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Chapter 4

The Supply Side

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A supply-side response to a school choice program is an essential part of the theory that greater choice will lead to positive systemic changes in K--12 education. The number and type of schools that open or expand will determine both whether students wishing to exercise choice have viable options as well as the extent to which all schools face competitive pressures. Thus understanding the influences on the supply of schools (more precisely, the supply of educational slots) is crucial to identifying the likely impacts of various choice programs.

A basic assumption of any school choice system is that, under such a system, K--12 education would function more like a market. In theory, suppliers should therefore enter the market to meet any increase in demand. However, as described in this chapter, even if the market analogy proves to be apt, the specific provisions of choice programs combined with community context factors are likely to have a major influence on any supply response.

We begin by presenting a simple theoretical model that describes the various factors influencing the supply of schools. In the following two sections we discuss the implications of our theoretical model for the real world of K--12 education and review some of the existing research on the determinants of school supply. This body of research is useful but does not alone give a full picture of how the supply of educational slots might expand in a widespread choice system. Therefore, in the following section we bring together observations from a variety of sources on barriers that currently prevent more schools of choice in California from opening their doors and keeping them open. In the final section we offer some conclusions and public policy recommendations.

The Theoretical Model

Because the theory of a supply-side response to the introduction of choice is grounded in the market analogy, it is useful to explore the assumptions of school supply in a market context. In the private sector, the motivating factor determining supply-side decisions is profit. Though many schools wishing to enter the K--12 education market may be motivated by profit, it is likely that many will not.ⁱ Nonetheless, it is still helpful to use the market framework when analyzing the supply decisions of schools, because the effects of changes in conditions are likely, all else equal, to have the same effect on the probability of entering the market for a nonprofit organization as they would for a profit-maximizing organization. In a typical nonprofit school scenario, for example, “excess profits” translate into the school’s being able to pay higher salaries to teachers and administrators, to have annual budget surpluses and a positive fund balance, and even to accumulate an endowment. All of these features would serve to stimulate other school operators to enter the market, just as profits would in a traditional market scenario.

If we imagine a comprehensive choice system whereby educational consumers have the freedom to choose among many schools, each school would be relatively small compared to the market as a whole. While different assumptions of market structure would change the estimates of the number of entrants into the market, the direction of supply effects (that is, supply increases or decreases) will be consistent regardless of the assumed structure.ⁱⁱ Thus we begin by examining the supply decision under the idealized conditions of a perfectly competitive market. While idealized, this serves to outline the way in which competition can enhance the provision of services. We discuss the implications of relaxing the assumption of perfect competition below.

According to economic theory, several important features characterize a perfectly competitive market. From the perspective of the schools, a competitive market is one in which there are many schools offering an undifferentiated product and in which market entry or exit does not substantively affect the market as a whole, due to the relatively small size of each individual school. In addition, schools are price takers in the sense that they face an infinite demand for their product at a given price, but if they raise their price (tuition), all students would

opt to attend a different school. Finally, this market structure assumes a free flow of information to all students about the quality of all the schools in the market.

Like any market, at least in theory, we would expect the demand for schooling to increase as the price of schooling falls. Thus were we to graph various prices (per pupil spending) against market demand, the slope of the line representing this demand would be negative. Conversely, the theoretical line representing the relationship between price and the supply of schooling (number of enrollment slots) is expected to be upward sloping, since existing school suppliers would likely supply more schooling if they could get a higher price for it, and we would expect more educational entrepreneurs to enter the education market if prices were higher.

Figure 4-1 shows these hypothetical relationships. The lefthand part of the figure shows how the overall demand for and supply of enrollment in schools of choice interact to determine an overall payment per pupil for schools of choice. The righthand part of the figure shows how administrators at an individual school of choice would respond to this market price by setting overall enrollment at the school. In the lefthand graph, the market supply curve reflects the total number of slots that all schools together are willing to provide for a given level of funding. The unique price or funding level at which the quantities demanded and supplied are equal determines the overall price in the market.

[Figure 4-1 here]

To understand the basis for the market supply curve, it is useful to consider the supply decision from the point of view of an individual firm, which, for simplicity, we assume is an individual school. As shown in the righthand panel of figure 4-2, the school is assumed to face a horizontal demand curve that is equal to the market-determined per pupil compensation. The horizontal nature of the demand curve represents the notion that the school is but one of many of similar quality and therefore has little influence over the pricing in the market as a whole. It can therefore “sell” as many educational slots as it wishes at the market determined price (tuition) but

cannot increase its price above the market-determined one without losing all of its students, because those students can attend a number of alternatives at the market price.

