

The Human Capital Market Failure: Using Vouchers to Increase Educational Quality and Productive Efficiency

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The economic importance of education is well established: nations have long known that education is the key to becoming rich. To ensure that American students receive a high quality education, the federal government spends an enormous amount of money on education, at a rate that grows on average 3.5% per year (Hanushek, 1996). However, studies show that the educational quality of many inner city schools is exceptionally poor: even more surprising is that, in most cases, expenditures per student in these schools are comparable to those in non-city schools. Understandably, parents residing in inner cities are enraged by poor educational quality. A recent poll shows that 88% of African Americans were dissatisfied with their current school (Hadderman, 2000). Thus, there is a clear non-market failure: schools are not allocating their funds to obtain a level of educational quality to match what parents expect from the school. That is, there is no mechanism for reconciling private and organization costs/benefits of the school with the costs/benefits of society as a whole.

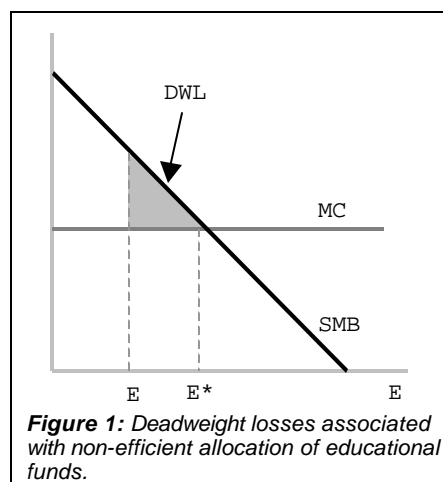
This paper will explain how the failure of public schools to meet parental expectations is attributable to inefficiencies of broad-based government control and the interests of teacher unions. The paper will then suggest how vouchers can be used to remedy the productive inefficiencies within schools and allow schools to deliver a satisfactory level of educational quality.

Failures from Government Control

The American public school system is a large, centralized power monopolized by the government; thus, one would expect that schooling is not produced efficiently because of the classic problems with big government: producers pad costs and provide quality below that contracted for. The first sign of inefficiency is that there is no competitive incentive among public schools (Eysenbach, 1974): they receive money based on area property taxes. As a result, schools often allocate funds inefficiently. It is important to resolve a common misconception about

declining educational quality at this point. Parents pay enough money in property taxes to allow schools to buy ample school inputs to compensate for the loss in education per student. Thus, the non-market failure is caused by the inefficient allocation of funds, *not* the fact that there are more students enrolling in secondary school. Eric Hanushek, University of Rochester, verifies this, noting: “the steady and large expansion of resources devoted to schools has come precisely in areas that are quite unrelated to school performance” (1996). Caroline Hoxby, Harvard University, concurs: “the current ‘predicament’ in school finance is a failure of productivity rather than a failure of spending” (1996).

Figure 1 illustrates the private marginal cost and social marginal benefits of each unit of an educational bundle E, which contains school inputs such as teachers, desks, overheads, etc. It has been widely recognized in labor economics literature that there is both a large private and public benefit from education (Weisbrod, 1962), and thus, there is a social marginal benefit associated with each unit of E. Because of the lack of incentive to allocate funds efficiently, administrators only purchase educational units sub-optimally at E instead of E*. In other words, schools are failing to consider the benefits to society in the amount of schooling they produce because there is no need to – hence, the non-market failure. The deadweight loss associated with this under-allocation



is the shaded region: the amount by which society could benefit from productive efficiency in schools. Though schools could produce past E*, doing so would not be efficient because it would overwork teachers and overexert the resources of the school, which already have very tight budgets. There is also a point where schools can invest so much in education that there is a negative benefit to students.

