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School Vouchers: Choice, Competition and Accountability

The Chilean Case

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Abstract of the Dissertation

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In this dissertation I test a series of hypotheses on parents' attitudes and behavior, and schools' responses to competition in a universal school voucher system based primarily on Chubb and Moe's (1990) theory of the effect of bureaucratic versus market accountability in schooling and on Milton Friedman's (1962) proposal of market reform in education. I empirically investigate parental sorting across schools, parents' satisfaction with their child's schooling experience, and parents' perceptions of their options in case of school failure. In addition, I empirically investigate schools' perceptions of and reactions to school competition under universal school choice.

Regarding parental choice, I find that parents are screened with respect to their demographics, which may lead to self-screening and exclusion of a portion of the universe of schools from the choice set based on non-academic criteria. Examining parents' choice sets with respect to the geographical location of their choices, I find that

parents disproportionately choose schools in their township, and only those who seem to have the ability to be mobile include schools from other townships in their choice sets. I also check to see if parents tend to flee from poor neighborhoods to schools in wealthier neighborhoods. I find no supporting evidence on the universal school vouchers' ability to give parents living in poor neighborhoods the incentive to change their students' educational environment.

Regarding schools' perceptions of competition, public schools seem to perceive significantly more competition in the environment compared to schools in other sectors. This perception may put pressure on them for improvement if the competition revolves around academics. However, descriptive analyses of school principals' choice sets show that they perceive mostly schools with higher socio-economic status (SES) as their rivals, which may suggest that public schools fear losing students with higher SES to schools with majority high SES parents.

Regarding parental satisfaction, I find that, despite decreases over time, parents' satisfaction with private voucher schools remain higher compared to public school parents at any point in the panel. Although what goes into overall parental satisfaction is unclear, it is the general satisfaction with the private voucher school sector that can create a constituency around the sustenance of school voucher reform. I also tried to get traction of the meaning of private voucher school parents' high overall evaluations of their schools by looking at their satisfaction with specific features of their schools. The results suggest that private voucher schools are not significantly more satisfied with their schools' academic quality, teacher, or principal compared to public school parents. Rather, they seem to like those aspects of the school less directly related to academic

quality such as extracurricular activities. The results show that private voucher schools' accountability to parents may not give schools the incentive to improve their academics more compared to public schools, or unleash competitive pressures on public schools based on academics. Instead, they may compete with public schools based on less-academic features of the school.

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CHAPTER ONE

Choice, Competition and Accountability and Universal School Vouchers

I. INTRODUCTION

In this dissertation I test a series of hypotheses on parents' attitudes and behavior, and schools' responses to competition in a universal school voucher system based primarily on Chubb and Moe's (1990) theory of the effect of bureaucratic versus market accountability in schooling and on Milton Friedman's (1962) proposal of market reform in education. I empirically investigate parental sorting across schools, parents' satisfaction with their child's schooling experience, and parents' perceptions of their options in case of school failure. In addition, I empirically investigate schools' perceptions of and reactions to school competition under universal school choice. My primary aim in this dissertation is to make general statements regarding how parents perceive and react to a schooling system with universal vouchers where public and private voucher schools coexist.

There are several reasons why investigating parental attitudes and behavior in a universal school voucher system is important. First, a universal school voucher system is the logical conclusion of school choice reforms anchored in market models of education (Belfield and Levin 2005). School choice advocates have attributed policy failure to partial marketization in limited school choice experiments (Chubb and Moe 1990: 217). However, the margin of error due to limited application of market reform is much smaller in a universal school voucher system compared to other school choice reforms. Testing the claims of school choice proponents against the most market-like school choice reform

(Buckley and Schneider 2007) can greatly contribute to our understanding of the limits of the market metaphor in education (Henig 1994). If high competition and unlimited parental choice can not deliver the expected outcomes in education then a revision of our theories on schooling markets would be necessary.

What makes parental attitudes particularly important is the fact that school choice reform is heavily dependent on the behavior of parents. Parents are expected to look for academic quality in schools, make academically correct choices when given a wide array of alternative schools, and be sensitive to how schools perform once a choice is made. Existing studies have shown that parents perform poorly in their school search compared to what is expected of them for the success of school choice reforms (Schneider et al. 2000; Elacqua, Schneider, and Buckley 2006, Schneider and Buckley 2007).

However, these studies investigate primarily the effect of choice compared to no-choice, i.e. when in fact a default schooling system is available to parents. Unlike limited school choice, all parents have to make a choice in a universal school voucher system. This may affect how parents perceive the public-private nexus, make their choices, and respond to their child's schooling experience. Hence, studying parental attitudes and behavior in a universal school choice system gets us closer to a clean test of the behavioral assumptions behind the idea of having a market for schools.

Second, school choice advocates propose further marketization based on empirical studies conducted in limited choice environments where either the entry into the schooling market or the eligibility of parents is regulated (Howell and Peterson 2002). However, given the existing design of school choice reforms we do not know what a large scale application of educational privatization at the K-12 level would look like. This

dissertation uses the Chilean case where large scale privatization created a sizable private voucher school sector. The Chilean universal school voucher system was modeled after Milton Friedman's proposal for school vouchers (Friedman 1962), and its basic structure has remained the same since vouchers were made available in 1980. By using the Chilean case this dissertation aims to close some of the gaps between school choice advocates' claims and the empirical evidence.

Last, when school choice is carried to its logical conclusion and a universal school voucher system is created, school finance and governance will be separated. The former will be public for most schools except for private non-voucher schools whereas the latter will be private only for private voucher schools. Given universal parental choice -the source of competition for all types of schools-, differences in the governance of schools become important determinants of schooling outcomes. Unlike an ideal market where supply is private, in a school voucher system school sectors with public and private governance live side by side. This dissertation aims to shed light on how this mixed system reflects on the receivers of a publicly financed service, schooling.

II. STUDYING SCHOOL CHOICE: SOME PRELIMINARIES

Education is a complex and multifaceted good (Schneider et al. 2000). It affects the individual, the community, and society at large. A person's educational attainment is one of the most important determinants of life chances in terms of employment, income, health status, housing, and many other amenities (Belfield and Levin 2007: 1). Societal externalities of schooling are far-reaching ranging from greater income tax revenue (Rousse 2007: 101) to reductions in morbidity and mortality (Muennig 2007: 125) and reduction in crime (Moretti 2007: 153). Because its benefits accrue at different levels, the

extent to which education should be a private or a public responsibility has been contentious.

Unlike an over-arching justice system, or national security which have been largely considered the duty of the governing authority, because of its public and private dimensions education displays a mixed historical record in terms of its provision. Although education had been a matter of private decisions and involved mostly religious instruction almost a century ago, as the notion of a "citizen" matured at the beginning of the last century national education systems proliferated throughout the world.[1] In addition, returns to schooling changed as the stock of information increased immensely, and societies have become ever more complex and interlinked at different levels. As a result, not only the true mix of public and private dimensions in education may have changed over time but people's understanding of who should provide the basic service of education, i.e. schooling, and its goals have also changed.

Education policy proposals paralleled these developments in the United States. The US education history nicely illustrates the interaction of social change and the shifting balance of the public and the private in schools (Rury 2002). As the US experience from common schools to progressive reforms and to current debates revolving around school choice demonstrates the multifaceted nature of education allows different groups to emphasize different dimensions of education, public or private, and attribute different goals to schooling ranging from parental satisfaction to public goals such as academic achievement, the creation of a responsible citizenry, a competitive labor force, or reduced

[1] For an excellent ethnographic study of the clash of old and new paradigms on education in the context of Turkey, see "The Pedagogical State" by Samuel Kaplan (2006).

poverty.[2] In turn, the same complexity allows for policy proposals that experiment with the public and private dimensions of schooling when the goals attributed to education are not achieved.[3]

However, the changes in the public or private organization of schooling, i.e. different degrees of privatization, may not necessarily alter the parameters that would determine the achievement of different goals attributed to public education. The societal goals attributed to education do not follow from a coherent grand theory of education where variation in public and private dimensions alters those outcomes. Even if this is at all possible such a theory is currently missing. As a result, given societal priorities, the study of school choice proposals becomes particularly challenging. Such proposals are anchored in the ideal market model which promises first and foremost efficiency whereas societal considerations are often beyond that.

As an alternative to market models of education that dominated the study of school choice, researchers have come up with a list of qualities that help define effective schools such as small size, small administrative overhead, high expectations for all students, a strong sense of mission and culture (Ravitch and Viteritti 1997). Although such a list describes those school qualities that seem to be linked to high student achievement we do not know the kind of intervention necessary to obtain these school qualities

[2] See Belfield and Levin 2005 p. for different combinations of the public and private dimensions under different school organizations.

[3] For instance, school choice advocates referred to the contentious National Commission on Excellence in Education (NCEE) report titled "A Nation at Risk" (1983) in the 1990s because it attracted the public's attention to declining test scores. The same report did not include evidence linking school choice to improved test scores.

simultaneously. Once again, an overarching theory relating effective school qualities to underlying policy variables is missing.

Given the nature of school choice proposals the framework within which school choice reforms are mostly investigated has been the ideal market model. In addition, the market failures perspective highlights the impediments to a perfectly functioning education market (Buckley and Schneider 2007). However, as mentioned above, there is disconnect between the societal goals attributed to school choice reform and what market models of education predict markets can achieve. This results in a discrepancy between the multitude of research questions of interest to the public and the hypotheses based on the theories at the researchers' disposal. For instance, as Okun's Law suggests some of these goals such as social mobility or decreased poverty may be in conflict with efficiency, the promise of the markets. Others such as increased test scores may not necessarily follow from a change in the public and private components of schooling. These considerations have led researchers develop lower level theories that relate the predictions of the market model to aforementioned societal goals such as the effect of competition on increased academic achievement (Hoxby 2000; Teske et al. 2000; Howell and Peterson 2002), or on educational innovation (Teske et al. 2000) that can help failing schools.

In addition to multiple theories used in studies of school choice policies, these policies are evaluated based on a mix of criteria (Buckley and Schneider 2007; Belfield and Levin 2005). For instance, Belfield and Levin (2005) set out four major goals of education to consider: choice, efficiency, equity, and social cohesion. The authors argue that "a balanced understanding of approaches to educational privatization could not be

undertaken without examining the specific details of a proposal and measuring its consequences against the four goals." Similarly, in a study of Washington D.C. charter schools, Buckley and Schneider (2007) argue that the debate over charter schools can be thought of as encompassing five dimensions: competition, choice, community, accountability, and achievement. In brief, researchers' interest in school choice is far beyond the predictions of a competitive market model despite the fact that the studies are anchored in the ideal market model.

The idea of having a market for schools was propagated by Milton Friedman (1955, 1962) in the last century. During the 1990s his ideas for educational vouchers served as the foundation for several school choice proposals. He argued that the most important justification for government intervention into education is "neighborhood effects", which can be taken care of by setting the minimum required standards in schooling and by giving parents educational vouchers that can be spent in profit or non-profit institutions. Hence, private and social costs of schooling would be equalized and the schooling market would run efficiently. However, considerations of "technical monopoly" in sparsely populated areas and the provision of a common core of values in instruction led Friedman believe that a combination of public and private schools would be justified, at which point he departs from the market model and argues that competition in such a mixed system would improve all schools, public and private. Such a system, however, is quite a distance away from the ideal market in neo-classical economics where government intervention is absent except as required by social externalities. Rather, it is a move towards a competitive market by means of incorporating private administration of public funds, hence some competition.

However, the "general theory of the second best" holds that if one optimality condition in the perfectly competitive model is not satisfied, it is possible that the next-best solution involve sub-optimal levels of the others (Lipsey and Lancaster 1956). In other words, it may be better to let two market imperfections cancel each other out rather than making an effort to fix either one. Thus, it may be optimal for the government to intervene in a way that is contrary to laissez faire policy. This suggests that the details of the policy domain matter the most, and that an improvement in market perfection in one area may not imply a global improvement in efficiency.[4] Accordingly Buckley and Schneider (2007) argue that privatization has the potential to increase costs and reduce benefits in a complex system like education.

In fact, Friedman himself was cautious in using the market as the benchmark and instead treated choice almost as a good in itself to justify the coexistence of public and private sectors in a school voucher program. Given the problems inherent in using the ideal market model school choice skeptics questioned the use of the term "market" in education. Henig (1994) suggests that market in the case of schooling can best be understood as a metaphor. [5] Other school choice skeptics have argued that such a metaphor would be misleading as it gives the public the impression that choice will bring

[4] For example, breaking up a monopoly in an industry which heavily pollutes the environment can increase pollution by increasing output. Breaking up a monopoly which produces an experience good would further complicate existing informational problems by increasing the variation in the experience good as suppliers increase. If that experience good has externalities further governmental intervention into the economy would be needed as competition would increase output which in turn increases at least the level of the externality.