Because the price of schooling is determined by the market as a whole, the school supply decision is going to be completely contingent on the cost to the school of supplying education. In particular, the school has an incentive to keep providing school slots as long as the additional revenue, called the marginal revenue, it receives from the sale of an additional slot exceeds the cost of providing education to the student who fills that slot, referred to as the marginal cost. In other words, a school will continue to admit students as long as the tuition it receives exceeds the cost of educating the additional students. As shown in the figure, marginal cost is often a U-shaped curve, but in general increases at higher levels of enrollment, because of bottlenecks in production of services to students. For instance, with a fixed number of classrooms, it will become more costly to accommodate more students beyond a point. Thus the marginal cost curve represents the minimum tuition rate that would make it profitable for the school to admit another student. This marginal cost curve is the school's supply curve---but only that portion of the curve that lies above the average variable cost curve (the curve showing per student average cost, excluding fixed costs, of supplying education at different enrollment levels). A school will choose to shut down temporarily if the price drops below the average variable costs, because it will incur losses by opening its doors if it operates at an enrollment level where it is receiving less in compensation for each pupil served than the average cost of educating a pupil.

It is possible for school providers to earn significant profits in the short run; however, in the long run the supply response of individual school providers will be such that the aggregate supply and demand curves intersect at a point where the price (tuition, in the case of private schools) is set so that no school is earning more than "normal" profits. This means that no school provider will receive a rate of return on investment that exceeds the rate of return that would have been received had the investment been in the next best option. For example, if there are large profits to be made in the provision of schooling, more providers will opt to enter the schooling

market, shifting the supply curve to the right, sending the equilibrium price of schooling downward, and hence diminishing those profits. This is an important economic concept because it implies that no providers are receiving “excess” profits and that only those providers that operate efficiently survive in the market. While this concept applies explicitly to for-profit school providers, it also implicitly dictates the level of efficiency that would be necessary for not-for-profit schools to remain open in the absence of any additional subsidies.

Figure 4-1 helps to illustrate how the specific provisions of any choice plan might greatly affect supply decisions. For example, any policy that enhances demand for new schools (such as public provision of transportation, increases in the size of a voucher, or expanded public funding per student for charter schools) would shift the market demand curve to the right, leading to an increase in the equilibrium price level in the market. This increases the per pupil amount that will be received by school i , leading to an intersection of marginal revenue and marginal cost that lies further to the right; therefore school i supplies more slots for students. It is also the case that changes in public school quality would be expected to affect the supply of nonpublic schools. One might anticipate, for instance, that the demand for nonpublic schools would vary inversely with the quality of public schools. Thus, all else equal, we should expect a higher demand and therefore a larger supply of nonpublic schools in areas with lower-quality public schools.

The long-run decision about whether to stay in the market or to enter the market depends on whether revenue per pupil is at least as large as average total cost. Average total cost is the sum of variable costs plus fixed costs (such as land leases or interest payments on permanent equipment), all divided by enrollment. Because average total cost includes fixed costs it is higher than average variable costs.

The decision over whether or not to enter the market is depicted more formally in figure 4-2. In this depiction, there are two average total-cost curves that a school could potentially face. One influence on the average total-cost curve is the costs associated with starting a school: high start-up costs are associated with a higher average total-cost curve, low start-up costs with a lower

average total-cost curve. We can divide the total costs of operating the school into fixed costs, F , which do not vary with enrollment, and variable costs, V , which do vary with enrollment.

Examples of fixed costs are the legal and regulatory costs of establishing a new school, the cost of new facilities, and basic maintenance. Examples of variable costs are teachers and supplies. It immediately becomes clear that average costs will plummet as a school increases its enrollment from zero, because, if E is enrollment, average cost will be $[F + V(E)] / E$, where $V(E)$ indicates that variable costs depend on E . For instance, a school that increases its enrollment from ten to twenty students may incur some minor additional variable costs, but this will probably be outweighed by the fact that the fixed costs are now being shared among twice the number of students. A rise in enrollment, which lowers the fixed costs per student, will lower the average cost per student---but only up to a point. At some point, as enrollment rises the school will begin to run out of space. At this point, adding more students could require the construction of new classrooms, overtime pay for teachers, and the like. Eventually, average cost per student should start to increase.

[Figure 4-2 here]

These competing patterns---declining fixed costs per student and rising marginal costs as enrollment rises---lead to the classic U-shaped average cost curve shown in figure 4-2, which has been observed repeatedly in many real-world studies of diverse industries. In essence, there is a single point that minimizes the operation's average cost per student. The figure shows two possible average cost curves, one reflecting high start-up costs and the other low start-up costs. The school with high start-up costs will have a higher average cost curve, and (as shown) the minimum point of the supply curve will be further to the right. In practice, this means that schools with higher fixed costs will, in general, be bigger, because they need a larger enrollment to absorb the fixed costs.