Educational failure may also arise because of uncertainty over what inputs improve the quality of education the most. That is, school officials could use government money to make expensive educational investments that are not very effective, which would be equivalent to school officials paying too much for one unit of E. Thus, E* is not reached. Such mistakes actually occur very frequently in today’s school system: school officials fund programs that have been shown to not significantly increase quality of education or student performance. The Third International Math and Science Study (TIMSS), administered in 1997, shed doubt (not

conclusively, but compelling nonetheless) on the long-held belief that children necessarily learn better in smaller classes (World Education League 1997). The TIMMS suggests that French, American, and British classes around the size of 20 pupils did far worse than East Asian students with classes two times larger. A study by the Organization for Economic Cooperation and Development (OECD) verified this result, finding little correlation between personal attention and student performance (World Education League, 1997). Thus, the large amounts of money could have been used to purchase more units of E (for example, one good teacher instead of three bad ones) because smaller pupil-teacher ratios only have a small, if any, effect on student performance.

One way state governments have tried to improve quality of education is to set standards for student performance and measuring success by standardized tests. However, because of heterogeneity among instructional quality, standards may cause schools not to allocate educational resources efficiently. Figure 2 depicts two schools that have different marginal benefits for each level of educational investment. This can occur when the instructional quality between the two schools differs. Here, school 1 provides higher educational quality, and as a result, provides higher marginal private and social benefits. This graph assumes that a particular level of educational investment E directly corresponds to a level of student achievement. Intuitively, this is a poor assumption, and the implications

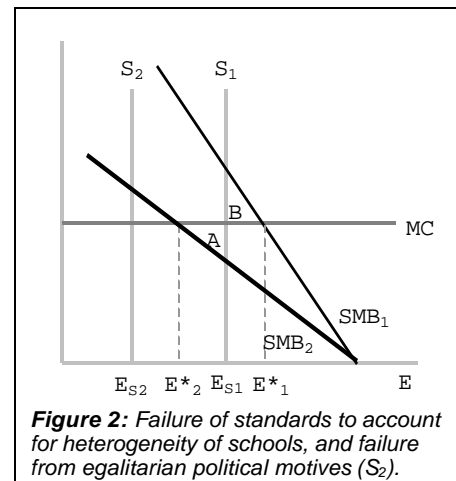


Figure 2: Failure of standards to account for heterogeneity of schools, and failure from egalitarian political motives (S_2).

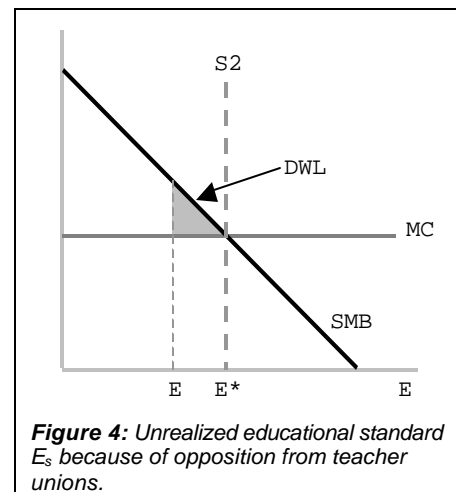
of this bad assumption will be discussed later. If the government sets an educational standard at S_1 , school 2 would be forced to provide education level E_{S1} . At E_{S1} , students would benefit from more education, although they would do so inefficiently: the private costs exceed societal benefits at E_{S1} , causing a DWL of A to society. Overexerting school 2 is not the most efficient way to get more educational quality because school 2's marginal benefit curve is relatively flat, implying that the same educational quality could be produced elsewhere with fewer E . The policy suggested later in this paper will show how this can be done with vouchers. For school 1, E_{S1} is a fantastic standard because schools could choose to operate at E_{S1} and devote extra funds to non-instructional purposes. Since society as a whole does not benefit from these non-instructional expenditures, there is a DWL of B to society. Thus, because of heterogeneity, standards can cause "trouble schools" to overexert their funds and good schools to invest sub-optimally.