[5] Robert H. Nelson in "Economics as Religion: From Samuelson to Chicago and Beyond" (2001) argues that the market model in economics itself should be considered a metaphor used in order to promote the "value" of efficiency.

about the same competitive effects as in other markets of less complex and multifaceted goods (Smith and Meier 1995).

As a result, institutional perspectives become more useful in the study of school choice because they help us see the specifics of the policy domain and the policy better. School choice policies that allow for private schools are specific combinations of public and private dimensions in schooling, each one of which can engender different sets of organizational structures in schools. Such institutional experiments are best studied with an eye on the new sector/s they generate. This is perhaps the reason why in "Politics, Markets, and America's Schools" Chubb and Moe (1990) advocate school choice based on the virtues of market accountability inherent in private schools. In fact, their argument for school vouchers, the most radical form of school choice, depends to a large extent on a priori assumptions about private schools and the accountability system assumed to govern them. As a result, their critiques test the inter-sectoral differences that follow from Chubb and Moe's (1990) institutional analysis (Fiske and Ladd 2000; Smith and Meier 1995).

This is particularly useful because if the market "metaphor" is carried to its logical conclusion and a universal school voucher system is instituted, public and private sectors will coexist and both be exposed to parental choices. Hence, the relevant comparison will no longer be a comparison of choice and no-choice systems, but of public and private sectors and the incentives given to these sectors and the parents. In brief, we need a theory that goes beyond the market metaphor and provide a model of school choice applicable in different choice environments including a universal school voucher system. Chubb and Moe's (1990) institutional focus provide the framework within which

variation in educational and societal outcomes can be studied in cases where competition from the private sector is the rule for all school sectors.

Given these considerations, it is clear to see that the study of school vouchers is complicated. Although much of the work in school choice is propelled by the market model, the outcomes expected of market reform may not necessarily depend on the public-private divide. As a result, researchers should consider theories that relate market reform to outcomes of interest such as academic achievement and social segregation in their evaluations of school choice policies. Moreover, school choice policies should be evaluated against multiple criteria that take into account these broad public concerns. What is even more complicating for the researcher is the realization that the idea of having a market for schools is problematic not only because of market failures but also because school choice is a move towards a market where public and private sectors live side by side. As a result, investigation of such a mixed system requires institutional theories that explain variation in educational and societal outcomes especially in cases where competition applies to both public and private sectors.

Accordingly, this dissertation evaluates universal school vouchers, the most market-like form of school choice where parents can choose public or private schools, using primarily Chubb and Moe's (1990) theory of the differences between public and private schools. In addition, this dissertation uses theories anchored in the market model and the market failures perspective to investigate hypotheses related to competition. Moreover, the dissertation uses several dimensions to evaluate universal school vouchers such as the level of competition, the extent to which choices are available to parents, and accountability to parents (Buckley and Schneider 2007).

This dissertation uses the Chilean universal school voucher system to test hypotheses on school vouchers. Most empirical studies in the US focused on the effect of limited parental choice programs on a host of educational outcomes. The empirical findings from these programs have often been used to support the idea of having a competitive market for schools (Howell and Peterson 2002; Hoxby et al. 2003). This creates a discrepancy between claims based on empirical studies in limited choice environments and the hypotheses based on assumptions of high competition. In order to test claims on the effects of a competitive schooling market this dissertation makes use of a mature universal school voucher system where the private sector supply is substantial. The Chilean universal school voucher system was modeled after Milton Firedman's original proposal of school vouchers and has kept its structure since 1980. Moreover, minimum market-entry requirements and the size of the voucher school sector, particularly in urban Chile, makes the Chilean school system a particularly good case to test hypotheses that assume high competition.[6]

Last, this dissertation focuses on parents' perceptions and choices and to a lesser extent on school principals' perceptions of and responses to school competition. The question of whether school competition unleashed by school choice policies can engender increases in academic achievement as measured by standardized test scores has been extensively studied in Chile (McEwan and Carnoy 2000; McEwan 2001; Hsieh and Urquiola 2006) and will not be addressed in this dissertation.[7] As Schneider et al.

[6] Chapter III explains the specifics of the Chilean school voucher system in detail and discusses the degree to which the Chilean system fulfills the requirements of a competitive education "market".
[7] Chapter III reviews studies on Chilean K-12 standardized test scores.

(2000:14) puts it "choice reforms concerned with changing the supply side of schooling must be based on a solid understanding of parental behavior". Accordingly, this dissertation aims to advance our understanding of how parents react to market reform in education at the extreme, i.e. universal school vouchers.

III. STRUCTURE OF THE DISSERTATION

Having introduced the aim of the dissertation and its theoretical approach to the study of school vouchers I switch to the existing literature in **Chapter 2**. I review the existing school choice literature in general and the school voucher reform literature in particular in order to start with a reasonable set of expectations for the following empirical chapters. First, I define the "market model of education" and discuss Chubb and Moe's (1990) theory of school choice, and their proposal for school vouchers. Second, I discuss the evolution of the school choice literature and its recurring themes. I close the chapter by discussing the various school voucher design options.

In **Chapter 3** I introduce the Chilean universal school voucher system. I briefly discuss its application and evolution. I explain the specifics of the voucher design, rules and regulations governing school sectors in Chile, and the organizational structure of school finance and governance. I explain the system of decentralized oversight and the municipal differences in resources that affect how the universal school voucher system works in practice. In addition, I review the literature on the Chilean education system, including existing work on inter-sectoral differences in achievement, social stratification, and parental choice. The aim of this chapter is to understand the extent to which the Chilean school voucher system in practice parallels the school voucher proposal by Chubb and Moe (1990) and Friedman (1962).

I turn to empirics in the following chapters. Each chapter includes a brief review of the existing literature for the research question addressed in that chapter and the hypotheses. In **Chapter 4** I introduce my data source and briefly explain the design of the NSF funded panel of primary school parents and principals in the Metropolitan Region of Santiago, Chile. I investigate the sample parent profile across school sectors and socio-economic groups. Next, I turn to the screening of parents by schools and the geographical limits of parents' choice sets.[8] Existing work (Elacqua, Schneider, and Buckley 2006) showed that parents consider schools similar in socio-economic status. This chapter investigates the two possible causes of this phenomenon: schools choosing parents and parents choosing neighborhood schools in a segregated urban environment. Schools' selection criteria and the difficulties associated with choosing schools in different neighborhoods may significantly limit the school options for parents despite the absence of formal school districts. Hence, this chapter evaluates the universal school voucher system based on the availability of "choice" for parents.

In **Chapter 5** I turn to the effect of competition on schools in the Chilean universal school choice system. Based on the analyses of the principals' responses to survey items and on the analyses of how they construct their competition sets, this chapter investigates the public school perceptions of competition in a universal school choice environment. Moreover, it investigates the effect of the voucher school supply in the immediate environment on public school's perceptions of competition. It examines the competition sets of the school principals in order to understand the school qualities along which

[8] Parent's choice set refers to the set of schools a parent considers before enrolling her child to a school.

competition takes place. In brief, this chapter evaluates the universal school choice system based on competition, i.e. whether market segmentation limits the competitive effects one would expect in a universal school choice system or not.

Based on Chubb and Moe's (1990) theory of the differences between public and private accountability systems, I investigate parental satisfaction across school sectors, public and private-voucher, in **Chapters 6 and 7**. Chapter 6 shows parental satisfaction with the school in the first semester and controls for selection problems as explained in Chapter 4. Chapter 7 shows the trajectories of parental satisfaction across school sectors over all panel waves which cover the first two grades. These chapters evaluate the success of the universal school voucher system based on market accountability, i.e. accountability to parents.

Parental exit and voice play a critical role both in models espoused by school voucher proponents and in predictions of the voucher skeptics. Both camps agree that increased competition in a school voucher system would generate more exits from failing schools. In this clatter I turn to whether dissatisfied parents are willing to leave their schools or contact school authorities in **Chapter 8**. Based on Albert O. Hirschman's (1970) seminal work I investigate whether different types of school organizations that a deregulated education marketplace gives birth to structure parental exercise of exit and voice. In turn, this exploratory chapter investigates how competition and accountability to parents interact in a universal school voucher system.

Chapter 9 reviews the results of the empirical chapters briefly. It evaluates the universal school voucher system in Chile based on the criteria used in each chapter. It discusses the degree to which the Chilean case can be generalized to other universal

school voucher systems and serve as a test of the school voucher proposals as advocated by Chubb and Moe (1990) and Friedman (1962). The chapter discusses the limits of the market metaphor in schooling (Henig 1994) and the dissertation's contribution to our understanding of market reform in education. Last, the chapter closes by outlining new research questions on the supply side of schooling and on the effects of different macroeconomic growth trajectories on parental demographics across school sectors.

CHAPTER TWO

School Choice and School Vouchers: A Literature Review

I. INTRODUCTION

In this chapter I introduce the market model of education and the rationale behind the empirical proposition that public and private schools are inherently different. After critically evaluating the idea of having a market for schools I discuss the recurring themes in school choice research as they relate to school vouchers. I briefly review the US experiments with school vouchers and their evaluations as well as different voucher design options. I conclude by explaining that this dissertation evaluates the universal school voucher system by inter-sectoral comparisons and using the dimensions of choice, competition, and accountability.

II. THE IDEA OF HAVING A MARKET FOR SCHOOLS

Milton Friedman laid out his views on education financing more than half a century ago in *Economics and Public Interest* (1955).[9] He later revised his views and included them in a chapter of *Capitalism and Freedom* published in 1962. The proposal for educational vouchers in that chapter became the foundation for school choice proposals particularly in the 1980s and the 1990s. His proposal for school vouchers combines the desirability of the concept of choice with some of the lessons of the neo-classical market model on competition. It is perhaps this combination which made his proposal accessible to a large audience.

[9] See Friedman (1955).

Friedman's views on education policy follows from his beliefs on the role of government in a free society. Government intervention is justified only for areas that cannot be handled through the market, or can be handled only at so great a cost that the use of political channels may be preferable (1962: 25) Accordingly, government intervention into education can be rationalized on two grounds: the first is the existence of significant "neighborhood effects", i.e. externalities. The second is the paternalistic concern for children and other irresponsible individuals. Regarding "neighborhood effects" Friedman argues that (1962:86): "A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of most citizens and without widespread acceptance of some common values. Education can contribute to both."

The government intervention justified to achieve a minimum degree of literacy and a common set of values would be in the form of a legal requirement that each child receive a minimum amount of schooling of a specified kind. He argues that it would be highly desirable to impose the costs directly on the parents. This would eliminate the governmental machinery required to collect tax funds from the citizens. It would reduce the likelihood that governments would also administer the schools, a matter discussed further below. However, differences in families in terms of resources make a subsidy necessary so that the children of families in need can also create the same positive externalities to society.

On the other hand, Friedman argues that the actual administration of educational institutions by the government is harder to justify compared to school finance. The finance and administration of the schools can be seen as two steps and can be readily separated (1962: 89). Governments could require a minimum level of schooling financed

by giving parents vouchers redeemable for a specified maximum sum per child per year if spent on "approved" educational services from an "approved" institution of their choice, which can be for-profit or non-profit. The role of the government would be limited to insuring that the schools met certain minimum standards.

However, Friedman acknowledges a couple of concerns on decoupling school administration from school finance such as the divisiveness of parochial schools, and the desirability of providing the common core of values deemed requisite for social stability. Another argument for public administration of schools is based on the idea of "technical monopoly". The number of children in small communities and rural areas may be too small to create competition. In such places government can provide schooling. Friedman also addresses the fear that private schools may tend to exacerbate class distinctions. However, he argues that poor children will have more mobility once they are given a school voucher, which should have the counter effect.

Based on his views on just government involvement in education and other considerations outlined above Friedman proposes the following school voucher system (1962: 93):

> The arrangement that perhaps comes closest to being justified by these considerations –at least for primary and secondary education- is a combination of public and private schools. Parents who choose to send their children to private schools would be paid a sum equal to the estimated cost of educating a child in a public school, provided that at least this sum was spent on education in an approved school. This arrangement would meet the valid features of "technical monopoly" argument. It would meet the just complaints of parents that if they send their children to private non-subsidized schools they are required to pay twice for education –once in the form of general taxes and once directly. It would permit competition to develop. The development and improvement of all schools would thus be stimulated. The injection of competition would do much to promote a healthy variety of schools. It would do much, also, to

introduce flexibility into school systems. [10]

The most significant feature of the proposal is that instead of full-scale privatization in education it creates a hybrid system where parents have public and private school alternatives, and school finance remains private for a majority of the schools. As a result, despite some marketization, i.e. the formation of private schools with public finance, the most important outcome of such a reform would be the expansion of parental choice to both public and private schools.

Furthermore, Friedman argues that if present public expenditures on schooling were made available to parents regardless of where they send their children, a wide variety of schools would spring up to meet the demand (1962: 93). Hence, the new hybrid system would imitate some of the features of a competitive market such as free entry, and the ensuing competition is believed to create a variety of schools to choose from. This would make publicly financed schooling look even more like a market where there are alternatives for any good and choices are made based on customer preferences.[11] In turn, parents can express their views about schools directly by withdrawing their children from one school and sending them to another (1962: 91), at a far greater rate compared to a public school assignment system.