In the case of the high start-up costs shown in the figure (we discuss some real-world challenges to school start-ups in the following section), the school-specific demand curve

intersects the marginal cost curve in the portion below the average total cost. At this point, the cost of providing this level of enrollment is greater than the revenue received, and the school will choose not to enter the market. By contrast, in the case of the low start-up costs, the same intersection point now lies above the average total cost curve. Schools will opt to enter the market in this case, since the cost of providing this level of enrollment is less than the revenue received, which indicates that the school would anticipate earning a profit from operation. High start-up costs imply that expanding existing schools will be far easier than building new schools.

It is also important to consider the implications of various regulations on both the decision to enter the market and the supply level. For example, regulation of the teacher labor market (such as credentialing) will potentially influence the costs of providing education. To the degree that these regulations increase the cost of provision, the average total-cost curve will be higher, therefore reducing the number of new school suppliers. In practice, there are several reasons that a competitive market structure may not always be the best one to consider in this context. For example, in rural areas there may be relatively few schooling options, which might imply that new school entrants will affect overall market conditions. Also, schools are distinct from one another in many ways, suggesting that they are not perfect substitutes for each other.

A market structure with large numbers of suppliers of a similar but somewhat differentiated product is referred to as monopolistic competition. The differentiation of product results in each school-specific demand curve having a downward tilt; the reason for this is that each school's product is a close---if not perfect---substitute for another. This downward slope signifies that a school is no longer a price taker and can choose the level of per pupil compensation that maximizes its profits.

This does not automatically mean that a school will be profitable, however. Although the school can determine the price, it cannot simultaneously determine the level of enrollment. Schools are still subject to the demand curve. In this case, the school will choose the level of enrollment such that the marginal cost of that level of enrollment is equal to the marginal

revenue. As shown in figure 4-3, marginal revenue from admitting one more student is significantly below the demand curve. This pattern reflects the assumption in the monopolistic competition model that, to increase enrollment, the school must drop its price for *all* students. So if a school receives P dollars from one new student, its total increase in revenues is less than P . [Figure 4-3 here]

The entry decision that monopolistic competitors face is similar to the decision that perfect competitors face: if the profit-maximizing price they set is above the average total cost, then it will be profitable to enter. If the price is below the average total cost, then they will incur losses upon entry and will likely choose not to do so. With monopolistic competition, the demand curve that the school faces depends on the number of competitors and the degree of differentiation among the competitors. Roughly speaking, a school facing a steeper demand curve (fewer substitutes) will have greater profits than one facing a flatter demand curve. In this case, a school has greater incentive to offer a different product than other schools, thus decreasing the amount of substitutability to their competitors.

From this analysis it is clear that schools tend to base entry decisions on their expected compensation as well as the marginal and average costs they face. We have simplified the analysis by looking at a static rather than a dynamic picture of the school decisions. In reality, the average costs that schools consider will be over the length of time that they expect to incur the costs and receive the revenues. Clearly, then, the time frame of these anticipated costs and benefits will affect the cost and revenue curves they face. For example, there are costs associated with uncertainty. Greater uncertainty over how long a choice system will exist increases the costs to potential market entrants, thus reducing the likelihood of entry.ⁱⁱⁱ

In the context of public school choice (that is, charter schools or private schools responding to voucher opportunities), the concept of price is a tricky one. From the school's point of view (which determines market entry), revenue per student is likely to be set by the state, either in the form of a voucher amount or per pupil funding for charters. Thus it would seem at

first that all schools must be price takers and that price is determined not directly by market factors but by political power and institutional factors. However, in practice, successful charter schools are able to augment this revenue, or price, in a variety of ways. Many charter schools, though prohibited by law from charging tuition, do operate at significantly higher cost per pupil than they are allocated by the state: successful schools are able to raise these funds from corporations, foundations, and individual giving by parents. Thus to the extent that charter schools can stimulate this kind of supplemental demand, they can influence the market price and thus increase average revenue. Though it is not the common practice under current voucher programs, voucher schools could, in theory, charge tuition and require parents to “top off” the voucher amount.

The unusual price structure described above is consistent with the monopolistic competition model: as more and more successful schools enter the market, it will become increasingly difficult to attract these extra funds, sending the equilibrium price of schooling downward. From the consumer’s point of view, public education is free, so there is no price except in the rare case of private schools that require tuition in addition to a voucher. For the most part, consumers wishing to choose among publicly provided options (whether they be charters or private schools participating in a voucher program) are making their decision based on product differentiation, not on price. Choice schools, then, unlike other industries, have less of an incentive to lower their cost of production (since it will not necessarily result in selling more of their product) and more of an incentive to differentiate themselves and achieve measurable results that will attract parents and students.