However, a common observation among economists and political scientists is that educational establishments and politicians set low standards for egalitarian reasons (Ravitch, 1985; Kramer; 1991). That is, to push up the lower bound of student achievement, politicians may choose standard 2. This pushes trouble schools closer to an optimum level, but can create enormous deadweight losses in good schools if administrators chose to devote extra funds for non-instructional purposes. Thus, productive inefficiencies can arise again.

Our faulty initial assumption that a specific level of educational investment corresponds directly with a level of student achievement causes more difficulties with educational standards. Although student performance heavily depends on the quality of education, educational quality is not the only determinant: others include ethnicity and family background. Thus, there is some uncertainty as to what level of educational investment brings about a desired level of student performance. Many argue that since low-income households tend to send their kids to trouble schools and have a familial background less conducive to learning, trouble schools would have to overexert their funds even more simply to meet a standard such as S_1 , not wanting to take the risk of obtaining a level of performance below the standard. Likewise, households that send their kids to school 1 could have familial backgrounds that are conducive to learning, implying that school 1 could invest even more sub-optimally with S_1 .

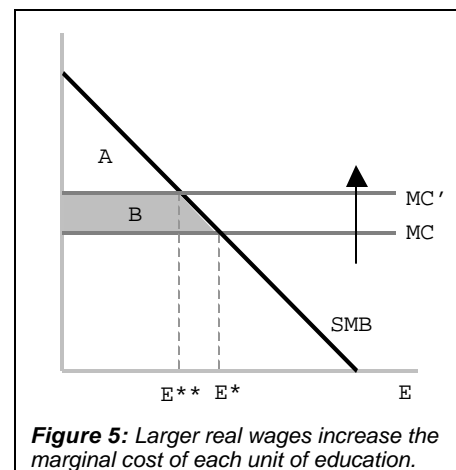
Failures from Teacher Unionization

Another reason for failure of the US educational system is the unionization of teachers. Teacher unions – like all unions in general – look after the self-interests of members. The National Education Association used to be a professional organization. When it and the American Federation of Teachers transformed into unions, teachers stopped working for students and began working for themselves. That is why state initiatives and court cases that seek to curtail union abuses are so important. That is why the AFL-CIO spent millions of dollars to halt them, as it did recently against California’s Proposition 226. Teacher unions hinder education in two specific ways: they give teachers influence to defy standards, and they effectively drive up the marginal cost of education.



The first reason why unions hinder education is that they give teachers the political clout to prevent educational standards. In the previous section, we discussed how standards could be inefficient if they were not at the point where private costs equaled social benefits; however, broad-based standards are useful in that they help schools get *closer* to efficiency. The AFL-CIO is an enormous organization that has vast amounts of money to dissuade politicians from passing standards. Teachers have resented such standards because they feel that every school is so different that national standards are not able to take into account the circumstances of every individual school. Indeed, it may be impractical for a school of exceptionally low student achievement to reach a rigorous standard set. More importantly, teachers feel that standards backed by an exam forces teachers to “teach an exam” rather than really delivering an education. They feel they know the educational situation of their school best, and therefore, should make the final decision about what is taught. Further, teachers believe that standardized tests are a measure of superficial knowledge and do not gauge real learning and real understanding. Because of the political influence of these teachers, governments have a difficult time instituting a standard, and if they do, a standard that is high enough. Figure 4 depicts the results of the unrealized standard S_2 . Because the standard does not exist and there is no incentive to improve, a school will continue to produce inefficiently at E rather than E^* , creating a deadweight loss of the shaded region. The effects of a low standard – for example at E – would have similar effects. They would allow school to produce at a point lower than where private costs equaled social benefits.

The second reason why unions cause inefficiency in education is that teacher unions increase the marginal cost of education, decreasing the optimum educational bundle from E^* to E^{**} , as shown in Figure 5. If a school is allocating resources inefficiently below the optimum bundle, increasing teacher wages *may* bring about a Pareto-improving trade by increasing teacher incomes without sacrificing educational quality. However, from society’s perspective, increasing teacher wages is bad because the best possible E^* decreases. Thus, if a school is allocating efficiently, the aggregate benefit to society – which was originally $A + B$ – reduces by the shaded region B at the expense of higher teacher wages. Furthermore, unions make wages of members sticky downward, making it hard for the marginal cost of education to decrease.