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[10] An issue not addressed in this dissertation is the effect of the voucher system on teacher pay and quality. Friedman's (1962:93) views on the issue follow from the idea of having a market for schools: *"Not least of its benefits would be to make the salaries of school teachers responsive to market forces. It would thereby give public authorities an independent standard against which to judge salary scales and promote a more rapid adjustment to changes in conditions of demand and supply."*

[11] However, one of the assumptions of the perfectly competitive market model is homogenous goods. Increasing variety within a good type creates monopolistic competition which reduces overall welfare. For an introduction to the model see *Analyzing Policy: Choices, Conflicts, and Practices* by Michael C. Munger (2000).

It is clear from this account that Milton Friedman's proposal of school vouchers is quite different from the ideal market of neo-classical economics. Rather, it is an institutional reform proposal which gives parents greater choice and changes the way schooling is administered. The result is the expansion of the private sector by public funds. Friedman, however, inserts a series of market features into the proposal such as greater choice from greater variety and competition unleashed by a growing private sector. He ties these features to outcomes such as reduced costs per student and greater supply based on the ideal market when in fact the proposal is at quite a distance away from a private market let alone an ideal one.

Then the question becomes, does moving towards a market piecemeal by adopting some of its features improve the societal welfare? The answer to the question and an important criticism to piecemeal privatization can be found in `The General Theory of The Second Best` (Lipsey and Lancaster 1956). The theory tells us that: "If there is introduced into a general equilibrium system a constraint which prevents the attainment of one of the Paretian conditions, the other Paretian conditions, although still attainable, are, in general, no longer desirable"

Accordingly, the next best solution to a maximization problem involves departures from other Paretian conditions. The negative corollary to this is that there is no a priori way to judge between various situations in which some of the Paretian optimum conditions are fulfilled while others are not (Lipsey and Lancaster 1956: 11-12). [12] In other words, if all the optimum conditions are not fulfilled then it is not true that a

[12] The theory applies to all maximization problems, not just with welfare theory.

situation with more conditions fulfilled is better compared to one with fewer conditions fulfilled. As a result, if there are many conditions which prevent the fulfillment of all Pareto conditions then the removal of any one constraint may affect efficiency or welfare, either by increasing it, or reducing it, or leaving it unchanged.

The theory has important ramifications for piecemeal privatization of K-12 education as well as privatization of other public services. In fact, the belief that removing the impediments to an ideal market one by one, often in the form of introducing some competition to the existing system, will increase societal welfare guided most market reform in the last decades of the 20th century. However, the theory of the second best tells us that if at least one optimality condition is unattainable, which is often the case with a complex and multifaceted good like education, then the second best solution will be achieved only with the violation of other conditions, and decreasing the number of other violations has unpredictable results on efficiency or welfare. The direction or the magnitude of the deviations from those optimality conditions that are necessary to achieve the second best solution are also unpredictable. Hence, introducing market features into public schooling is problematic even from a solely economic perspective. [13] Specifics of the policy domain, existing market failures, and whether certain market failures work better together compared their absence, given that at least one optimality

[13] Lipsey and Lancaster (1956: 17-18) explain that any economics which attempts piecemeal policy recommendations must be based on the belief that there can be discovered sufficient conditions, as distinct from the necessary conditions, for a net increase in welfare. However, the theory of the second best tells us that there are in general no such sufficient conditions for an increase in welfare, but only necessary conditions for Paretian optimum which should be achieved simultaneously.

condition is outside reach, should be carefully investigated empirically.[14]

In the context of schools, Buckley and Schneider (2007: 7-12) lists a couple of impediments to a market for schools. First is the extent to which education generates externalities, one of the prime justifications for the public provision of public education. In addition to a higher quality workforce, education has broader externalities such as its effect on the democratic knowledge and values of the citizenry. However, this does not mean that public provision of education will necessarily generate greater positive externalities compared to its private provision, but that government action beyond what is necessary based on market rationales may be required (Buckley and Schneider 2007:10).

In addition, because there is little direct personal return to the student, some parts of the current curriculum under the existing education system such as civics education would not be provided by private enterprise (Belfield and Levin 2005). Also, information on school quality may be hard to reach and understand for parents (Fiske and Ladd 2001, Lubienski 2003; Schneider et al. 1997; Schneider et al. 1998). As a result, parents with different skills and social networks will differ in their quality of information on schools (Henig 1996; Schneider et al. 1999; Schneider, Teske, and Marschall 2000). Existing information asymmetries are further exacerbated by the fact that education is an experience good and its quality can not be evaluated unless the student has been enrolled for some period (Buckley and Schneider: 2007, 11).

From the market failures perspective and the theory of the second best, it is clear that

[14] However, Buckley and Schneider (2007: 8) argue that in the real world of imperfect markets policy makers should strive to reach all the sufficient conditions for a net increase in social welfare, which is still an elusive goal.

the idea of having a market for schools abounds with problems. Critiques, however, go beyond the economic rationale and question whether an education market can ever be a social reality. Henig (1994) suggests that the market in this case should be considered a metaphor. The use of the metaphor makes abrupt changes in the way education is provided less intimidating by associating market reform with market arrangements that are familiar and comforting such as shopping. Moreover, the metaphor helps to bridge the gap between evidence and prescription because evidence of a truly market based system of school choice is missing in the US (Henig 1994: 13).

Despite criticisms, based on economics and the market failures perspective or otherwise, the idea of having a market for schools influenced policy proposals and generated a host of policy experiments ranging from public school choice, to charter school reform and school vouchers (Belfield and Levin 2001, 2005). Because school choice has been framed as a panacea for several ills in public education (Schneider et al. 2000) the studies based on these small scale school choice experiments investigated whether improved academic outcomes, lowered costs (Epple and Romano 1998; Hoxby 2003, 2000, 1997; Hill, Pierce, and Guthrie 1997; Peterson et al. 2002; Howell and Peterson 2002), and educational innovation and variety (Nathan 1996; Kolderie 1990; Teske et al. 2001, 1993) followed the market features introduced into public education.[15]

As a result, different interpretations and lower level theories based on Friedman's

[15] Section II of Chapter II aims to clarify what is meant by "a market for school". Studies that evaluate school voucher programs in the US and abroad will be reviewed in Section III of this chapter and in the relevant empirical chapters.

proposal coalesced to create a common account of the market for schools, which is nicely explained in *Charter Schools: Hope or Hype?* (Buckley and Schneider 2007: 7):

> The central idea of a market … for education is that once the government's monopoly on public schooling is broken and parents and students become "consumers," a host of new suppliers will enter the market and compete with existing schools and among themselves to provide educational programs that better meet the demands of parents and students than does the current monopoly provision of education….In this idealized system of choice, programs and curricula will align with consumer preferences, and efficiency and academic outcomes will improve. Schools that do not improve or do not meet parental and student needs will lose students and be forced to reform or close.

Throughout the dissertation the market model of education refers to the above mentioned set of market features and expectations, which are tied together by another set of a priori assumptions on parent and school behavior. The key assumption is that what parents want is academic quality. Other important assumptions are that schools will provide accurate information on quality, and parents will seek, find, and use this information in choosing a school. Also, the possibility of schools choosing students has so far been largely left outside the model. However, this dissertation shows that schools tend to choose students in a universal school voucher system through various means and based on non-academic criteria even in cases where rules and regulations governing the voucher system are structured to discourage them from doing so.

III. THE INSTITUTIONAL THEORY OF SCHOOL CHOICE

The unifying theory that goes beyond the market metaphor is found in an institutional theory of school choice. In *Politics, Market, and America's School,* Chubb and Moe (1990) express the discontent with the American education system, and discuss how a decade's worth of extensive education could not improve the situation. They adopt an

institutional theoretical framework and argue that the institutional arrangement of education, i.e. the government and its bureaucratic arm, is the culprit behind organizational ineffectiveness, i.e. failing schools.

Building on the "High School and Beyond" study (Coleman et al. 1982), Chubb and Moe collected data on half the schools of the original study and surveyed teachers and school administrators. Controlling for student, family and school level effects they found that effectively organized schools add half a year of academic gain over the two years of high school controlling for student ability, family and school socio-economic status. They also found the school autonomy to be the single most important element in student academic gains. Based on the findings Chubb and More argue that bureaucracy, and more fundamentally, direct democratic control, are the reasons behind failing schools. Chubb and Moe conclude that since the institutions of democratic control work against school autonomy, they reduce school effectiveness. If public schools are ever to become effective, then the institutions that control them must first be changed (1990: 183-184).

What is needed is a new system which would vest authority directly in schools, parents, and students, and free schools from direct democratic control. Chubb and Moe (1990) argue that that system is to be found in market mechanisms.

In a market for schools, schools are governed autonomously outside the reach of bureaucratic hierarchies. Chubb and Moe (1990: 32-33) further argue that parents and students play a much more central role in private education . First, schools would have a strong incentive to please their client parents in a market system. As a result, what parents and students want and what schools provide would have a better match. Second, if parents and students do not like the service of a school they could exit and find another

school whose offerings better meet their needs. Third, schools would be subject to natural selection. Schools that fail to satisfy their clientele would go out of business and those that are more likely to satisfy their clienteles would prosper and proliferate. As a result, the market for education guarantees more satisfied parents, and more effective schools.

Furthermore, Chubb and Moe (1990) argue that the organizational differences between the public and private sector explain the effectiveness of private schools in their analyses. Bureaucratic mechanisms limit the actions public schools can take. On the other hand, private schools are less constrained by political actors than public schools, and more responsive to parents because they are governed by the market. "If public schools were freed from democratic control and bureaucratic constraints, and instead regulated by the market, they could repeat the success of private schools." (1990:564). They believe that in order to establish a market accountability system for all schools the existing public school assignment system should be replaced by school vouchers.

Chubb and Moe proposal for "scholarships" is (1990: 215-225) similar to Friedman's (1962) school voucher proposal but more detailed as to its governance structures. Chubb and Moe set the criteria for what distinguishes "public schools", i.e. privately governed schools that receive the vouchers, and old-fashioned district schools. Public funds are first given to "Choice Offices" in each district which distributes the funds to schools based on enrollment. States determine by which formula each district contributes for each child. Parents are not allowed to supplement their scholarship with extra funds; however vouchers may vary between districts with collective "add-ons" decided by the citizens of each district. Schools are free to set their tuition levels and make their own admission decisions. Throughout the application process the Choice Office assists the parents with

information on schools, and facilitates the admissions process. Each school is granted the sole authority to determine its own governing structure. Chubb and Moe believe that such a system creates autonomous schools, which is the key to organizational effectiveness based on their empirical investigation.

Chubb and Moe (1990: 225) argue that their proposal calls for fundamental changes in the structure of American public education, but it has nothing to do with 'privatizing' the nation's schools. They argue that the voucher system they propose is a truly public and democratic system where the design and legitimation of the new institutional framework are democratically determined. Although they present their proposal from an institutionalist perspective the proposal has considerable faith in self-correcting mechanisms of the market (1990: 25):

> The state will not, on the other hand, hold the schools accountable for student achievement or other dimensions that call for assessments of the quality of school performance. When it comes to performance, schools are held accountable from below, by parents and students who directly experience their services and are free to choose. The state plays a crucial supporting role here in monitoring the full and honest disclosure of information by the schools, but it is only a supporting role.

In brief, the institutional theory of school choice is a theory on the superiority of market accountability over democratic accountability in the organizational effectiveness of schools. Private schools that receive scholarships become accountable to their client parents, which triggers the mechanisms of supply and demand satisfying both parents and schools. This characterization of private schools versus public schools is the key to Chubb and Moe's analysis, and will be the key to the dissertation's analysis of public and private sector parents' attitudes in a universal school voucher system.

It is again this characterization that makes their work controversial. Smith and Meier (1995: 35-36) criticize the assumption of uniform institutions in public education and argue that within public school variation is left unexplained (also see Tweedie 1990, 550). Similarly, Bryk and Lee (1992) argue that Chubb and Moe chose to overlook the fact that the most important variable in explaining the level of bureaucratic control is urban location and the fact that the likelihood of a public school student being in an urban environment is greater than the likelihood of a private school student being in an urban environment. In other words, the urban effect may be far greater than the school sector effect on achievement, and the bureaucratic control problem may be concentrated in urban areas.

In fact, Murnane (1984) found that within public school and within Catholic school variation is much higher compared to between public and Catholic school variation. As a result, specific qualities of the school and its surrounding environment may be more influential on the student's achievement compared to the effect of the school sector.