Implications of the Theoretical Model

We must emphasize the importance of uncertainty in determining how many new schools will open should legislative changes result in greater school choice. In fact, we might not even be able to anticipate all the different types of institutional arrangement that might emerge under such a

scenario. For example, one might imagine public-private partnerships engaged in the operation of schools. But, for convenience, the discussion below focuses primarily on schools of choice that have been started under existing choice plans: charter and private schools.

Typically, the enabling legislation for charter schools can be changed by state legislatures without notice. Many states have already done so in the last five years. Similarly, imagine that a voucher system is set up by state-level legislation that, again, can be changed without notice. The prediction that comes out of this immediately is that new entrants to the schooling industry are going to be unwilling to build new schools. After all, the state legislature could cut the funding by half next year, or it could outlaw private provision altogether a few years into the future. This represents a large business risk for potential operators of new charter schools or voucher-funded schools. Therefore, new entrants would likely prefer to take over existing school structures rather than to *increase* the number of schools. One for-profit school operator, Edison Schools, is now following exactly this model.

Similarly, uncertainty about whether a choice school will be allowed to operate over a long period without changes to the funding environment or the regulatory environment could lower the demand for slots in such schools. Dozens of studies confirm that most people are highly risk averse. If parents are considering moving their child out of a regular public school to a charter school, they may hesitate if they worry that its funding might be cut or that the chartering authority might fail to renew the school's charter. This in turn can have a negative effect on supply, as potential school operators take into account the impact of regulatory uncertainty on the demand for choice by parents and students.

What policy changes could be made to lower both the start-up (fixed) costs and the marginal costs of new schools? The regulatory requirements to charter a new school or to open a new voucher-funded school will have a significant effect on fixed costs. Of course, even in the most lax of regulatory environments, the fixed costs of building a new school are substantial. Thus there are opportunities both for government and philanthropists to engage in activities that

would increase the likelihood of a supply response by pooling funding resources to finance the building of new schools of choice. Julian Betts (chapter 2, this volume), for instance, argues that-- - given the large fixed costs of building schools from scratch---creating small schools within an existing large school building could greatly increase competition and choice for parents without a need for new facilities.

As for the variable costs of operating a school, teacher and administrator salaries are typically the most important component. New charter and voucher schools generally do not have to adhere to collective bargaining agreements in their local districts. Also, teachers in independent schools will often accept slightly lower wage and benefits packages in return for greater autonomy. In addition, charter and voucher schools do not have tenure requirements, nor do they have the administrative overhead that districts carry, thus their marginal costs should be lower than regular public schools. However, they are still competing in a labor market that likely substantially overlaps the labor market that public schools draw upon, and thus they must offer reasonably competitive salaries to attract high-quality teachers.

Teacher licensure requirements also represent an important cost factor. If choice schools must follow the same guidelines in hiring teachers as regular schools, then this will, in general, increase the schools' costs. Of course, many argue that there are important reasons for requiring teachers to submit to lengthy credential processes. But this must be balanced against the claims of opponents of the current credentialing process, who argue that it creates a major barrier against entry of talented people into the teaching profession. Allowing recent college graduates, or midcareer professionals who have specialized in certain key subject areas such as math and science, to enter teaching through schools of choice without having first fulfilled the normal credentialing requirements has the potential to improve the quality of public education.^{iv}

In concluding this section on implications of the theoretical model, we point out that economic models of competition predict that education will be provided *efficiently* thanks to the rigors of competition, but the theory does not predict whether education will be provided

equitably. Betts argues that competition can lead to unequal or equal allocations of outcomes across consumers, depending on how buying power is distributed across consumers. In the context of school choice, for instance, a voucher of \$2,000 to every student in a state would arguably aggravate inequalities in the quality of education between affluent and less affluent families; the former would be able to top up these vouchers so that their children could attend the most elite (and expensive) private schools, leaving less affluent families with much more limited choice. In contrast, a voucher system that allocates substantially more per student but that gives vouchers only to less affluent families could arguably do much to lessen inequities in educational outcomes.

The scenario in which public funds are targeted toward less affluent families, via needs-based vouchers or charter schools, presupposes that there exist (potential) school operators who would be willing to provide slots to disadvantaged students. We address this issue, as well as the broader issue of the responsiveness of new schools to economic incentives, in the following section.

The Empirical Evidence on the Supply Side

There are two distinct ways in which supply restraints can slow the development of a school choice system. The first concerns the number of potential school operators who are willing to enter the market. The second concerns the extent to which talented people are willing to teach in schools of choice. We consider both of these issues briefly.

The charter school movement is too new for researchers to have yet grasped the extent to which laws enabling charters to operate induce the entry of new schools. This is even more true of the impact of voucher programs, which to date have been implemented in the United States in only a handful of cities. In spite of this, we have learned something about supply responses in these situations. More broadly, we can glean evidence from research that examines where and why private schools are established.