Historically, increasing real wages is a very real problem. Hanushek notes that teachers have been awarded with increasing real salaries, yet the quality of education has been constant at best, and may quite possibly be decreasing (1996). This implies marginal cost has increased without an accompanying increase in marginal benefit of education. Thus, the best possible solution keeps getting smaller, eliminating possible benefit to society. Teachers may further increase marginal costs by interacting with inputs. For instance, they may claim that they are overburdened and request more teachers to reduce pupil-teacher ratios, even when evidence has shown little effect of pupil-teacher ratios on quality of education. Teacher unions also may work together against non-union members who are competing for an incumbent, union member, which also keeps costs high. All of these potential effects are magnified even further because the market for schooling is imperfectly competitive.

A Policy Alternative: School Vouchers

Of the numerous proposed plans, school vouchers seem to be the most promising. The demand for public school choice is steadily on the rise, and a recent survey showed that 88% of African Americans were in favor of school choice plans provided by vouchers (Hadderman, 2000). The voucher policy analyzed in this paper will be limited to public schools because there are many additional complex legal issues that arise from implementing voucher programs with private schools. As they do today, public schools will receive a portion of tax revenues determined by property taxes of the area, number of students, and attendance. Our voucher system will follow these guidelines (Hoxby, 1996):

1. the accepting school would be paid the cost of schooling the additional student plus an additional premium for accepting the student
2. the accepting school would tax the sending district its average per-pupil spending
3. the accepting school would tax the sending household the difference between average property taxes in the receiving district and its own property taxes
4. any remaining voucher amount would be split equally between the district (the voucher) and the household.

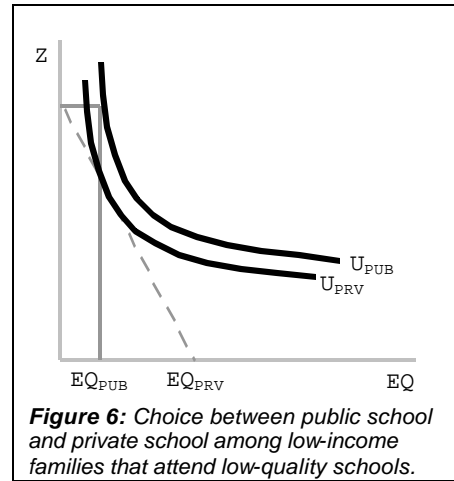
The fact that households have to pay the difference between property taxes ensures that the household is not free-riding off the property taxes from better schools. The money the accepting school gets in excess of its costs gives schools profit-incentive to perform better to attract more students. A common misconception to note here is that the average amount of money spent per pupil in inner city schools is extremely low, when in fact, it is fairly comparable to – and in many cases exceeding – those in suburban/urban areas. Thus, the amount paid to the

accepting school is not terribly high. Because the author is a believer in gradual policy actions, the proposed plan will make vouchers available only to trouble schools as identified by the government. Vouchers are a fairly new system without much empirical backing, so once the results of this plan, along with other studies are analyzed, the voucher plan can be extended to more households.

Let us explore the decisions of families who reside in failing school districts. Assuming families have well-behaved preferences, Figure 6 depicts the decision between private and public schools for low-income families. On the x-axis is amount of educational quality (EQ) and number of students in the school), and on the y-axis is everything else (Z).¹ The budget constraint for public education is rectangular because it is largely free, allowing the household to spend all of its money on everything else, Z. Because the children of these families attend low quality public schools, they can receive at best E_{PUB} amount of education. Because private school is so expensive to these families, the private school budget constraint (dotted line) is very steep, implying that the household must give up many units of Z to afford an additional unit of E. The budget constraint is linear because there are many private schools that a family can choose from, and schools with more educational resources cost more to attend. Thus, more units of E necessarily imply fewer amounts of everything else (Z). In this particular case, the cost of private school is so expensive that the household chooses to attend public school ($U_{PUB} > U_{PRV}$). Notice the maximum amount of education the child of this individual household could receive at a private school is E_{PRV} , which is much higher than E_{PUB} . There are also probably more expensive private school alternatives that the household definitely cannot afford, and as a result, these are not reflected in the budget constraint.