Another set of criticisms come from Benveniste, Carnoy and Rothstein (2003). The belief that what is unique about private schools should be adopted by the whole education system (Chubb and Moe 1990; also Coleman, Hoffer, and Kilgore 1982) is based on the assumption that there is indeed something unique about the private sector, which is accountability to parents and students from Chubb and Moe's (1990) point of view. In *All Else Equal* Benveniste, Carnoy and Rothstein (2003) trace school-level evidence for this argument by an in-depth study of sixteen public and private schools. Looking at the schools' organization, achievement, and client orientation they conclude that the social, economic, and cultural backgrounds of the parents and their communities are the main

determinants of these outcomes, much more so than a school's public or private character. They explain that the similarities between schools and the problems that they confronted overwhelmed their differences.

IV. SCHOOL VOUCHERS AND THE LESSONS FROM EXISTING SCHOOL CHOICE POLICIES

Having reviewed the two most influential and complementary strands of school choice theory, one anchored in the market model, and the other in institutions, I turn to a more detailed discussion of existing school voucher programs in the US and the discussions revolving around the possible effects of these and other school choice programs. I also explore different design options for school vouchers.

i. The Evolving School Choice Literature and School Vouchers

The idea of having a market for schools (Friedman 1955, 1962) and Chubb and Moe's (1990) theory on the differences between private and public organizations of schools were paralleled by a series of studies since the mid-1960s on educational achievement and its determinants. The influential "Equality of Educational Opportunity" report, widely referred to as the "Coleman Report" (1966) based on almost 150,000 students from a nation-wide sample triggered the debate on whether school level variables affect educational achievement or not. Coleman et al. (1966) found that socioeconomic background differences, not school facilities or resources, explained most of the variation in students' academic performance. Also, black students who attended predominantly white schools did better than black students who went to predominantly black schools.

Later, however, others using the same dataset found different results (Bowles and Levin 1968; Hanushek and Kain 1972). The high correlation between family background

and school quality resulted in an underestimate of school effects, which led to a reanalysis of the data by Coleman and Hoffer (1987) producing higher school effects. Using the High School and Beyond longitudinal surveys by the National Center for Education Statistics (NCES) Coleman, Hoffer, and Kilgore (1987) showed that public-private high school differences affect student achievement. Because most private high schools in their study were Catholic schools the 1987 study focused on the Catholic and public school achievement difference. The conclusion was that controlling for socio-economic differences the school sector made a difference in achievement. The senior-sophomore differences were grater for those who attended Catholic schools and background characteristics were less effective in determining achievement in these schools. Using new data on value-added in academic achievement, Coleman and Hoffer (1987) reproduced similar results. However, others argued that the gains were minimal (Willms 1987).

Bryk, Lee, and Holland (1993), on the other hand, found a considerable Catholic school effect on the achievement of low income African-American students. They argue that the set of values in Catholic education helps disconnect low-income urban students from their environments and makes them academically better off. They argue that public schools can incorporate the organizational lessons of Catholic education that make it more successful for low-income children such as small size and a college preparatory academic curriculum for all students. Similarly, Evans and Schwab (1995) and Neal (1997) found that Catholic high school students are much more likely to graduate with their cohorts and attend college than public school students. However, Sander (2001)

show that controlling for selectivity based on religiosity eliminates the difference in high school graduation rate for all but inner-city minority youth.

Because most private schools are Catholic in the US, the literature focused on the Catholic school versus public school comparison. The fact that Catholic schools were private was not fully addressed until Chubb and Moe's *Politics, Markets, and America's Schools* (1990). Chubb and Moe's work (1990) came during a wave of disillusionment with public education and when studies on public versus Catholic school effects had proliferated, and market reform proposals were put in practice by privatization in many public services. Consequently, their work was influential in a series of school voucher experiments and how they were evaluated.

In 2007, publicly funded voucher programs existed in Arizona, Florida, Maine, Ohio, Utah, Vermont, Wisconsin, and the District of Columbia, the first federally funded voucher system. District-level public voucher programs for low-income students exist in Cleveland, Milwaukee, and Washington, DC. Several statewide public voucher programs are also in place. Maine and Vermont provide vouchers to rural high school students whose communities have no secondary schools. Arizona, Florida, Ohio, and Utah offer special education voucher programs or vouchers for students in low-performing schools. Florida offers vouchers to low-income students (Milwaukee Department of Public Instruction, 2007).

In K-12 education, the first voucher experiment since the Alum Rock school district experiment in San Jose, California in the early 1970s took place in Milwaukee in 1991. The Milwaukee program was followed by voucher experiments in Cleveland; Dayton,

Ohio, Florida, Charlotte, North Carolina; New York; and Washington D.C.[16] Most of these experiments were limited to students from lower socio-economic backgrounds and the number of schools willing to accept the vouchers remained limited. For instance, in the Milwaukee program vouchers were given to low income parents by lottery, and until the Wisconsin legislature decided to expand the program to include religious schools the number of schools participating in the program had only been twelve (Milwaukee Department of Public Instruction, 2007).

Witte, Sterr, and Thorn's (1995) evaluation of the Milwaukee program showed high levels of satisfaction among voucher parents compared to parents in public schools. However, the results showed no gain in academic achievement. They admitted that the study did not control for new students added to the private school sample each year. As a result, Green, Peterson, and Du (1996) criticized Witte et al. (1995) for downgrading the voucher effect, and their analyses showed a large voucher effect on achievement over time. Green et al.'s (1996) results were also challenged by Witte (1997) and Rouse (1998a, 1998b) who found much smaller gains and only in some years.

Cleveland's voucher program was more extensive compared to the Milwaukee program. The number of vouchers in the lottery was higher and private school participation in the program was larger because of the inclusion of religious schools. Despite a flexible formula to adjust the amount of the voucher based on family income the voucher was capped at $2,250 per student for all families. Families had to add extra

[16] However, two state-wide voucher initiatives in California (1993 and 2000) and Michigan (2000) were rejected by the electorate.

funds to the voucher because private schools could charge tuition higher than the voucher. Mostly Catholic religious schools attracted the majority of the voucher students. The remaining voucher students mostly attended the for-profit Hope Schools (Peterson and Howell 1999).

The evaluation of the Cleveland program, once again, showed higher voucher parent satisfaction (Peterson, Howell, and Greene 1999). However, achievement results were controversial. Peterson, Howell, and Greene (1999) found that achievement gains in the first year were substantial for voucher students, which persisted despite the lack of gains in the second year. Moreover, the voucher school parents were more satisfied with their school's teachers, moral values, class size, and academic program. Their results were later challenged because the majority of the private schools were Catholic schools. This raised the concern that what drives the gains is the religious affiliation of the school and not its sector. Looking at the within private sector differences in achievement Metcalf (2001) found achievement gains in for-profit Hope Schools to be negative.

In the 1990s, other smaller scale privately financed voucher experiments started in a number of cities (New York; Washington D.C.; Dayton, Ohio; the Edgewood School District in San Antonio, Texas; Charlotte, North Carolina) targeting mainly low income minority children. The evaluation of these programs showed satisfaction gains for voucher parents as in Wisconsin and Cleveland (Howell and Peterson 2002; Schneider et al. 2000). The achievement gains, however, were much larger compared to the above-mentioned programs especially for African-American students (Schneider et al. 2000; Howell et al., 2002; Mayer et al., 2002), with the exception of the District of Columbia (Viadero, 2002).

The use of randomized field trials in some of these studies made the empirical claims more reliable. For instance, Howell and Peterson (2002) test their differential theory of school choice, which predicts that the programmatic impacts of school voucher programs will differ markedly for African Americans and members of other ethnic groups using a field experiment design. The results show that many educational outcomes favoring academic quality such as school-family communication improved particularly for African American students. Their results also showed voucher parent satisfaction and test scores to be higher for the same group of students.

Another line of research investigated the competitive effects of the voucher schools and charter schools on the remaining schools. For example, Hoxby (2001) ties academic gains of lower-income students to increased competition unleashed by vouchers. Similarly, Greene (2001) evaluating the Florida voucher program found large gains on lowest-performing schools due to voucher threat. Similarly, Schneider et al. (2000) examines New York City districts 1 and 4, and shows evidence linking choice to increased performance. However, what makes Schneider et al. (2000) perspective different among studies linking choice to achievement is the focus on the response of the school system to pressures with reforms and improvements. The example of District 4 shows that experimenting with new teaching ideas and approaches combined with demand-side pressures can help choice improve academic outcomes.

The main focus of the above mentioned studies has been the effect of school choice, mainly the availability of vouchers, on academic achievement, and the public-private school differences. These studies also investigated parental satisfaction and largely found that choice parents are more satisfied with their child's education compared to public

school parents. However, school choice effects go well beyond changes in academic achievement or parents' satisfaction with their child's school. In fact, Chubb and Moe, as mentioned above, has at least three assumptions (see p. 15) on how parents will behave in the market-like setting of school choice and how schools will react to those changes.

Research that focused on the empirical propositions based on these assumptions investigated the process of choosing a school in many choice settings including school vouchers and charter school reform. A series of studies examined whether what parents want from schools is quality education (Schneider et al. 2000; Elacqua, Schneider, and Buckley 2006; Buckley and Schneider 2007). These studies showed parents' preference for high quality based on parents responses to survey questions. However, non verbal measures of parental preferences in their search for a schools showed that parents pay more attention to demographics compared to academic indicators of school quality (Schneider and Buckley 2002a, 2002b; Elacqua, Schneider, and Buckley 2006).

Other studies on the process of choosing a school focused on the informational requirements of the market model. These studies examined how parents search for information, and what determines the parent's level of information (Schneider et al. 1997; Schneider et al. 1998; Schneider et al. 1999; Schneider et al. 2000; Schneider and Buckley 2002a, Schneider and Buckley 2002b; Buckley and Schneider 2007; Lubienski 2003; Ladd 2001). The results were sobering. These studies found with some variation that the socio-economic background characteristics of the parents affect whether parents search for information on alternative schools, how they search for alternative schools, the kind of information they reach, hence the quality of the choice they make. Teske, Fitzpatrick, and Kaplan (2006), on the other hand, argue that in well established school

choice systems such as in Milwaukee the information gap between parents from high and low socio-economic backgrounds may be narrowing so as to become too small to exacerbate segregation.

So far, however, the evidence predominantly favors the existence of an information gap between different social classes. In addition to the effect of family background differences on how parents search for information in the process of choosing a school, school choice may exacerbate existing socio-economic inequalities (Henig 1996; also see Fuller, Elmore, and Orfield et al. 1996) because of what parents look for in a school. As Schneider and Buckley (2002a, 2002b, 2007) argue parents may prioritize school demographics in their choice and self-select into schools with similar socio-economic status parents. Another source of more socio-economic stratification may be schools' selection of easy to educate children, i.e. "cream-skimming" of the high socio-economic status and successful children by schools participating in the choice programs.

Empirical investigations of the "cream skimming" hypothesis produced mixed results. Schneider et al. (2000) found little or no evidence for academic or class-based cream-skimming by schools in New York Districts 1 and 4. Howell and Peterson (2002) show moderate cream skimming of academically more successful students into the voucher program. The programs they consider, however, are different in design, and the specifics of the school choice policy may greatly affect whether school choice will lead to greater social stratification or not (Teske and Schneider 2001). Simulations of different school voucher designs showed that schools have to choose more successful students to minimize costs (Epple and Romano 1998).

ii. School Voucher Design

Belfield and Levin (2005: 35-36) list four criteria for an effective education system: freedom of choice for parents so that parents' wants and what schools offer match; productive efficiency per educational result; equity, i.e. fairness in access to educational opportunities, resources, and outcomes by gender, social class, race, disability; and social cohesion. They further argue that plans can be constructed using three design instruments -finance, regulation, support services- to create school voucher programs to fulfill the four criteria for effective education.[17]

Belfield and Levin (2005) classify voucher designs based on the same four criteria. The typology they develop (2005: 38-39) will be useful for the analysis of the Chilean universal school voucher system in Chapter 3; hence, a short discussion is in order here.[18]

"Voucher designs for freedom of choice" would encompass most types of schools and schooling and either provide a very large voucher or allow add-ons to the voucher. Moreover, it would minimize regulation of curriculum, admissions, and school operation requirements. It would also provide a good system of information dissemination and transportation.

"Design for productive efficiency" would have a voucher high enough to attract many competitor schools. Regulations that can inhibit competition would be minimal.

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[17] Finance in voucher design refers to the overall magnitude of the educational voucher, how it is allocated, and whether families can add extra funds on top of the voucher. Regulation refers to eligibility criteria for schools and for families to participate in the voucher program, and schools admissions criteria. Support services such as the availability of transportation and dissemination of information on alternative schools facilitate the effectiveness of the education market.

[18] The discussion of the school voucher typology is heavily borrowed from Belfield and Levin (2005: 38-39).

However, to ensure high educational productivity testing of student achievement should be required and the results should be made public.

"Designs for equity" would have compensatory vouchers for educationally at risk or disabled students. Families could not add on to the voucher so that income differences would be neutralized. Also, a provision of nondiscrimination in admissions, perhaps admissions through lottery in the case of oversubscription, would be put in school regulations. Transportation and dissemination of comparable school information would be required support services.

