school boundaries in line with existing housing stocks through a political process in which higher income parents have greater influence.

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<sup>24</sup> In other contexts, such as some of the European systems, access to different types of public schools is based on academic achievement – making the “ability tracking” model of Section 3 a more relevant model than the quasi-public school model discussed here.

<sup>25</sup> Sometimes some degree of choice within a district exists, but even that is often subject to capacity constraints that cause those living close to a school within the district to have the right to attend and those that live closer to another school excluded by those constraints or by transportation costs involved in getting to the alternative school.

<sup>26</sup> Over the past 35 years, this connection has been repeatedly documented through a variety of empirical approaches, some of which are reviewed in Epple and Nechyba (2004).

An equilibrium in which the public sector is characterized by vastly different school quality across public schools is then maintained through the housing market and through explicit policies that limit housing options in particular school districts and neighborhoods. School quality differences are thus maintained because access to public schools is implicitly priced, with the differences due to some combination of resource differences (through locally financed schools with access to different tax bases) and peer differences (due to sorting of households in housing markets).<sup>27</sup>

### *5.2. Quasi-Public School Markets and Residential Segregation*

Public schools exist in part because of a collective desire to provide access to educational opportunities that are unrelated to the economic circumstances of parents and partly because of a sense that schools should internalize larger externalities (such as those discussed in Section 3.3). In practice, however, the bundling of public school access to private housing markets results in a *quasi-public* system that, while maintained through taxpayer contributions and shaped by political processes, contains elements of a private system in that access is priced – resulting in strong correlations of educational opportunities for children with economic circumstances of parents as well as considerably less mixing of different types of students than one would expect if school assignments were random.

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<sup>27</sup> By “peer differences” we mean something quite broad – including not just explicit peer effects but also the effect of parents and the ability of schools to attract good teachers (given better peer environments) when more explicit pricing of teacher ability is constrained (often by rigid salary scales). This is discussed in greater detail in Nechyba (2003d).

Since pricing of public school access is through residential housing markets, however, the quasi-pricing of public schools has an additional effect that differs from explicit pricing in private school markets in that it introduces an explicit economic rationale for *residentially segregating households* along income lines.<sup>28</sup> Empirically based simulations of housing and school markets suggest that this force may be quite powerful, resulting in levels of income segregation that are substantially greater than one would expect in the absence of school considerations.<sup>29</sup> To the extent to which peer externalities operate not only within schools but also within residential neighborhoods, this raises additional concerns related to persistent achievement differences.

### 5.3 *The Role of Private Schools in Quasi-Public School Markets*

The emergence of substantial capitalization of public school quality into housing prices in a quasi-public school system defined along residentially based public schools then offers the final of our four potential competitive advantages to private schools. Consider, for instance, a middle-income family struggling to pay inflated housing prices in a good public school district for the sole reason of gaining access to the good public school in that district. A private school entrepreneur may then open a school in a neighboring district with low public school quality in order to permit this household to divorce its housing choice from its school choice. While the household would now have to pay school tuition, it is also free to take advantage of bargains in the housing market of the worse public school district. Thus, the

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<sup>28</sup> To the extent to which “zoning” can be based on factors other than those related to household income, additional segregating forces (including those based on race) can become important as well.

<sup>29</sup> Simulations in Nechyba (2003b) suggest segregation levels (as measured by the ratio of average income or property wealth in wealthy communities to average income or wealth in poor communities) that are twice as high when public school distortions are introduced (in the absence of a private school market) than would be the case in the absence of such distortions.

advantage that emerges for private schools arises precisely because of the quasi-public nature of public schools that results in capitalization of public school quality into housing prices.<sup>30</sup>

Even in the absence of explicit policies aimed at mobilizing the private sector, we would therefore expect to find private schools in lower income districts in part to allow some households to reside in larger houses within that district while not being affected by the public school quality offered (other than through the lower housing prices they have to pay).

Empirically based simulations in fact suggest that private school markets may be playing a substantial role in moderating the levels of income segregation we observe through this channel – while at the same time reducing the housing price differences that would persist in a purely quasi-public system.<sup>31</sup> Thus, while the quasi-public nature of public schools in residence based systems gives rise to residential segregation, the presence of a simultaneous private sector tends to ameliorate such residential segregation.

While our previous discussions suggested that an equilibrium can typically be characterized by a hierarchy of school quality in which the public school offers the lowest level of school quality,<sup>32</sup> the addition of the quasi-public nature of public schools now suggests a somewhat more complicated equilibrium hierarchy. The public school in the lowest quality school district must still offer the lowest quality in the system overall, with all private schools attracting parents through higher quality. However, depending on the nature of other

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<sup>30</sup> This advantage most likely affects families with small numbers of children disproportionately. For instance, otherwise identical middle income parents may make different choices if one has four children and would thus have to pay 4 times the private school tuition and the other has one child and thus only incurs the tuition cost for that one child. (The effect may in principle, however, go in the other direction since the housing needs of the 4-children family are greater than the housing needs of the 1-child family.)