¹ We will define educational quality (EQ) as a function of: i) the area under the marginal benefit curve up to the educational bundle E the school invests in and ii) the number of students in the school. There is not a linear relationship between EQ and number of students. That is, doubling the number of students does not imply EQ halves per student.

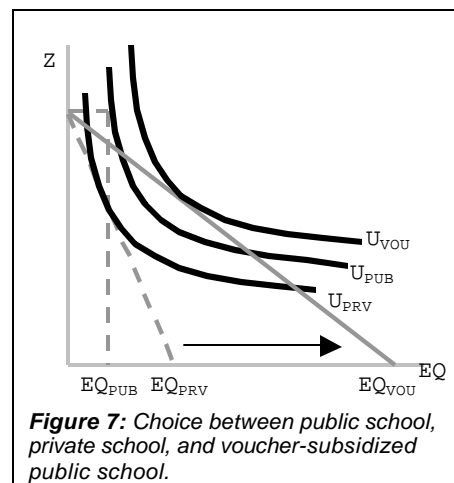
For low-income families, school vouchers beget the appearance of a new budget constraint. Because vouchers subsidize the cost of education at a better public school than the student's current school, another budget constraint much flatter than the private school budget constraint can be drawn. The larger the voucher size, the flatter this new budget constraint is. If the new voucher-subsidized public school is flat enough, the family could reach a higher level utility, depicted in the figure as U_{VOU} in Figure 7.



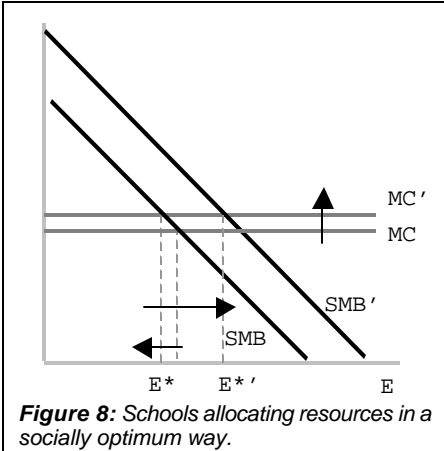
As students leave bad schools and enter good schools, there will be a competitive pressure for bad schools to allocate resources efficiently:

cut costs to boost productivity and increase quality of instruction. Studies have shown that schools spend a large amount in areas that are unrelated to student performance and educational quality (Haushek, 1996), and there are many things schools could do to boost productivity (Hoxby, 1996). Thus, competitive pressures arising from leaving students will force schools to please the school district by considering social benefits along with private costs to reach the largest allocation of resources, given a particular set of marginal and social marginal benefit curves.

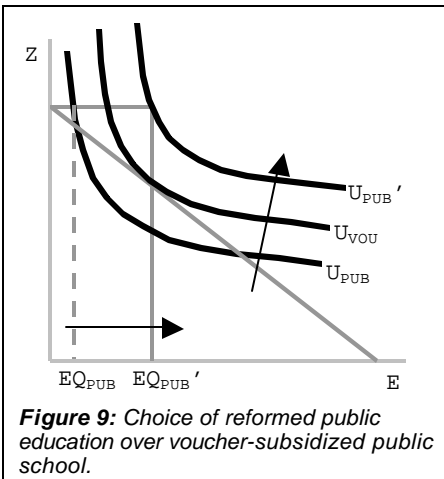
Schools would also be compelled to cut extraneous marginal costs and maximize the amount of educational investment per dollar. Doing so would lower the private marginal cost of education, boost productivity, and effectively raise the optimum level of education that schools can deliver. Extraneous costs in real schools are often non-instructional costs, which have been growing at a large rate (Hanushek, 1996). Because inner city schools spend just as much per student – often more – as suburban/urban schools but often produce lower educational quality, it makes sense that there is plenty of room for productivity increases in inner city schools. Where exactly these cost-cuts need to be made will be let to the discretion of the school administrator.