"Designs for social cohesion" would have large enough vouchers to provide a common educational experience beyond specialized subjects or activities. Parental add-ons to the voucher would probably be proscribed so that students can be exposed to peers from various backgrounds. Regulations would focus on establishing common curriculum and school activities, and support services would include technical assistance in helping schools develop a common educational core in addition to information and transportation services.

Based on Belfield and Levin's typology the market model of education as proposed by Milton Friedman (1962) is a school voucher design both for freedom of choice and for productive efficiency. The existence of add-ons, inclusion of religious schools and Friedman's discussion of transportation for remote regions as well as his prediction of decreasing costs per pupil all convey the idea that school vouchers first and foremost should expand the choices available to parents and create a competitive school market where costs decrease. In fact, voucher advocates argue that despite stagnating test scores if costs per student decrease this would still be a success for voucher reform (Hoxby

2003). Friedman proposal allows for voucher add-ons and requires minimum regulations for ensuring a common set of civic values in choice schools. These qualities clearly show that equity and social cohesion are not the design criteria for Friedman's proposal.

However, Moe (1995) and Chubb and Moe (1990) think that particular objectives can be built into the voucher design. Chubb and Moe's proposal for educational vouchers carry most of the features of the Friedman proposal (1962), but the weights given to the criteria of equity and social cohesion are somewhat greater. As a result, Chubb and Moe (1990) proposal does not allow parents to use extra-funds in addition to the voucher except for students with special needs. In order to secure productive efficiency, however, the plan allows for inter district variation in the amount of the voucher.

Another voucher design classification emphasizes how vouchers are transferred to schools, the voucher amount and eligibility. Gonzales, Mizala, and Romaguera (2004: 2-3) list the following basic characteristics that differentiate voucher structures:

> (i) *The form in which the resources are delivered (to whom and how):* the funds are distributed directly to the parents as a stipend, cash, or as a certificate *vs.* the funds are delivered to the school, as a function enrollment. This second type is the most common and is known in the literature as the 'funds follow the child' system.
> (ii) *Open (schools) vs. a restricted system for eligible schools*: in an open system any school can participate *vs.* a restricted system where only eligible schools that comply with certain requirements can participate; for example, a system restricts itself to public schools only, or includes private non-fee charging schools only.
> (iii) *Open (students) vs. selective or means-tested vouchers by students*: in an open system vouchers are available to all families *vs*. a selective or targeted system where only poor families, with income below an established threshold, can obtain them.
> (iv) *Flat or lump-sum vs. progressive, income related or means-equalizing vouchers*: in a flat or lump-sum system, all students receive the same amount of resources *vs*. a progressive system where the funds are inversely related to student's income.
> (v*) Only voucher vs. top-up voucher:* schools can receive funds only from

the government *vs.* parents can make additional contributions to the school, known as "top up" above the value of the voucher.

It is clear from this classification that school vouchers come in various forms. The design features may make a significant difference in fulfilling the four educational effectiveness criteria laid out by Belfield and Levin (2005). For example, flat vouchers which allow family add-ons are more likely to cause discrimination, hence reduce equity, compared to a progressive system of vouchers without add-ons. Simulations of different voucher features produce vastly different outcomes in social stratification (Epple and Romano 1998, 2002). For example, Epple and Romano (2002) show that conditioning vouchers on student ability and imposing tuition constraints at the same time will generate an increase in welfare without increased stratification. So far, however, little empirical work has been done on the effect of specific voucher design features with the US voucher experiments.

V. CONCLUSION

This chapter reviewed Milton Friedman's (1962) proposal for school vouchers, and Chubb and Moe's (1990) theory of the organizational consequences of democratic control versus market accountability in education. These seminal works produced several empirical propositions which shaped the way school choice policies are studied. However, there are only three promises coming directly from the Friedman (1955, 1962) and Chubb and Moe (1990) school voucher proposals: vouchers will increase choice, competition, and school accountability. Greater academic achievement, educational efficiency, and changes in equality are by-products of a voucher design revolving around choice, competition, and accountability.

These three factors are central to the coherence of the above-mentioned school choice theories and the working of the market-like system of public and choice schools. According to the school voucher proposals, school vouchers and the lifting of the district enrollment requirements give parents more school options, both public and private. Parents' choices determine the survival of schools; hence, schools compete for and care about parents. The effect of having the public sector in a choice system was left open in Friedman's narrative of the market for schools. In Chubb and Moe's interpretation of this market-like arrangement, competition for enrollment would help public schools improve their accountability to parents. However, if the public sector keeps democratic control over their schools, private schools would still do better in terms of parental accountability because of their autonomy. On the other hand, the expansion of the private sector in a school voucher program would guarantee increased accountability to parents.

If the idea of having a market for schools is carried to its logical conclusion and a universal school voucher system is created, the above-mentioned theories of school vouchers predict greater choice, competition, and market accountability. This dissertation investigates the extent to which three promises have been achieved in Chile's universal school voucher system.

Next, I turn to the case of the Chilean universal school voucher system in Chapter 3 and examine the extent to which the Chilean system mimics the Friedman plan (1962). I discuss the public and the private voucher school sectors' defining characteristics. I focus on the rules and regulations governing these schools in order to trace Chubb and Moe's argument on school autonomy and market accountability.

CHAPTER THREE

The Chilean Universal School Voucher System

I. INTRODUCTION

School voucher reform is one of the most controversial educational reforms in the US today. It is difficult to obtain credible evidence on how it would work in practice without a fundamental restructuring of the education system. Fortunately, we do not need a restructuring of the US K-12 education or any other education system to see the outcomes of school voucher proposals. Such restructuring took place elsewhere. Carefully investigating the voucher proposals and their applications in different countries can provide credible evidence to set reasonable expectations on what school vouchers can achieve in different contexts. Significant experimentation with school vouchers has already taken place in many countries including England, Australia, New Zealand, and Chile (Wolf and Macedo 2004; Plank and Sykes 2003; Fiske and Ladd 2000). This dissertation uses the Chilean case to investigate the empirical propositions of the market for schools proposal as discussed in Chapter 2.

Chile underwent sweeping reforms in education in 1980. The Pinochet government decentralized the administration of schools and began to provide school vouchers to all public and most private schools. The school voucher system was shaped by a group of University of Chicago educated Chilean economists who applied Friedman's school voucher plan (1962) to transform the public K-12 education in Chile. As a result, the Chilean universal school voucher system has become the most extreme and mature market reform in public education. However, the original design of the school voucher

system did interact with the social and political realities of Chile in the past few decades, and affected how the competitive effects of this market-like system worked in practice. The aim of this chapter is to examine the Chilean universal school voucher system so as to find the degree to which the system parallels the market for schools proposal.

The chapter begins with explaining the birth of the school voucher proposal, and its application in the broader context of social reform of the era. It discusses regional decentralization, the design of the Chilean school vouchers and how regional decentralization might have affected the school voucher outcomes. Next, I investigate the rules and regulations governing public schools and private voucher schools, present aggregate data on their organizational structure and educational outcomes. I also review the literature on achievement in the Chilean school voucher system, which is not directly addressed in this dissertation. Last, I compare the Friedman (1962) and Chubb and Moe (1990) proposals to the existing Chilean K-12 education system, and conclude by discussing the lessons of this substantive chapter for the following empirical chapters.

II. THE EMERGENCE OF SCHOOL VOUCHERS IN CHILE

Before the coup d'état of 1973 the Chilean education system was the most developed in Latin America in terms of its coverage and literacy rates (Castañeda 1992). The Ministry of Education was responsible for administering public schools. Half of the remaining private schools were administered by the Catholic Church. The private schools were also receiving subsidies from the government which covered almost 30% of their costs (Espinola 1993). In this centralized system of education, the teacher union was strong and the teaching profession had high social status. With the coup d'état (1973) the

centralized nature of public education and the privileges enjoyed by the Chilean teachers came under attack. But it was not until 1980 that the attack had a coherent ideology.

The neo-liberal ideological wave that swept the US following the election of Ronald Reagan, and Great Britain, under the Thatcher administration became an all-pervading framework of ideas in Chile with the military regime (1973-1990). The junta of generals and admirals that seized power in 1973 lacked a definite government project. Their national security doctrine could not provide them with a vision for a new regime. The Chicago School of Economics and its Chilean students who later became Ministers under the military regime supplied Pinochet with a revolutionary project whereby political discourse of the Chilean democratic culture was replaced by an ideology that proposed economic and market solutions for practically all problems in society.[19]

The neo-liberal revolution in Chile had two phases clearly differentiated by the economic crisis of 1982 (Oppenheimer 2007; Valdes 1995; Castiglioni 2005). The naïve phase of Chilean neo-liberalism created reforms without opposition or criticism and witnessed a quick application of market reform without much attention to social adjustment costs. A group of University of Chicago educated economists occupied all the main state economic posts.[20] The same group built social networks between the public

[19] In fact, market reform ideas began to take shape at beginning of the 1950s in the publications of Economic Commission for Latin America of the United Nations, and in collaborations between University of Chicago Department of Economics and Universidad Catolica in Chile.

[20] As part of a contract between the University of Chicago, the Universidad Catolica de Chile, and the International Cooperation Administration (later Agency for International Development) which fostered the study of economics in Chile, a group of twenty six Chilean economists were trained in Chicago. Some of them were hired as full professors upon their return to Chile by Universidad Catolica where they completely transformed the economics department with the help of their professors at Chicago. Hence, Universidad Catolica's "Chilean Project" supplied the human capital needed by the military government to create a new regime and became the ideological hub for the social reforms that followed.

sector and Chile's main centers of financial and industrial power, and participated in an active press and television campaign to spread the messages of neo-liberal economics.[21] This initial core of economic ministers and advisors devised and applied a wide range of neo-liberal reforms in many sectors traditionally considered public such as education and health-care. The second phase of reforms followed the economic crisis of 1982. This era was marked by the departure of the "Chicago Boys" (Valdes 1995; Foxley 1983) from office who were replaced by a second generation of Chicago-educated economists. This period ran from 1983 to 1989 and witnessed state-led corrections to the economy, and further privatization (Oppenheimer 2007).

The hallmark of the first period of neo-liberal reform movement is the so-called "seven modernizations". In September 1979 General Pinochet announced that having reached some of the goals of national reconstruction, the government would now become a government of national modernization. The "seven-modernizations" referred to drastic changes in seven areas: labor policy, social security, education, health-care, regional decentralization, agriculture, and justice (Foxley 1983). The intended direction of economic reforms were then to decentralize public institutions, leave as many of these activities as possible to the private sector, and let market private decision making dominate the economic arena. Hence, these reforms sought to create a private market for education, health, and housing services where the government would only guarantee the provision of free minimum services to the very poor.

[21] Similar 1980 television series "Free to Choose" by Milton Friedman was broadcast in the US by Public Broadcasting Corporation. The series was updated in 1990 with introductions by figures like Arnold Schwarzenegger and Ronald Reagan.

The allocation of public funds for these services would be very centralized, and the public institutions distributing them at the local level would be directly dependent on the president. So, economic decentralization and political centralization would go hand in hand. Then newly enforced 1980 constitution helps better explain this strange mix of political centralization and local decentralization (Biblioteca del Congreso Nacional 1980). The new constitution defined the nature of the political institutions of the new regime, but it would not be applicable until nine years after it was approved. Meanwhile transitory emergency regulations would prevail, which meant extreme political centralization. Hence, although the institutions stipulated in the constitution were mostly created in accordance with neo-liberal thinking on local autonomy and market reform their governance became very centralized under the emergency regulations.

One of the seven modernizations, regional decentralization, has affected the shape of "modernizations" in many public services including education. So, a discussion of the nature of regional decentralization is in order here. First of all, as mentioned above political centralization was embedded in regional decentralization. The junta divided the country into 13 regions and the regions into provinces and more than 300 municipalities. At each level, the president appointed governors and mayors from the military. During the 1970s the Ministry of Education, similar to other ministries, deferred some powers to *Secretario Regional Ministerial*, or Regional Ministry Secretariats (SEREMIs), which were charged with administrative and supervisory duties formerly performed by the central ministry. Despite the apparent move toward decentralization, the system often functioned as a military chain of command, organized to implement central government directives (Parry 1997, Stewart and Ranis 1994). Mayors of municipalities would not be

elected democratically until 1992, and there were no elected bodies. As a result, regional decentralization did not mean sharing power with the local constituency but rather organizing the military rule locally.

Another feature of the regional decentralization is the difference in wealth between municipalities that affected the resources these municipalities could bring to the provision of the newly decentralized public services. The policy of regional decentralization targeted mainly Santiago. In Greater Santiago, the policy of Pinochet further exacerbated the resource problem by doubling the number of municipalities in the area and creating more segregated zones within the Metropolitan Region of Santiago. According to the urban plan, *Plan Regulador*, the boundary lines between townships were drawn to make the municipal system more efficient by creating greater homogeneity within towns (MINVU 1998). In the mean time, the government undertook a massive relocation of "pobladores", or working class people, out of well-to-do townships.[22] As a result of relocations and the boundaries of newly created municipalities, per capita income differences among municipalities peaked.