Supply of Choice Schools

Some of the best evidence to date on the supply of choice schools may come from a related but distinct literature that examines the location decisions of private schools. The most developed research in this regard, by Thomas Downes and Shane Greenstein, studied the location of private schools in California during 1978--80.^v Downes and Greenstein find that private schools are more numerous in public school districts with more children living in poverty. The elasticity of private school slots with respect to the share of children living in poverty in the local area varies from 0.0 to 0.2. Thus the elasticity of 0.2, for instance, indicates that a 10 percent increase in child poverty is associated with a 2 percent increase in the provision of private school slots. This result suggests that, on average, private schools are more likely to locate in poorer areas. However, a countervailing finding is that private schools are more likely to locate in areas with a greater share of highly educated adults. For instance, they find the elasticity with respect to the share of high school graduates in the local population is about 1.0--4.0.

Another characteristic that the authors use is average income in the area. They do not find a strong link between income and provision of private schooling. There are many ways to interpret these results; one is that private schools (many of which are religious) are mission based and seek to serve needy students. Another interpretation is that in high-poverty districts with pockets of gentrification there is greater demand for private schools so the white middle class can escape sending their children to school with the poor children in the public school district. In suburban districts, where income is more uniform, there is not this demand, thus the finding of fewer private schools.

Downes and Greenstein also report that private schools are responsive to the level of crowding in public school classrooms. They find that the elasticity of private school slots with respect to the local public school pupil-teacher ratio is about 4.0. This is an extraordinarily high effect, suggesting, for instance, that a 10 percent increase in the local pupil-teacher ratio is related

to a 40 percent increase in the provision of private school slots. To the extent that parents value smaller classes, this is exactly the sort of supply response that one would hope to engender in a broader system of school choice. It promises that private school provision could equalize school quality to some extent. The vast majority of private schools in the United States are religious, so it comes as little surprise that Downes and Greenstein find that the location of private schools is positively related to the percentage of the local population that is of the same religion and denomination.

More recently, Lisa Barrow has studied private school location in Chicago as a function of characteristics of the local zip code.^{vi} Her findings do not match those of Downes and Greenstein very closely. This could reflect the fact that the two sets of studies are of two different times and places. Furthermore, the Chicago study uses a relatively small sample as well as a very narrow definition of neighborhood that could well be much smaller than the attendance area for a typical private school, thereby missing some of the relations the California studies have found. One important area of agreement between the Downes and Greenstein and the Barrow studies is that private school location does not appear to respond much at all to the racial and ethnic mix of the local area. This finding is relevant, given concerns that increased school choice could spell increased racial segregation. Overall, these studies suggest that the supply of private school slots is quite responsive to the conditions of local public schools districts, as one might expect.

Of course, this does not tell us much about how private schools would react to the provision of public funds through a wholesale voucher program, and these results do not say anything about charter school provision. Less formal evidence on voucher programs and charter schools suggests that the supply of these schools can be very responsive. For instance, charter school growth has been quite impressive nationally, suggesting that even with today's fairly strict rules, new schools enter the market. In Arizona, which has been among the most aggressive states in encouraging the development of charter schools, roughly 7--10 percent of public school students had enrolled in charters by 1998--99.^{vii} In Washington, D.C., more than 10 percent of

students are enrolled in charter schools. Research by Jeffrey Henig and Jason MacDonald suggests that these charter schools are more likely to be established in high-minority, middle-income areas and that their establishment is sensitive to both economic and political considerations.^{viii} For example, they tend to locate in areas of the city with high need (in the sense that the achievement of public school students is poor) and with less competition from private schools.

Experiments with vouchers also provide important hints that a major voucher program could increase the supply of private school slots considerably. Brian Gill and co-authors report on Milwaukee's long-running voucher program.^{ix} Many of the new schools opened after the program was expanded to allow for the participation of religiously based schools, and many of these new schools tend to focus specifically on voucher students, signifying a strong supply-side response to vouchers.^x

Supply of Teachers

We know surprisingly little about how the existence of private schools, charter schools, and voucher programs affects the supply of teachers. If teachers are unwilling to work in such environments, the development of a widespread choice system, even in the most generous of regulatory environments, could be constrained.