Schools would also be compelled to hire better teachers, which studies have shown is the main factor that affects quality of education and student performance (Summers and Wolfe, 1997). Hiring better teachers would increase the marginal benefit of each unit of education, again increasing the optimum amount of educational investment. However, attracting better teachers may be difficult because better teachers usually have more experience and hold higher degrees. As a result, higher wages, salaries, and benefits would have to be provided to attract excellent teachers, for example, Ph.D. holders. Such actions would slightly increase the marginal costs, but increase marginal benefit by much more, raising the optimum level of education from E^* to E^{*} . Schools could also hire very qualified teachers at low cost, for example, holders of bachelor degrees participating in the Teach America program. Doing so would increase marginal cost by less (maybe even decrease), and if instructors were well chosen, there would again be a large increase in marginal benefit. Furthermore, it would be in the school's best interest to hire very well qualified, non-union teachers, although such actions will be met with resistance from incumbent teachers. Administrators should block out union resistance and hire extremely well qualified teachers to undermine the influence of the union and avoid the problems they cause.



The result is that the quality and quantity of education would increase in trouble schools. Thus, the rectangular public education budget constraint, depicted in Figure 9, is shifted out rightward, and at the point where U_{PUB} ' equals or exceeds U_{VOU} , then the voucher-student will return to his home public school, where he can get a better education and not pay extra money. The government should also establish a fund to award trouble schools for improving educational quality.



Discussion and Conclusion

Because school vouchers are such a new idea, and their changes so widespread, it is difficult to measure their efficacy. There are, however, many clear benefits to this system described above. One advantage is that the

aforementioned plan eliminates the free-rider problem and does not cause major changes in moving patterns. Vouchers are only provided to students that attend flagged trouble schools, and the sending family household is charged the difference between their current property tax and the average property tax of the accepting school district. The household and the government also pay an additional premium to the accepting school above their average cost per student, and this amount is split between the household and the school district voucher. Thus, the voucher-carrying student is not free-riding because the household may actually pay more on average to attend the accepting public school. This would prevent major changes in moving patterns because there is little incentive to “beat the system” and move to a bad district and use vouchers to attend a good school. Though the household may be paying smaller amounts in property taxes, it may actually pay more than the average household in the accepting district pays. A household is better off living in an area of higher property tax and not paying the extra premium. Chances are, districts with higher property values are nicer areas to live in anyway.

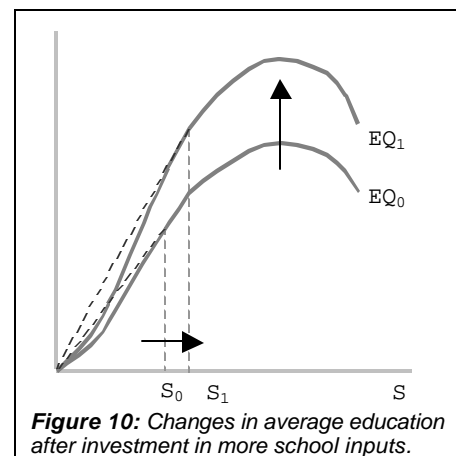
Another advantage is that as leaving students induce bad schools to cut costs and improve educational quality, profit-incentive induces good schools to improve even more. Thus, the aggregate supply of high-quality education increases, and schools begin to consider societal benefits, which would bring the standard of education closer to the one that parents expect – hence reducing the non-market failure. Furthermore, competition-induced increases in productive efficiency could effectively decrease the price of education, making it more affordable for those in bad public school systems to attend even better public high schools. Students who decide to remain in failing public high schools actually benefit from voucher-students attending other schools because the trouble school is forced to cut costs and improve educational quality. This may be a free-rider issue in a sense because students in the trouble school receive benefits without compensating the voucher-students. However, this would not be a significant issue because changes in educational quality will most likely come about gradually, and if a person really valued education enough, he would be willing to pay to ensure that he received a better education rather than hoping that the school would improve within the near future.