State funding further reinforced differences among towns. Revenues such as business taxes that formerly went to the central government and later redistributed now remained in the municipality. The sudden inflow of money to already wealthy municipalities with large tax bases resulted in an increase in the range and quality of services in wealthy towns whereas poor towns could not even provide the basic services to its citizens (Oppenheimer 2007; Salman 1994). In fact, one of the first consequences of regional

[22] Urban policy created a large number of people called "guests" forced to live with relatives or friends. Out of 12 million Chileans in the late 1980s about 2.5 million were guests (Clert and Wodon 2001).

decentralization was the firing of thousands of people working in public services, including teachers, not only because of their leftist views but also because many municipalities were too poor to provide the basic municipal services (Oppenheimer 2007).

It is against this background of political centralization, local decentralization and urban segregation through sometimes forced relocation that all the other "modernizations" took place. In the domain of education policy "modernization" meant (1) decentralizing the management of public schools from the Central Ministry of Education to municipal levels of government, (2) opening the way for private operators to create schools to compete with public schools, (3) creating a nationwide voucher system that pays equal amounts per child to both public and public and private schools, and (4) creating a testing system to provide information on school performance that will enable parents to choose where they send their children (McMeeken 2004, Delannoy 2000 Gauri 1998, Parry 1997).

While local governments would have jurisdiction over staff management at public schools and the right to hire and dismiss teachers and administer educational facilities, the Ministry of Education would maintain regulatory, pedagogical, and surveillance functions (Cox and Gonzales 1998). In 1980, with the issuance of the Decree 3,476, the government started directly subsidizing public and private schools based on monthly enrolment (Espinola 1993: 144). Consequently, both Catholic and for-profit nonreligious private schools began to receive vouchers in addition to the public schools. With the same decree school buildings and land were signed over to municipal control (Gauri 1998, Parry 1997). All schools were transferred to municipalities by 1987 (Jofré 1988).

Moreover, *Sistema de Medición de la Calidad de la Educación* (SIMCE), System for Measuring the Quality of Education, was instituted. SIMCE serves as a standardized test of school-level achievement in mathematics, language, and science at 4th and 8th grades of the primary school and the 2nd year of high school. In brief, the reforms in education targeted mainly school governance and finance, and supplied the choice system with a testing tool to compare schools.

Reform in school governance paralleled the above-mentioned changes in urban policy. Municipalities became more homogeneous in socio-economic status, and because of decentralized administration of schools, school resources became tightly linked to what these homogeneous units could provide. This had important consequences on school finance, both the level of vouchers and extra transfers, in different municipalities. Next, I turn to an in-depth discussion of reform in school governance and the vouchers.

III. DECENTRALIZATION AND THE UNIVERSAL SCHOOL VOUCHER SYSTEM

In 1980 the military government transferred responsibility for public school management from the Ministry of Education to local municipalities. The Law of Municipal Revenues of 1979 served as the legal foundation for the transfer of schools to municipalities. The law created a centrally mandated system of municipal education. Municipal mayors, or *alcaldes*, most of whom were military officers, were ordered to assume control of educational services (Gauri 1998). After return to democracy mayors

began to be publicly elected in 1992.[23]

Once transferred to municipalities, public schools were placed under the control of one of two kinds of institutions. Most of the schools chose to manage their schools with *Departmento de Administracion de la Education Municipal,* or Department of Municipal Education Administration (DAEM). DAEMs are educational departments within municipalities which exist under the larger umbrella of the municipal bureaucracy and are governed by municipal rules. They do not have a constitutional standing; hence, they are politically weak and dependent on other municipal units (Elacqua, Gonzales and Pacheko 2007). DAEMs hire teachers for public schools, comply with ministerial provincial directorates' requests for information and propose the municipal teaching endowments (Gaury 1998). DAEMs do not manage resources or make financial decisions. The division of administration and finance within each municipality receives and distributes the vouchers to schools.

The second type of institution is called "Corporation". Corporations are non-profit organizations that are not subject to direct mayoral control. Their operations are generally subject to fewer regulations. In contrast to DAEMs, the corporation head is not required to be a teacher and corporation employees are not subjected to municipal rules regarding

[23] Local mayoral elections and universal school vouchers that can be spent in any municipality would create a dilemma for mayors if parents tended to choose schools across municipalities. Better service provision would increase the demand from parents living outside the municipality for the municipal schools. Because elections of mayors are local and out of municipality parents can not vote in local elections, mayors would have decreased political pressure to improve the municipality's schools. However, wealthy municipalities still transfer extra-funds to their schools, The existence of such transfers may indicate that parents tend to choose schools in their municipalities, an issue addressed in Chapter 4. Hence, urban segregation and geographically clustered school choice sets of parents may still make these transfers electorally useful for mayors.

the hiring and remuneration of municipal employees. The share of enrollment in corporation schools at the K-12 level has always been very low (see Figure 1).

Figure 1 Here

The decentralized system of school governance has never been similar to a local governance scheme whereby school administration can receive first hand information from the school environment and react to the demands of the receivers of the service and the immediate community. Instead, public schools remained in the hands of a municipal bureaucracy with multiple layers each having a different function. Moreover, the decentralized system of school governance affected the extra resources that can be spent on education in different municipalities. Rich municipalities can add onto the voucher only for public schools and they may build school facilities.

In addition to administrative decentralization, the government drastically altered school finance. The deregulation of the K-12 education system in Chile was modeled after Milton Friedman's (1962) proposal for school vouchers. Before 1980, public school finance was determined by the need to sustain the existing teachers and the facilities. The private schools were subsidized before 1980, but they were charging tuition and receiving funds from other sources such as the Catholic Church to cover their costs (Carnoy and McEwan 2003). After the reforms, the Ministry of Education began disbursing monthly payments to municipalities based on a fixed voucher multiplied by the number of students enrolled in their schools; private schools received equivalent per student payments if they did not charge tuition. According to Mizala and Romeguera's (2004: 2-3) classification Chilean vouchers are considered flat and lump-sum, because equal amount of per student vouchers are paid to schools automatically based on their monthly

enrollment levels. As a result, payments to public and private schools began to fluctuate in proportion to student enrollments.

L.O.C.E. (*Ley Organica Constitucional de Ensenanza*) i.e. the Organic Constitutional Education Law established a base voucher, which varied according to the level of education and the location of the school. Chilean law specifies a factor by which the base voucher is adjusted for students at every grade level. Both public schools and private schools who are deemed eligible to receive a voucher receive the base voucher and the adjustments. The base voucher itself can be considered a flat voucher. Selected municipalities receive "ad hoc" zone assignments to compensate for high poverty or isolation. Since 1987, schools within rural municipalities have received upward adjustments. Because of the economic crisis of the early 1980s, the declining copper prices in the 1980s, the real value of the voucher declined precipitously until the end of 1980s. It bounced back in the 1990s and continued to rise (Carnoy and McEwan 2003; Gauri 1998). Private voucher schools may also be financed by contributions from parents (shared financing), a practice instituted in 1996.[24]

Currently, there are at least 22 monthly and yearly upward adjustments to the base voucher based on the geographical location of the school, the needs of teachers teaching in poor, rural areas, or in schools with children with special needs or from disadvantaged

[24] The "shared financing" law in Chile allows private voucher schools and public high schools to charge fees that can be up to 1.6 times the basic voucher payment. Discounts to vouchers are applied progressively. If monthly tuition is less than half the level of the *Unidad de Subvención Escolar* (USE), no discount is applied. Tuition fees between one half and one USE incur a 10% deduction. Fees between one and two USE incur a 20% deduction. Fee charging schools must also devote up to 10% of their additional income to finance scholarships. The USE is the monetary index, valued at $14.206,936 Chilean pesos (US$ 29.6) in 2007.

backgrounds (Departamento de Estudios y Desarrollo 2007a). Despite these adjustments the fact that parents can now add money onto the voucher if they wish to send their child to a tuition charging private voucher school creates inequalities in choices based on parental resources. Moreover, wealthy municipalities can add money onto the voucher for their public schools, which creates both inter-sectoral and inter-municipal inequalities. When these differences are taken into account school resources vary based on the location and the sector of the school; however, because most adjustments and transfers are also based on the average number of students enrolled in the school the pressure to enroll and keep more students continues to be a defining feature of the education system.

The initial reforms looked like a text book application of vouchers. Flat vouchers based on monthly enrollment were accepted in most schools and parents were, and still are, able to choose any school. After the democratic government came to power in 1990, the form and function of Chile's voucher system were largely maintained although new policies were developed in addition to the existing ones such as the shared financing system of 1996. So, instead of changing the voucher system, *Concertación*, a coalition of center-left political parties in Chile, has put special emphasis on instructional reforms and investments.

Beginning in 1996 President Frei proposed a six-year reform that included lengthening the school day by 8 hours a week, developing new curricula for these additional hours, conducting teacher training and providing additional money for special innovative programs to be awarded on a competitive basis. School day was lengthened to 8 hours in the Lagos government. Also, the democratic government gave priority to improving poor primary schools through direct resource investments. The 900 Schools

Program, P-900, was targeted at high poverty and low-achieving schools (OECD 2004). In 1992, The Program to Improve The Quality of Equity of Pre-Primary and Primary Education (MECE) was initiated with World Bank financing to improve all public schools with textbooks, libraries, and infrastructure improvements.

The current President, Michelle Bachelet ,highlighted education in her campaign and promised programs to reduce educational inequalities. In June 2006, however, she faced massive street protests by public school students who demanded reform of the L.O.C.E. (Ley Organica Constitucional de Ensenanza) of the past military regime. The striking public school students asked for shifting the responsibility for public education back to the national level and out of the hands of the municipalities. The Bachelet government sent a bill to the Congress to reform the Pinochet era education law and agreed to pay 80% of college entrance exam and transportation costs, and in April 2007 proposed to replace the existing L.O.C.E. with a new General Law of Education. The proposal for the General Law of Education explicitly deals with discrimination in admissions to public and private voucher schools, raises the standards that apply to private voucher schools, and makes their monitoring more strict[25].[26]Proposed legislation, which initially prohibited for-profit education organizations, now would require that such entities make available to the public information on their profitability as well as their use of voucher funds (Elacqua, Contreras, Salazar 2008).

[25]Recent laws on education such as Law Nº 20.247 reflect the demands of teachers and students for greater control of private voucher schools by increasing their monitoring. See http://www.bcn.cl/leyes/pdf/original/268806.pdf for Law Nº 20.247.

[26] Currently, there is a nation-wide teacher strike. Student protests are taking place in Santiago and Valparaiso. Teachers and students are protesting the slow pace of reform and asking for the immediate removal of L.O.C.E and its effect on the new General Law of Education.

IV. DIFFERENCES BETWEEN SCHOOL SECTORS

i. Public and Private Voucher Schools

Chile's reforms encouraged a rapid growth in private school enrollment in the 1980s that was driven by a rapid expansion of nonreligious and profit maximizing schools (See Figure 1). Hence, Chilean K-12 education has developed three sectors: public, private voucher and private non-voucher elite schools. Fee-paying private schools, which have always existed, do not compete with public schools, as their fee is, on average, about five times the per-student subsidy. On the other hand, the voucher plan created a massive redistribution of enrollment across private voucher and public schools. At the beginning of the 1980s, around 15 % of students were enrolled in private voucher schools and almost 80 % in public schools. During the return to democracy in 1990, the same figures became 32% and 58%. By 1996, around 33 % of enrollments were in private voucher schools. As of 2006, 44% of total enrollment is in private voucher schools, whereas 49.7 % of the students are enrolled in public schools. (Departamento de Estudios y Desarrollo 2007b; OECD 2004).

In addition to Catholic schools, many for profit private schools joined the voucher program. For-profit voucher schools best fit the description of educational privatization proponents (e.g. Chubb, 2001). They are profit driven, targeting large numbers of students in order to maximize profits from Chile's per-pupil voucher formula. They are often controlled by a group of off-site owners, in some cases with private shareholders, and often have ties to other industries,[27] which permits them access to a greater number

[27] See, for example, La Tercera (2005).

of potential customers and investors (Elacqua, Contreras, and Salazar 2008). Private voucher schools with these characteristics are more likely to recruit and retain a higher portion of less expensive to educate students to maximize their profits. McEwan and Carnoy (2000) report that for-profit schools account for 21 % of primary school enrollments, whereas 10% of primary enrollments is in Catholic voucher schools. Using tax status to classify private schools, Elacqua (2005) finds that 70% of private schools is for-profit.