In one of the most relevant studies to date, Caroline M. Hoxby surveyed charter school teachers and merged this information with data from the Schools and Staffing Survey on private and public school teachers.^{xi} One of the central questions Hoxby asked was, Which types of school have a greater share of teachers with certain characteristics? Table 4-1, calculated from raw data in the unpublished version of Hoxby's study, provides some answers. Regular public schools ranked first in just two categories: the share of teachers who were fully credentialed and the share holding a master's degree (and charter schools were tied for first in the latter category). Charter schools ranked at the top of a number of other important categories, including the share

of teachers with a math or science major in college and the selectivity of the college from which teachers graduated. Private schools also tended to outrank public schools. Hoxby used these rankings to conclude that the expansion of school choice could increase the average quality of teachers in the United States. Of course, an important limitation of this research is that the charter school movement is still so small that it is impossible to predict whether these patterns will persist if and when charters and other schools of choice become more prevalent.

Dale Ballou and Michael Podgursky suggest that a divergence in hiring practices between public and private schools could explain why private schools tend to employ teachers with greater skills in certain dimensions.^{xiii} They found that private schools have a less compressed teacher pay schedule, allowing pay to be linked more closely to skills. For instance, teachers with subject mastery in areas that are perennially in short supply can be paid a premium. The authors also provide evidence that private schools are more likely than public schools to hire teachers with high ability (as measured by test scores).

While this literature is far too limited to allow for a prediction of the outcome should school choice expand in the future, it does suggest that private and charter schools may bring talented people into the teaching profession, especially if they are not governed by public school licensure requirements.

Practical Barriers to Market Entry

The previous sections outline a theoretical model and initial empirical data that help to predict which factors may stimulate or constrain a greater supply of schools. They also reveal how little is in fact known about the supply responses of private and charter schools. This section draws on the experience of school practitioners to illustrate the greatest barriers to entry faced by charter schools. It then focuses on case studies of three San Diego charter schools to show the complex circumstances and institutional alliances that give rise to and nurture successful charter schools.

Barriers

From a market standpoint, perhaps the number-one barrier to successfully operating a charter school is that initial approval and continuing oversight is by the local school district, whose schools are the charter's main competitors. If charter schools are successful and grow, they often are perceived as draining money from the district. In most states, charter school funding flows through school districts, which can apply fees and assessments based on the district's cost overruns, and charters have no recourse but to pay. As a result, charter schools cannot survive without the tolerance and, indeed, the support of their districts. One of the few districts with a different regulatory arrangement, Washington, D.C., also has the greatest market penetration of charter schools. The city has a separate charter board, which grants and oversees charters.

The market models outlined in the previous sections postulate fixed or start-up costs as another significant barrier to market entry, and this is indeed true in practice. Purchasing land and building a school adequate for 300 students typically costs between \$3 million and \$4 million. Anita Landecker of ExEd, a charter school developer in Los Angeles, points out that this barrier is especially high in California, where real estate values are exceedingly high, even in low-income areas. According to Landecker, to pay market rent or conventional debt service on a suitable property would cost approximately \$1,500 per student, or 20--30 percent of total per pupil revenue. By contrast, in-district charters pay a fee of about 3 percent of their revenue to lease district space. This single factor keeps many choice schools out of the market.^{xiii}

Zoning and building regulations create additional obstacles to opening a school. In some areas, these regulations are so prohibitive that schools without major funding will seek buildings previously occupied by other schools. Paul Hill worries that the supply of new choice schools may be limited in some cities to the "number of abandoned Catholic school buildings."^{xiv} It should be noted that, although building regulations increase costs and thus constrain supply, many of them are necessary and serve the common good. Most of us want our children to go to

school in a building with fire sprinklers, for example; yet if sprinklers were not required, a substantial number of schools would not have them.

The facilities barrier is perhaps the most recognized barrier in policy circles at both the state and federal levels, and there have been several attempts to ease it. A new federal program (New Markets Tax Credits) will provide tax credits to investors in charter school facilities in low-income neighborhoods; another program provides for a guarantee pool to entice more lenders into the unknown and risky market of charter school facilities financing. Both of these approaches are very promising though currently limited in scale. At the state level, efforts have focused on altering traditional public school bonding programs to accommodate charter schools. In California these efforts have not borne fruit: districts that already have major space and financial woes are not willing to make room for charters. State-level bond allocation procedures are so complex, overregulated, and time consuming that most charter operators are unable to tackle them. Tying charters into district facilities may not be the most cost-efficient approach either. Eric Premack of the Charter Schools Development Center likens bond-financed school facilities to the huge public housing projects of the 1960s, when layers and layers of regulation and purported economies of scale gave rise to expensive behemoths like Cabrini Green and Robert Taylor Homes in Chicago. Private developers are now taking those projects apart, using flexible subsidies to create smaller-scale, more cost-effective housing that mixes income levels. Premack advocates “a flexible, ‘Section 8--like’ subsidy” that charters could use for rent or mortgage payment. The challenge would be to authorize such a subsidy for ten years. “California had it for one year, but it was wiped out by the budget crisis.”^{xv}