One main topic of debate is the pace of educational changes. Some argue that it would be difficult for a failing inner-city public school to attract any talented teachers because they are such undesirable places to teach. To remedy this, a federal or state grant should be established to enable problematic public schools to attract good teachers through high salaries and benefits. This grant should be through application only, and a panel would

review the school's finances, paying close attention to whether or not the school is putting its resources to the best use. If the school really is working close to its optimum efficiency and is unable to obtain good school inputs due to a lack of funds, the school could be given such a grant. Once grants are established to attract highly qualified teachers into public schools, it would be easier to attract even more good teachers because they are more willing to teach at better schools (Welch, 1966). Thus, there is a sort of "snowball effect": as schools improve, it would be easier to attract better teachers. The same type of reasoning applies to good schools. As they attract more students, they receive amounts of money in excess of the cost it takes to educate the marginal student. The school would use this money to provide even higher educational quality because doing so would attract even more students, further increasing profits.

Another advantage of vouchers is that making families pay for a portion of the tuition costs makes families value their education more. Studies have shown that consumers value goods more if they physically pay out of their pocket for them (Shales, 1998). Thus, parents would take their children's education more seriously and would be more willing to take an active role in their child's education. Studies have also shown that students that have parents that take an active role in their education perform better in school (Shales, 1998).

However, there are also disadvantages of school vouchers that must be considered. One problem critics point out is the unclear effect on accepting schools. Marginal benefit could increase when the student joins because for each unit of E , there is another student that privately benefits and brings about a positive spillover benefit to others. However, more students could decrease the average quality of education each student receives in a given school. Thus, students who live in good school districts could be hurt because they are not receiving as good an education on average. However, such declines are small if they exist at all, because schools are not only compensated for their cost of educating the marginal student, but are also given an extra premium that could be used to purchase more than enough inputs to compensate for the decrease in average education. It is the job of the school administrator to see that this happens. In fact, average education may even increase if education is viewed from the standpoint of a production function, as Figure 10 depicts. If the school reinvests the money it earns from voucher-students to purchase more



school inputs, the amount of education that the school can provide for each student increases, which could in turn increase the average amount of education for each student. Furthermore, it is not even totally clear that greater number of students is a detriment to educational quality. As stated before, pupil-teacher ratios do not necessarily increase quality of education, as the TIMMS exam and an OECD study concluded. Therefore, with a good teacher, each student in a class of 20 could learn approximately the same amount as each student in a class of 25 people, controlling all other variables. Thus, it is uncertain whether the educational quality for each student in the good public school will decrease. Furthermore, it is not probable that a school would reach the point where it was so overcrowded that it simply had no space for another student. This is because the public school are overcompensated for the cost of educating the student, and sending households consider how crowded the accepting school is in deciding whether or not to enroll. Thus, it seems that schools should almost always be able to accommodate another student. In practice, there may be situations where schools cannot expand fast enough to accommodate all new students, and in such cases, the school administrator should enroll as many students as possible on a first-come, first-serve basis, directing the rest elsewhere.

Another disadvantage of vouchers is that as school quality improves within a district, housing prices will increase, increasing the amounts families pay in property taxes. However, this is a direct consequence of improving school quality. There is no way to avoid increasing housing prices because they are determined by a market.