Non-profit voucher schools, including Catholic,[28] Protestant,[29] and secular organizations,[30] are more likely to be characterized by a mission that targets disadvantaged students. These schools, which are subsidized by the Church or local businesses, often have access to donated facilities and teachers willing to work for below-market salaries, and thus are able to provide a range of services to disadvantaged students whose costs exceed the voucher (Elacqua, Contreras, and Salazar 2008).

The students who enroll in each type of school are different in many respects. Those attending private non-voucher schools come from families that have much higher incomes on average, and are headed by parents with substantially more schooling. The average father of a student in a private non-voucher school has at least some college education, which is not true of any other school type. Differences among students from public and private voucher schools are somewhat less pronounced. Nonetheless, the

[28] Branches of the Catholic Church include religious orders, parishes, archdiocese, and religious foundations.
[29] Protestant church schools include Methodist, Baptist, Seventh-Day Adventist, Anglican, Lutheran, Presbyterian churches.
[30] Most of the secular nonprofit schools are branches of foundations that were created for other specific tasks, such as the Aid Corporation for Children with Cancer. Some foundations were created by community development groups such as the Rural Social Development Corporation.

families of students from private voucher schools are still of higher socioeconomic status than public school families (See Tables 1-4).[31]

Tables 1-4 Here

The differences are even more visible when we look at the share of vulnerable children in each school sector (See Figure 2).[32] Figure 2 divides the private voucher school sector into 2 groups based on whether these schools charge tuition (FONIDE 2008). 32% of total enrollment in private-voucher schools without tuition is composed of vulnerable students whereas the same figure for private voucher schools with tuition is 10.8%. The add-ons to the voucher seem to create further segregation within the voucher school sector based on parent resources.

Figure 2 Here

Inter-sectoral and socio-economic differences are also reflected in academic achievement. Tables 5 and 6 show language and mathematics SIMCE scores of 4th and 8th graders across school sectors and school socio-economic status (UCE 2008). Average SIMCE scores across sectors for both language and mathematics show a private school advantage. However, when we look at each school's socioeconomic status group, public, private voucher, and private non-voucher schools perform best among low, middle, and

[31] The Ministry of education in Chile determines the socio-economic status of schools based on the information collected with the administration of SIMCE tests, based on -among other things- parent surveys. SIMCE test are administered in all schools at 4th and 8th grades of the primary school and the 2nd grade of high school. Hence the Tables 1-4 show enrollment and the number of schools across socioeconomic categories and school sectors based on 2007 SIMCE tests of language and mathematics for 4th and 8th graders. The criteria used for school socio-economic status categories are presented in Tables 1 and 3 (UCE 2008).

[32] All subsidized schools in Chile are required - as of March 2006 - to enroll a minimum of 15 percent of students classified as vulnerable. For more information see http://www.modernizacion.cl/1350/articles-66426_ley_19979.pdf

high status groups respectively.

Tables 5 and 6 Here

In addition to class and sector differences, the Chilean education has a sharp rural urban divide. Only 12.4% of the total enrollment is in rural areas in Chile, but rural areas have 48.7 % of all schools in Tables 7 and 8 (UCE 2008). The difference is due to the high supply of public schools: 79.3% of all schools in rural areas is public. Because the density of the population is low in rural areas the private school supply remained limited. However, the number of schools needed to address the needs of scattered families is high, and public schools address the needs of these families. The rural urban divide in Chilean education is not a topic of this dissertation. This dissertation focuses on the Metropolitan Region of Santiago because of its competitive urban context and population density. School choice policies including vouchers are often proposed as cures to the ills of inner-city public schools; hence, focusing on the urban context is particularly useful. However, I also acknowledge the fact that the market-like school choice arrangements are least likely to take root in rural contexts where the number of children is not high enough to attract several private schools to the area. Hence in such areas, school supply remains too low to induce competition.

Tables 7 and 8 Here

a. Rules and Regulations Governing Public and Private Voucher Schools

Public and private voucher schools in Chile differ in many respects: the standards they have to comply with, their ability to hire and fire teachers, school finance, and admissions practices. In order to understand whether those differences parallel Chubb and Moe's

expectations of private and democratic accountability and characterization of public and private schools I will discuss the establishment and operation standards, rules and regulations governing teacher's employment, school's financial resources, and admissions policies first for the public school sector and then for the private voucher school sector.

As explained in Section III public schools are governed by municipalities through DAEMs and they receive their financing including vouchers from the division of administration and finance within each municipality. Hence, their many functions are monitored and supported by different layers of the municipal bureaucracy. In addition to accountability to DAEMs, the public schools have to comply with the Ministry of Education regulations.

The role of the Ministry is supposedly limited to "technical-pedagogical issues", with administration left to municipalities, or in the case of private schools, to the school owners but the Ministry's technical role gives it discretionary power in setting the curriculum. Because the minimum curricular requirements are high few schools can propose its own curriculum. The Ministry enforces its rules on curriculum, infrastructure, and classroom capacity by auditors from the ministerial provincial directorates (DIRPROVs) to check schools' physical state, possession of necessary documents, conformity with ministerial norms and enrollment records (Gauri 1998: 26-27). These regulations apply both to public schools and private schools.

There are other regulations, however, that apply mostly to public schools.[33] Ministerial Decrees define the role of the director, inspector, the pedagogical unit, the administrative unit, teacher's council, the parent association, and student organization. Also the documents public schools are permitted to keep, grade scales, tests that should be administered in certain intervals, and personnel ranks are all enumerated by the Ministry and enforced by the SEREMIs.[34]

In addition to these regulations public schools are constrained in their governance because of the Teacher Code that governs the hiring and firing of their teachers. At the beginning of the education reform movement, the military government dissolved the teachers' union and fired teachers with leftists views (Parry 1997). Teachers lost their status as civil servants, reverting to municipal contracts (Gauri 1998, Parry 1997). In the mean time teachers became municipal employees and instead of conforming to the national *Escala Unica de Remuneraciones* (The Scale of Renumerations), their wages and working conditions were governed by the more flexible *Codigo de Trabajo* (Labor Law). As a result, teachers lost guaranteed job security, paid vacations, standard wage scales, a 30-hour week, and the right to collective bargaining.

With the return to democracy teachers began seeking improved wages and working conditions. Negotiations between the government and teachers resulted in the passage of the 1991 *Estatuto Docente* (Teacher Code) which introduced regulations to the public school teacher market. Wage floors were set for teachers with various levels of

[33] Rules on the selection of school names and colors for school uniforms apply to both sectors, public and private vouchers.
[34] See http://www.seremi13minvu.cl/ for different Decrees and Laws applied by the Metropolitan Region of Santiago SEREMI.

experience and training; these minimum wages were legislated to vary in lockstep with the voucher's value. Limits on hiring and firing of public teachers were also introduced.

Public school teachers could be hired as either tenured or contracted teachers. Tenured teachers were to be hired through public contests in each municipality, and severe restrictions were placed on their firing and reassignment. If they are fired from one school they have to be rehired in the same township unless a serious crime is committed. The *Estatuto Docente* makes it unlawful for municipalities to dismiss teachers on the grounds of a decline in enrollment, or even to transfer a teacher to another school with greater enrollment without her consent (Biblioteca del Congreso Nacional 1996).[35] Contracted teachers had fewer restrictions placed on their hiring and firing but could account for no more than 20% of a municipality's teacher work force. The contracts of private school teachers were still governed by the *Codigo Trabajo* (Labor Code), which permitted significantly more flexibility in hiring and firing for private voucher schools.

Although public and private voucher schools are both eligible to receive the same per student voucher, wealthy municipalities can add to the per student voucher, transfer funds to schools in financial distress, or build school facilities. However, they can not officially try to reduce their costs by "cream skimming' easy to educate students because public schools are legally forbidden from administering admissions tests or selecting students by other means. However, most private voucher schools apply informal interviews, and certain parents can be discouraged from applying to the school during the interview.

[35] See http://subvenciones.mineduc.cl/seccion/documento/2D20020404161328110 94.pdf for the *Estatuto Docente*.

Unlike public schools, private voucher schools are not governed by DAEMs but by their governing boards, or owners. In the first few years of the voucher programs, setting up a private voucher school had very few requirements such as holding a primary school degree; however, over time complaints about lax standards somewhat increased the requirements private voucher schools should comply with. For instance, in 1983, the Ministry authorized SEREMIs to inspect schools for safety and hygiene (Decree 81/83), and gave the provincial directorates the authority to establish the required teaching materials for each school (Decree 615/83) . A decree passed in 1996 also requires private voucher schools to have at least 15% vulnerable students. Despite the increase in regulations, the standards they are subjected to still do not go beyond what is necessary for maintaining the infrastructure, except for curriculum as explained above.

The initial requirements to set up a private voucher school are explained each year in the "*Educational Subvention Guide*" published by the Ministry of Education (Departamento de Estudios y Desarrollo 2007a). The school founder, *el sostenador*, who is responsible from the operations of the private voucher school is required to have secondary education, and no serious criminal record. 51 % of private voucher schools belongs to individual owners. If the *sostenador* is a legal person, similar rules apply to its members. In order to be eligible for vouchers there are 8 simple rules for the school (Departamento de Estudios y Desarrollo. 2007a: 4-5):

1. The school should be officially recognized by the SEREMI.
2. The school should have at least 15% vulnerable students (Decree 196/1996).

3. The regulations on the maximum and the minimum number of students should be applied to class size unless otherwise noted by the Ministry for pedagogical or other reasons.
4. The school should have a full cycle of grades as required by the level of education.
5. The school should have an internal regulation specifying the rights and duties of the school, students, and parents and what should be done in case of noncompliance. The internal regulation should be communicated to the parents at the time of registration and amendments should be immediately sent to parents. Only those sanctions and measures that are in the internal regulation can be applied.[36]
6. The school office have a publicly visible notice stating the admissions rules and disciplinary measures according to the law Nº18.962 and to the Decree Nº2 of 1998 of Subsidies.
7. No real or legal person can supply funds for the school that violate registration rules except as authorized by the law.[37] In the case of schools that implement processes of selection, the total and conditions of the registration fee should not exceed the limit set by the Ministry.[38]

[36] The 5th requirement entry continues with the internal disciplinary measures. See http://w3app.mineduc.cl/mineduc/ded/documentos/Guia%20Subvenciones%202007.pdf
[37] In 2007, the maximum contribution at the time of registration was 3,500 Chilean Pesos. The contribution can be paid monthly. Also, Parents Association can charge contributions up to 16,000 Chilean pesos which can be paid in installments.
[38] In 2007, such schools were allowed to charge selection fees up to 3,500 Chilean Pesos.

8. The school should abide by the personnel contracts, and laws governing their payments.

In brief, vouchers private schools should adopt the minimum requirements in curriculum, comply with the maximum class-size number, possess a complete cycle of primary or secondary education, charge no more than the small fees deemed permissible, and pay the social security of the employees. In 1986, a series of infrastructure requirements were imposed on private voucher schools because of alleged abuses (Gauri 1998). The decrees that followed set exact measurements on school infrastructure and equipment which suddenly increased the costs of the schools. Because the adaptation period was short many schools closed down as a result. However, the 1986 requirements are no longer enforced or rarely enforced. It is extremely rare that a school closes down because it does not comply with these requirements. Perhaps the only real scrutiny private voucher schools are subjected to is their financial audits. Auditors from the DIRPROVs randomly check attendance documents because schools have an incentive to over-report their enrollment to receive more vouchers. Failure to comply with proper account keeping rules result in large fines (Circular 606, MINEDUC).

Private voucher schools face no extra limitation in dealing with the teachers compared to other personnel because their contracts are governed by the *Codigo Trabajo* and not by *Estatuto Docente*. Most private voucher school teachers are not in a union. The relative lack of job security resulted in the hire of relatively inexperienced young teachers especially by the for-profit private voucher schools. Some of these teachers had to work in two schools because the schools operated in a two-shift basis. Unlike private voucher school teachers, public school teachers tend to be more experienced, and work for the

same school for longer periods of time (Departamento de Estudios y Desarrollo 2006) because only public schools have a tenure system. The fact that wealthy municipalities can add funds to the voucher help their public schools employ more experienced and better teachers.

Private voucher schools' main source of income is the per student voucher. As mentioned above, the policy of shared financing which began in 1996 contributed to their income. 43% of all private voucher schools charge tuition, however small (MINEDUC 2008). The tuition contributions do not reach the level of wealthy municipalities' contributions to their public school. However, private voucher schools with religious affiliation can receive funds from their religious organizations, and some voucher schools that belong to a network with private elite schools receive add-ons to the voucher.[39] In addition, private voucher schools can use student selection tools such as exams, but their criteria should not be based on social class. However, this dissertation shows that private voucher schools screen parents by informal parent interviews (Chapter 4).