<sup>31</sup> Such simulations in Nechyba (2003b) suggest a 50% drop in the ratio of average income in wealthy communities over average income in poor communities when private school markets are introduced into quasi-public school systems.

<sup>32</sup> This was true for all of our previous considerations except for the case in which the public school responds by creating “schools within schools” through tracking – giving rise to some tracks that potentially offer higher school quality than some of the private schools.

private school advantages and the nature of housing markets, it is now quite plausible (and empirically likely) that an equilibrium will contain some public school districts that offer school quality higher than what is offered by private schools located in lower quality public school districts, with quasi-tuitions in those public schools (through housing prices) higher than explicit tuition in lower quality private schools elsewhere. The previous hierarchy of private schools dominating public schools thus continues to hold *within a school district* but not necessarily across school districts.

#### 5.4 *Mobilizing the Private Sector in a Quasi-Public School Environment*

The addition of the quasi-public nature of public schools to our model of evaluating private school competition does not obviate the important issues raised within a framework that treats the public school sector as a single public school. Rather, it adds an additional layer of complexity in which those forces now interact with the additional considerations raised by the bundling (and unbundling) of school and housing choices. It furthermore adds an additional dimension to consider in school policy design to the extent to which policy makers consider the degree of residential segregation an important element.

Consider a general voucher policy aimed at mobilizing the private sector in a quasi-public school system characterized by different public school quality across different neighborhoods. In the absence of residential mobility considerations, we are left with precisely the same forces to consider as we did in the previous sections – except that these forces would now play out *within* each district as private schools aimed at residents within each district form and compete. In addition, however, one would expect *inter-jurisdictional* effects to emerge as public school attending parents in better school districts re-evaluate their

decision to pay high housing prices in order to access good public schools. While it might be unrealistic to assume that a general voucher policy will cause households to immediately consider moving to other districts in order to pay less for housing and use the voucher to gain access to existing or newly formed private schools, over time – as households move for reasons related to job location or family expansion, we would expect households to make housing and schooling choices differently than before the introduction of the voucher policy.<sup>33</sup>

While private schools might therefore initially attract families within districts in which they form, the theory predicts that increasingly such private schools would market themselves across districts – causing inflows of households that, on average, will have higher income than those currently in the district. While this adds to the local tax base and thus lowers the tax price for funding per pupil expenditures within shrinking public schools, it may also influence the political support for local public schools to the extent to which funding of such schools is locally driven. Local per pupil spending on public schools may therefore increase or decrease depending on which force dominates.<sup>34</sup> In addition, local public schools may suffer from the exit of good peer quality students (to the extent to which private schools engage in cream skimming in the presence of vertical peer effects). At the same time, to the extent to which competition operates through greater resource efficiency (either through less rent seeking or greater pedagogical targeting) and forces greater efficiency on the part of local public schools, public school quality may increase.

Empirically based simulations suggest that the long run impact of the partial unbundling of housing and schooling choices through general voucher policies will be more *inter-* rather than *intra-*jurisdictional. Put differently, in the long run, it appears that the

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<sup>33</sup> Households in the U.S. move, on average, once every five years – suggesting that mobility effects, while being muted initially, would emerge relatively quickly.

<sup>34</sup> See Nechyba (2003a).

increase in private school attendance will be more due to residential mobility than changes in within-district school choices.<sup>35</sup> This suggests that, while private schools would emerge disproportionately in lower income districts, their clientele will be drawn disproportionately from higher income districts. To the extent to which cream skimming by private schools is an important factor in the emergence of private schools, this furthermore suggests that public schools in higher income districts may suffer disproportionately.

### 5.5 *Implications for Targeting Vouchers*

In the previous sections, I have repeatedly suggested that various concerns emerging from an understanding of potentially negative effects from an increasingly active private sector can be addressed in part through a nuanced design of policies (such as vouchers). In particular, I suggested that voucher amounts can depend on household income and student type. Put differently, I have argued that equity concerns that emerge as we think about mobilizing the private sector can be addressed by *differentially targeting vouchers to households of different types* (and, in some instances, to schools exhibiting different characteristics).

The introduction of the quasi-public nature of public schools now introduces a further dimension of policy design that may play an important part in how private schools evolve as they are mobilized through policy. If vouchers indeed give rise to unbundling of housing and schooling choices by some households that currently stretch financially to reside in good public school districts, policy targeting may in part be aimed at encouraging such unbundling by *targeting geographically rather than targeting households*. Our discussion above suggests

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<sup>35</sup> See Nechyba (1999, 2000, 2003a,b,c,d).

that the impact of such different methods of targeting may differ dramatically from the household targeting we have discussed previously.