The most difficult problem that would have to be dealt with is the bureaucratic costs that would have to be paid to implement such a voucher system. The following are the institutions that would have to be established:

1. a committee to carefully inspect every school to determine its quality of education
2. an accounting committee to approve/distribute vouchers and enforce payments
3. a committee to review grant applications for schools in really bad shape
4. a network of busing to transport students to accepting districts
5. a committee that published annual reports on the educational quality of all schools and the exact specifications on how much going from one school to another would cost.

All of these costs could amount to quite a considerable sum. The most expensive of these costs are the ones pertaining to information on school quality. It takes considerable manpower to inspect every individual school and compile comprehensive statistical reports detailing resource allocation and quality of education. This task is made more difficult by the fact that the quality is difficult to measure and may require expensive standardized tests. After every school is examined, comprehensive reports have to be organized in a simple, understandable manner for all households. Every school must then be re-examined annually so that administrators may monitor the value

of vouchers. With the implementation of this voucher plan, one can also expect the property values of districts begin to rise faster than usual, and as a result, a meticulous accounting staff would need keep track of all of these changes and how they would affect voucher values and the payments between households and districts. To make things run more efficiently, it would probably be helpful to minimize the scope of these duties and committees: perhaps one set of these groups for every county could be formed, and counties could collaborate their data. Administrating education on a local scale is very important because committees that are too large and cover a broad area tend to be inefficient. Furthermore, local committees would take more of an interest in the reports because it affects them personally. More unattached state committees may put less effort into it.

Another issue that voucher-opponents point out is the high cost of busing. Because movement from one county to another would be fairly common, committees between counties would have to convene to find efficient ways to transport students from one school to another. It seems unlikely that busing would be that expensive because there is already a network that transports students from their homes to schools, and because typically middle schools begin school earlier than high schools, voucher-carrying students could be brought to their local middle school, and from there, a bus could carry all students going to each high school. Because the suggested voucher implementation only allows students in failing high schools to attend different schools, most students would come from the same areas, and extensive busing would not be needed. There would probably only be a small increase in busing costs because only a few drivers would be needed to work a few more hours a week.

Another point of contention over vouchers is that they are unfair: households of underprivileged students may actually have to pay more to attend a good high school than a household that already lives in the area. Some claim this to be un-egalitarian. However, this does not seem to be entirely true. An underprivileged household may have to pay more in raw amounts, but considering what it is received in return, they receive just as much, possibly more than the students in good districts. The student from a well-off household has to pay their property taxes, and it is only fair that the underprivileged household have to pay close to the same amount in property taxes because it is receiving the same level of education. Further, households also have to pay part of a premium given to the accepting school (which means the underprivileged household may pay more). However, this premium would not be terribly large because the government would subsidize most of it with the voucher. After all, the government is trying to help underprivileged students, not make a profit off of them. Further, considering what

underprivileged households get in return, it seems they may get the better end of the deal. The government has enormous bureaucratic costs and busing costs to pay. The underprivileged school is also given the opportunity of a lifetime: to get an education in a much better institution when before, they would not have had such a chance if they did not move out of the district. Thus, vouchers seem like a fair plan, and people only begin to view this plan as unfair when they look at it in terms of “rich people should pay more, poorer people should pay less,” when fair *should* be defined as “everybody should pay the same amount to receive the same quality of education.”

As one can see, school vouchers could indeed be a very good plan to boost quality of education in both good and bad schools. The policy presented in this paper prevents voucher-students from free-riding, does not cause large changes in moving patterns, helps schools improve faster, and makes low income households take a more active role in their children’s education. Disadvantages of this voucher system are the unclear effects on accepting schools, increasing housing prices, and large bureaucratic/busing costs that must be paid. Overall, it seems that the presented policy would be effective, and once implemented, it would help solve the non-market failure of schools failing to meet educational standards expected by the public. In fact, evidence is already beginning to emerge as studies have shown that test scores of voucher-students have shown a statistically significant increase (Howell, Wolf, Peterson, and Cambell, 2000).

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