A related barrier is simply the limited amount of per pupil funding that charters or voucher programs receive from the state. Charter schools are supposed to receive the same per pupil funding as public schools in their state or district do, but in practice they receive considerably less. Districts receive substantial transportation and special education funds, making their per pupil revenue significantly higher than the allocation that charters receive. These two are related,

since facilities represent most schools' greatest expense, outside of wages and salaries. If facilities cost only 3 percent of a school's budget, instead of 20--30 percent, current per pupil funding would be adequate. Conversely, if per pupil funding were increased, charters could afford to pay market rates for facilities. Per pupil funding for charter schools does not provide for transportation, which can cost between \$300 and \$500 per pupil per year. Given the residential segregation of most major cities, implementing a widespread choice system without transportation assistance risks creating a system of segregated schools that mirrors residential patterns.

In addition to per pupil operating funding, schools need start-up working capital. Per pupil funding starts the day the school opens, but there are considerable earlier costs to planning and developing a school, on average about \$400,000 per school. The federal government has a charter schools grant program, administered by the states, the purpose of which is to offset some of these costs, and it plays an extremely important role in enabling new schools to enter the market. However, the program is designed to fund a relatively small number of schools each year and would have to be considerably expanded were a full-scale choice program to be implemented nationwide.

A *Los Angeles Times* article tells the sad story of an approved charter school that closed its doors before admitting its first student, ostensibly due to "red tape and high costs".^{xvi} Eric Premack calls this "re-regulatory creep" and confirms that it is taking place at both the federal and state levels.^{xvii} Charters, which began as a way to deregulate education, are now facing new layers of regulation and reporting requirements related to funding streams, student assessment, and teacher credentialing.

A final barrier to market entry, and perhaps even more to sustaining a successful school, is the instability of funding for charters and the fragmentation of legislation and regulation. Every state has different authorizing legislation, and every district has complete power to regulate and extract fees. This makes it risky to enter the market and difficult to attract investors or lenders to

the venture. It would likely take a nationwide program---and a number of years of stable funding--before operators would enter the market on a scale comparable to other public funding-stream markets, such as housing or health care.

Case Studies

The Preuss School, affiliated with the University of California at San Diego (UCSD), serves 750 limited-income students in grades 6--12.^{xviii} The main impetus for the creation of the school was the perceived need to increase socioeconomic diversity on University of California campuses by providing a single-track, rigorous curriculum to students from less affluent families. To prepare high-achieving, low-income students for the university, UCSD faculty and administrators decided to create a charter school. Students are admitted to the school by lottery, and applicants are limited to those whose parents have no college degree; in addition, students must qualify for federal meal assistance. A major capital campaign was undertaken to raise funds for the \$13 million facility, led by Peter Preuss, a University of California regent and local philanthropist.

The Preuss School was able to surmount the initial barriers to market entry through its affiliation with the university. It offsets limited per pupil funding through ongoing fund-raising, helped out by its university link and by its widely perceived role in righting inequity and creating equality of educational opportunity. Favorable relations with the chartering school district, San Diego Unified School District, ensured transportation funding and made regulation and oversight relatively smooth during the 1999--2002 period. Students have performed well on the state test and are making unusually good progress on completing the "A-G" courses, which refer to the courses in seven subject areas required for students to become eligible to attend the University of California and California State University systems.

The Preuss School; charter was up for renewal in fall 2003. Facing a difficult budget situation, the chartering district did renew the charter in 2003, but rescinded all financial support for transportation. For the 2003--04 school year, the Preuss School instead leased buses from the

district, paid for out of its general funds. This cutback by the district is clearly a costly blow to the school, as by design almost all students are bused to the UCSD campus from relatively disadvantaged neighborhoods, many of which are fifteen or more miles away. The cutback represents roughly a 7 percent cut in funding for the school, at a time when other (state) sources of funding that finance the school's longer school year and longer school day were also at some risk because of California's current fiscal crisis. This episode provides a vivid example of the budgetary uncertainties and risks that charter schools face.

Explorer Elementary Charter School, a K--6 school that focuses on individualized learning, interdisciplinary curriculum, and social intelligence was started in the context of a districtwide reform that standardized curriculum and teaching methods and was perceived by many as rigid. The initial planning group was then joined by a group of parents who were disaffected from their private school. Although it enrolls by lottery as well, due to its focus and its location in a relatively affluent area near a university, Explorer has attracted highly educated, high-income families. Thus while it has no affiliation with a powerful institution, it is able to draw on its parent body for ongoing fund-raising to offset limited per pupil funding. An initially oppositional relationship with the district has now become more favorable due to several years of high and consistently improving test scores. Explorer is still struggling with the facilities barrier but will likely surmount it in the next few years.