In particular, consider a policy that targets vouchers only to the lowest income families who by definition tend to reside in the lowest performing public school districts. Such a policy would in effect limit private school competition to low income districts – excluding higher income households in better districts from access to the voucher policy and thus eliminating the possibility of significant numbers of parents unbundling their housing and schooling choices. If, on the other hand, the policy is targeted to residents who reside in low performing (or poor) districts, any household who moves to the district qualifies for the voucher. Thus, a district targeted voucher can spread the impact of increased private school competition to non-targeted districts as it enables households in those districts to unbundle their housing and schooling choices by moving to lower income districts and sending their children to private schools.<sup>36</sup>

### 5.6 *The Political Economy of Voucher Design*

The realistic modeling of public schools within the context of housing markets also has potentially dramatic implications for the political economy of voucher design. In the absence of modeling the public sector as quasi-public and linked to housing markets, political economy considerations are squarely focused on the impact that vouchers would have on the costs and benefits of accessing quality schools for parents. But once the link to housing markets is taken into account, these considerations may ultimately be outweighed by considerations related to capital gains and losses that homeowners are likely to experience in

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<sup>36</sup> The differences between these different forms of targeting are illustrated explicitly in Nechyba (2000).

an environment in which the private sector has been mobilized by unbundling housing and schooling choices.

A plethora of empirical studies over the past four decades has convincingly documented the close connection of housing values to public school quality, with similar houses valued quite differently by the market depending on which school neighborhood they are associated with. Households in good public school districts have paid a premium for those houses, a premium that must decrease in equilibrium as private schools offer increased options for households to unbundle schooling choices from housing choices. Within housing markets, general voucher policies or voucher policies targeted to low performing school districts may therefore create substantial capital losses for homeowners in good public school districts and substantial capital gains for homeowners in poor districts. Empirically grounded simulations suggest that the implications of such policies for homeowner wealth will outweigh school-based considerations for a substantial fraction of voters.

The desire of policy makers to mobilize private schools to enhance educational opportunities therefore runs into a political constraint related to the implications of such policies for the distribution of homeowner wealth. This suggests that, as different methods of targeting vouchers are considered, there is an inherent bias toward targeting vouchers to low income households if politics is disproportionately influenced by resources of higher income households. Such targeting in essence isolates the competitive effect from a more active private sector to low income areas – thus reducing the impact on homeowner wealth through changes in housing prices. While the most effective way of spreading a competitive effect

throughout the public school system may therefore involve geographic targeting, it seems unlikely that such targeting is politically feasible without other offsetting public policies.<sup>37</sup>

## **VI. Predicting the Impact of Mobilizing Private Schools**

Our discussion above suggests a number of competing effects as the private school sector increases its activity due to changes in policy – with the effects depending on what assumptions we make about the competitive advantages of private school and the particulars of policies employed to mobilize the private sector. The question, often asked in policy circles, “Is competition good or bad” is therefore much too coarse. The real question is what kinds of competition (depending on underlying economic conditions) are likely to lead to the types of policy outcomes aimed for by policy makers.

Structural economic modeling linked to empirical data can give us some sense of which predictions regarding vouchers are relatively robust to changing assumptions and which are sensitive to what we assume about private school formation and public school responses. In work that takes as its benchmark the quasi-public sector operating alongside a private sector in New Jersey, I have simulated (in previous work) different types of private school sectors with competitive advantages analogous to the four types discussed in this paper. With the quasi-public sector operating in poor, middle income and wealthy districts (representing districts in the lower, middle and upper third of the wealth distribution), the model can then simulate the impact of private school vouchers of various types.

While results on different types of vouchers (and other school finance policies) are available elsewhere, I report here only one set of simulations in an attempt to illustrate how

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<sup>37</sup> In analyzing voting date from California’s voucher propositions, Brunner, Sonstelie and Thayer (2001) provide evidence related to this.

disagreements regarding the desirability of vouchers can emerge directly from different assumptions about the private and public sector. The table below simulates the impact of different voucher amounts (not targeted in any particular way) on public school quality in the three different districts. The possibility of families unbundling their school and housing choices is maintained throughout as is a level of peer externality consistent with empirical observations.<sup>38</sup>

In the first third of the table, the only private school advantage (aside from allowing households to unbundled their housing and schooling choices) derives from their ability to engage in vertical cream skimming in order to create more desirably (and exclusive) peer groups. As private schools are fostered through vouchers, the public schools therefore lose high peer quality students, and public school quality for those who remain in public schools drops (at an increasing rate as voucher amounts increase).<sup>39</sup> To the extent to which one believes that vertical cream skimming is the primary competitive advantage of private schools, one might therefore be concerned about the impact that an increasingly active private school market has on public school quality.

**PUBLIC SCHOOL QUALITY AS (NON-TARGETED) VOUCHERS ARE INTRODUCED\***

		Voucher Amount				
		\$0	\$1,000	\$2,500	\$4,000	\$5,000
<b>Cream Skimming Only</b>	Poor District	69.97	68.05	65.82	39.83	***
	Middle District	100.00	98.80	89.43	78.93	44.59

<sup>38</sup> In order to match the empirically observed levels of private school attendance, the “unbundling” assumption does not provide a sufficiently strong competitive advantage to private schools in the model. Peer effects are therefore introduced to the extent required in order for private school activity to match the level of activity in the data. When other private school advantages are introduced in the lower two thirds of the table, these peer effects become weaker in order for the model to continue to match empirically observed private school attendance rates.

<sup>39</sup> The public school in the poor district actually ceases to exist when the voucher level reaches \$5,000, the minimum per pupil spending level assumed for a school to exist. The more dramatic drops in quality in each district take place when private school attendance in the district increases sufficiently to “tip” the political support for public schools.

	Wealthy District	126.31	120.22	112.96	93.19	80.27
Cream Skimming + <b>Pedagogical Targeting</b>	Poor District	70.36	76.46	80.55	81.61	76.85
	Middle District	100.00	101.52	104.96	105.99	101.55
	Wealthy District	131.05	130.11	129.67	131.74	127.02
Cream Skimming + <b>Competitive Resource Efficiency</b>	Poor District	65.72	67.42	69.81	71.08	71.74
	Middle District	100.00	101.83	104.90	107.68	109.75
	Wealthy District	124.64	126.96	128.23	131.24	132.59

\*Source: Adapted from Tables 5c and 6a in Nechyba (2003a). School quality is normalized to be equal to 100 in the middle income district in the absence of vouchers.

The middle portion, of the table, then introduces horizontal (pedagogical) targeting, the private school advantage discussed in Section 3. With empirically plausible levels of this advantage (relative to the vertical cream skimming advantage), the simulations suggest that it is plausible for public school quality to increase with a more active private school market (as public schools can more effectively target their resources on the student types that remain in the public system). Similarly, the lower portion of the table introduces resource efficiency on the part of private schools and competition-induced increases in public school efficiency. Again, plausible levels of such effects can result in the prediction that public school quality will increase with greater competition.<sup>40</sup> Altering our assumption about what private schools do and how public schools respond within empirically plausible ranges therefore can alter dramatically how we think private school competition will affect the public sector. Furthermore, public and private schools

<sup>40</sup> The structure of the underlying model necessitates that, as one private school advantage is increased in the model, others must decrease in order for the model to replicate empirically relevant levels of private school attendance in the absence of vouchers. These simulations assume that, when either pedagogical targeting or resource efficiency are added to the model, they represent approximately half the private school advantage (aside from the unbundling advantage), with the other half deriving from vertical cream skimming.

in the model become more homogeneous with increased private school activity, potentially raising concerns if more general externalities from diversity (not taken into account by parents) are present.

The only prediction of the model that appears to be completely robust to changing assumptions about private and public schools relates to the residential desegregating effect of increased private school competition – by allowing households to unbundled their housing and schooling choices, increased private school activity tends to be accompanied by less residential income segregation. To the extent to which larger externalities from diversity are present and operate both within schools *and* neighborhoods, this may ameliorate concerns raised by greater segregation in the school sector.

## **VII. Conclusion**

This paper suggests that private schools must operate with some competitive advantages relative to public schools in order to attract households – and that the nature of these advantages is likely to shape our view of how the private sector can be most effectively mobilized to advance academic achievement and other social goals. Rather than asking whether competition is desirable, the discussion suggests more nuanced policy questions asking what kinds of policies are most likely to advance the aims of policy makers depending on the underlying economic realities.

In the context of private school vouchers, for instance, policy makers can choose from a variety of methods of targeting vouchers and thus adjusting the price of attending private schools for different households in different circumstances. Broadly speaking, such targeting can be done (in a variety of combinations) along four different dimensions:

(1) by parental characteristics (such as income); (2) by student characteristics (such as learning disabilities, aptitude, etc.); (3) by school characteristics (such as the demographic composition of the voucher-accepting private school); or by the characteristics of the neighborhood in which the household lives (such as the level of under-performance of the local public school).

While different assumptions about private schools and public school responses to competition give rise to a number of concerns, it is unclear at this point to what extent these concerns ought not apply equally to public schools given the quasi-public nature of schools in which other prices (such as property values) substitute for explicit tuition. Furthermore, it appears plausible that such concerns can be addressed through voucher design (along the four dimensions mentioned above), perhaps even more effectively than they could be in the absence of vouchers within the context of a quasi-public school system.

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