The initial idea for High Tech High came from corporate leaders who saw local labor shortages in the high-tech industry on the one hand and inadequately trained young people on the other. The 400-student high school focuses on project-based learning and integrating students of diverse backgrounds in nontracked classrooms. Initial success has led to the creation of a middle school for grades 6--8. Strong corporate relationships helped overcome start-up costs and continue to help with the ongoing challenges of limited per pupil funding. Even with these powerful connections, the facilities barrier is proving extremely challenging; banks shied away

from long-range financing, given the school's five-year charter, and required either a personal guarantor, a shorter term loan, or a higher interest rate.

Because the students at High Tech High come from throughout the metropolitan area, transportation is a critical issue. Initially, the school rented buses from the district and expected the district to subsidize the cost, as the school paid an integration encroachment to the district and the school is integrated. The district balked, and the school sought and received a federal grant through the Workforce Investment Act. This grant covered transportation costs for the first three years of the school, but it ended early because of federal cutbacks. The school no longer provides transportation but subsidizes the bus passes of those students who qualify for federal meal assistance. This change will undoubtedly limit the student pool to those who are highly motivated and further illustrates the financial challenges that charter schools face, particularly if they are not neighborhood schools and seek to be integrated by race and class.

These three examples of highly successful charter schools, though quite different, share common features. Each responded to a very significant context and need, which then translated to a clear mission around which public support and funds could be rallied. Each had access to resources and power, either through the parent body or through affiliation with powerful institutions. Each has had consistently high test scores, helping them to weather criticism or attacks from regulators. What is most sobering though, is that each school, despite great success and significant advantages, is still struggling to operate comfortably.

Conclusions and Policy Recommendations

Market theory predicts that the supply of new schools depends crucially on market price and cost structure. Practical experience shows that these, in turn, are significantly influenced by the political and regulatory environment that schools face, both in terms of per pupil funding and ongoing regulations that can ultimately be prohibitive. In short, lower per pupil funding and greater regulatory costs will constrict the supply of new schools.

For a given infrastructure there is a unique ideal enrollment size such that lowering enrollment below that point will increase costs per pupil needlessly by spreading fixed costs across too small a number of students, and raising enrollment will increase costs per pupil due to overcrowding. However, economic theory cannot tell what the optimal size of schools might be. Real-world experience has convinced many practitioners that large schools are increasingly unable to deliver a high-quality education. The implication is that in a choice system there may be considerably more schools than currently exist in the United States.

The empirical literature is only beginning to study determinants of supply of choice schools and supply of teachers to those schools. Initial data suggest that private schools are responsive to local conditions such as overcrowding and that both private schools and charter schools are able to attract highly talented teachers. There are, however, significant barriers to opening new choice schools, which might limit a supply response under a choice program. Three broad areas of reform would do the most to increase the supply of choice schools while not sacrificing their quality: increases in funding, deregulation, and reducing uncertainty.

---Increases in funding: Although it would be politically difficult to achieve, a simple rise in the funding of charter schools and vouchers would do the most to increase the supply of choice schools. In market terms, it is equivalent to increasing the market price through stimulating the buying power of consumers, or effective demand. Unlike many other types of public service, where increased public funding can run the risk of simply reducing efficiency while not increasing quality, choice schools have a built-in accountability factor, since they are competing with each other and with public schools. Per pupil funding can only be collected for students who come to school, so funding increases cannot be translated into increased revenue unless the school is delivering an education which is good enough to keep attracting parents. Depending on policy aims, funding could be augmented through increasing the basic per pupil amount that schools receive, and it could be targeted to transportation, special education, or facilities assistance.

---Deregulation: Expanding the number of chartering authorities would eliminate district monopoly and encourage more school operators to enter the market. For example, state universities or community colleges could grant charters and oversee them. With multiple chartering authorities, individual schools would have more bargaining power and greater ability to resist extraordinary fees or arbitrary demands by their school districts. Relaxation of teacher licensing requirements would increase the supply of talented teachers to choice schools. Data on private schools, which face no credentialing requirements, show that these schools are able to attract high-achieving teachers. Because choice schools would still have to compete in the labor market with public schools, this deregulation might not translate immediately into lower costs. However, the ability to attract skilled teachers makes it easier to open new schools, sustain them, and deliver high-quality education.

---Reducing Uncertainty: There is no guarantee in any industry against legislative changes that influence market conditions, nor perhaps would we want there to be, because the ballot box is the final arbiter of our priorities and thus of which markets actors should thrive or fail. However, given that public school choice programs have been created by voters in many states, these programs should be implemented in such a way as to minimize uncertainty and thereby encourage more schools to enter the market. Charter schools could be given longer terms, and per pupil funding could be based on five-year contracts instead of fluctuating from year to year. For capital costs, districts or other (perhaps private) organizations could extend loan or bond guarantees to offer security to lenders.