In short, except the minimum standards by the Ministry of Education the school owner has the authority in all decisions in a private voucher school. The school is not subjected to the authority of DAEMs. Setting up a school is fairly easy. The owner basically needs to have a high school degree and comply with building codes and space requirements, and have a list of teachers. Gauri (1998) and Magendzo et al. (1988), however, argue that compared to any other period of Chilean history the government

[39] The information is based on an interview with Gregory Elacqua, former advisor to the Chilean Minister of Education, dated February 20, 2008.

monitors private schools more closely and frequently. Monitoring and standardization may have increased in Chilean education for all schools; but there is a clear difference between public and private school governance, their supplemental resources and their flexibility in the teacher labor market. Despite intra-sectoral differences especially for the private voucher school sector, the institutional arrangements that allow for private voucher schools seem to give them the incentive to cater to their parents' wishes more, which will be further discussed in Section V part b.

Before going into the discussion of how the Chilean public and private voucher schools fit in the Chubb and Moe's (1990) framework of democratic versus market accountability and whether the voucher system is close to the ideal, I will briefly discuss an important outcome measure of the success of voucher systems, test scores, which is not addressed in this dissertation. However, understanding parents' choices', perceptions of competition, and what makes parents happy with their schools may provide a substantive explanation to Chile's stagnating standardized test score problem.

ii. School Sectors and Standardized Test Scores

Given the enormous energy devoted to educational reform in Chile, the fact that Chile scores badly in international tests, and that its own testing system SIMCE shows only slight improvements cause major disillusionment with how the educational system performs as a whole (OECD 2006). Hsieh and Urquiola (2006) using differences across roughly 300 municipalities show that the first effect of the school voucher program was increased sorting and not improvements in test scores, as the "best" public school students switched to the private sector. Using test scores, repetition rates, and grade for age as measures of achievement, they find no evidence that the large reallocation of

students from public to private schools improved average educational performance in Chile.

Most parents rely on reputation of the school in their school choice decision, and in Chile reputation is simply a function of the social class of a school's student population. SIMCE results were not widely distributed because of resistance from teachers, who feared it would be misinterpreted. Instead of social background of the students and the low level inputs to the school parents would blame the teachers (Gauri 1998). Although the test scores' public dissemination increased over time, parents may have hard time interpreting them because the SIMCE scores do not control for selection bias and do not provide value-added information per student. As a result, parents may use social class as a shortcut to academic success, which in turn reduces the pressure on private voucher schools to improve their test scores. Instead, they can attract parents by enrolling and keeping students from relatively higher social classes, hence, reducing their overall costs.

In fact, Carnoy and McEwan (2003) concluded that private voucher schools do not score higher than public schools. Using Spanish and Mathematics achievement test data collected by the Ministry of Education between 1990 and 1997 and background data on students they (McEwan 2001; McEwan and Carnoy 2000) find that non-religious privately run voucher schools are marginally less effective than public schools in producing Spanish and Mathematics achievement in the fourth and eighth grades after controlling for socioeconomic status. Nonreligious private voucher schools are even less effective compared to public schools when they are located outside of the capital of Santiago. McEwan and Carnoy (2000) argue that the difference may be due to the different resources in nonreligious voucher schools such as the existence of a greater

percentage of teachers with short-term contracts. On the other hand, Catholic voucher school students score higher than public school students controlling for SES differences and selection bias.

Although they produce somewhat lower test scores non-religious private voucher schools cost about 13% less than public schools. The differences in costs may be due to regulations imposed on municipal schools but not on private voucher schools. These include higher public-sector wages for teachers and other personnel and less public-sector flexibility in managing infrastructure investments. Catholic schools produce somewhat equal test scores but they are equally cost-effective controlling for test-scores, student social class, and school location. McEwan and Carnoy (2000) argue that Catholic schools spend more in absolute terms compared to public schools, thereby producing greater achievement, even though their cost effectiveness is similar to that of public schools. They also argue that thanks to vouchers and public school response to increased competition, the average scores of pupils in public schools may have increased by 1990 to the point where public school effectiveness achieved parity with private schools.

Also, McEwan and Carnoy (1999) find that the effect of private voucher school competition on test scores is positive in the metropolitan region of Santiago, though modestly so, accounting for a roughly .2 standard deviation increase in test scores over 15 years. Outside the metropolitan region competition has small negative effects. The lack of or the minimal size of competitive effects may have two reasons. First, some public schools may lack the proper incentive to compete, in spite of declining enrollment and revenues. Gauri (1998) explains that some municipalities faced “soft” budget constraints during the 1980s. When voucher revenues declined, these national governments lobbied

the national government for extra budget allotments, instead of improving quality. Second, some public schools may not possess the means to improve quality, even given proper incentives because they may simply lack the financial, administrative, or pedagogical resources that are necessary to raise achievement.

V. CONCLUSIONS

The universal school voucher system in Chile was modeled after Milton Friedman's (1962) proposal for school vouchers. Hence, its design is very close to his idea of creating a market for schools. The vouchers are flat and can be spent in public or private schools, including religious private schools. Parents can enroll in any school, and all parents have to make a school choice decision. With the relatively new shared financing scheme (1996), parents can add money onto the voucher. Moreover, As Friedman would have predicted a host of new schools have entered the K-12 market. The growth in the private voucher sector was driven by for-profit voucher schools. The criteria for eligibility to receive a voucher for private schools are not strict.

These main features of the existing system seem to fit Friedman's (1962) description of a school voucher system. However, there have been other developments that affected how schools are financed and governed such as the military regime's urban policy. That policy created segregated zones within metropolitan areas and increased the resource gap among municipalities. Combined with the decentralizing features in the education reform, school finance became more local than ever for public schools in Chile. Public school resources came to vary according to municipal transfers in addition to school enrollment, and the fact that such transfers apply only to public schools skew the playing field considerably in favor of public schools. As a result, it is extremely rare that a public

school closes down for financial distress. However, such disclosures have happened in the private voucher school sector especially in the mid 1980s (Gauri 1998).

Also, the local control of public schools that Friedman talks about is not the municipalization observed in Chile. The military regime's application of decentralization created another layer of local control by the junta of generals. As a result, it was not geared towards getting first hand information on what students and parents need and want and making changes accordingly. The mayors, and the high-ranking personnel of the military employed in the DAEMs had very little information on governing schools. With the return to democracy, mayors have become publicly elected. Public election of the mayor of a municipality should increase her sensitivity to local educational needs; however, election zones are smaller than where the vouchers can be spent, basically everywhere in the country. It is because most public school students go to schools in their township that the wealthy municipalities have an incentive to transfer extra resources to schools either in funds, or as school facilities.

Aside from the effect of decentralization on the finances of public schools in wealthy municipalities, the main structure of the initial design is still in place in Chile. Flat vouchers, with many but minor adjustments, accepted in public and private schools everywhere, and almost free entry into the private voucher school market make the Chilean system very close to what Friedman prescribed in the 1960s. However, Friedman himself left the consequences of having both public and private schools in a voucher system open. As the Chilean case shows once the school voucher reform is applied, the sectoral differences become more visible. In order to understand how the voucher school

system performs as a whole, we need to understand the environment surrounding the different types of schools.

Chubb and Moe (1990) characterize public and private schools as institutions with different constituencies operating in different environments. Public schools are accountable to many constituencies and the bureaucracies that regulate them. As a result, they have less autonomy, and they are less likely to prioritize their most immediate constituency, the parents. On the other hand, private schools are autonomous and because their survival depends on the parents they serve they are more attuned to their needs.

The review of the governance of Chilean public and private schools show that public and private voucher schools are somewhat similar to the ideal types described by Chubb and Moe (1990). Public schools are governed by DAEMs which are municipal organizations, yet they are also subject to Ministerial regulations due to several government decrees on education in public schools. As a result, they are embedded in municipal and national bureaucracies.

On the other hand, private voucher schools are relatively autonomous. Their owner or the governing board is responsible from the administration of the school. The schools have to comply with the minimum standards set by the Ministry in health and safety, infrastructure, and account keeping. [40] It seems the only exception is the curriculum standard, which is considered too high by most schools.

Moreover, municipalities help their public schools, if they can, by increasing their

[40] However, one should also note that religiously affiliated private voucher schools may have their respective religious bureaucracy.

vouchers or by building facilities. Although private voucher schools may charge tuition, this extra-income fluctuates according to enrollment whereas the far higher extra-funds given by wealthy municipalities to public schools shield public schools from enrollment pressures.

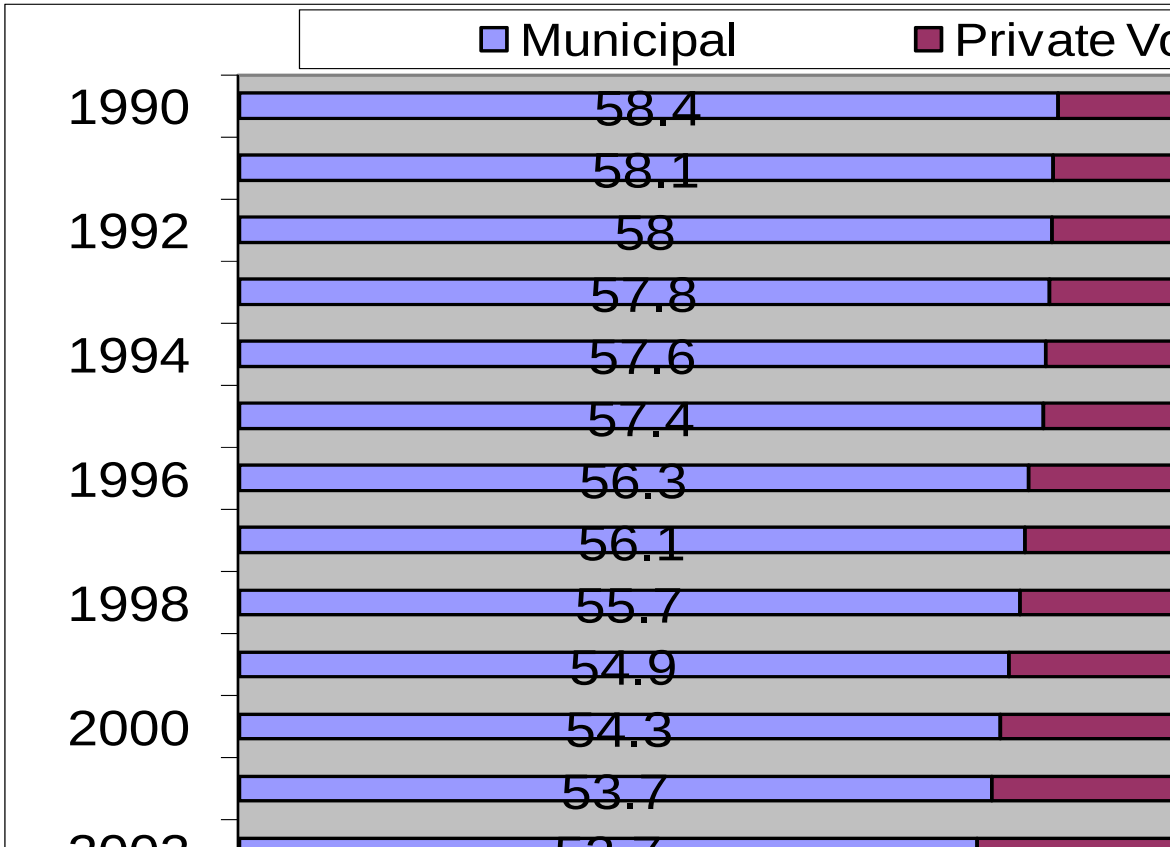
The similarities to Chubb and Moe's (1990) account of public and private schools seem to have increased after the return to democracy. Although the military government wiped out teacher unions, and subjected teacher contracts to the Labor Code in the 1980s, with the return to democracy teachers in public schools once again strengthened their job security with the new Teacher Code. Even if a public school loses students and faces financial distress, the tenure policies for teachers protect them from getting fired. There is no similar protection for private voucher school teachers. Their employment is governed by the Labor Code, which makes hiring and firing teachers considerable easier. As a result, teacher's employment is linked to the survival of the private voucher school which runs on per student vouchers.

In short, given the main features of the school voucher system and how public and private voucher schools operate the Chilean case seems to have the qualities necessary to test predictions and assumptions of the school voucher proposals. However, one should pay attention to a couple of changes in the system, especially in school finance, which may mediate the effect of vouchers on school outcomes.

First, the resource differences between municipalities seem to affect the degree to which public schools are exposed to enrollment threats. Second, the shared financing scheme creates an extra source of revenue for tuition charging private voucher schools, 43% of all voucher schools (MINEDUC 2008). Although small, these tuitions may

change the status of these schools in the eyes of the parents. The tuition payment is directly made by the parents unlike the voucher, which automatically follows the child to the school. Hence, empirical studies should account for municipal wealth and tuition for private voucher schools. Third, employment of teachers is governed by two different laws. School voucher outcomes should be interpreted with an eye on these two different incentive sets for teachers, one with a tenure system and the other without it.

Figure 1: Distribution of Enrollment across School Sectors



Source: Departamento de Estudios y Desarrollo, 2007

Figure 2: Distribution of Vulnerable Students across School Sectors

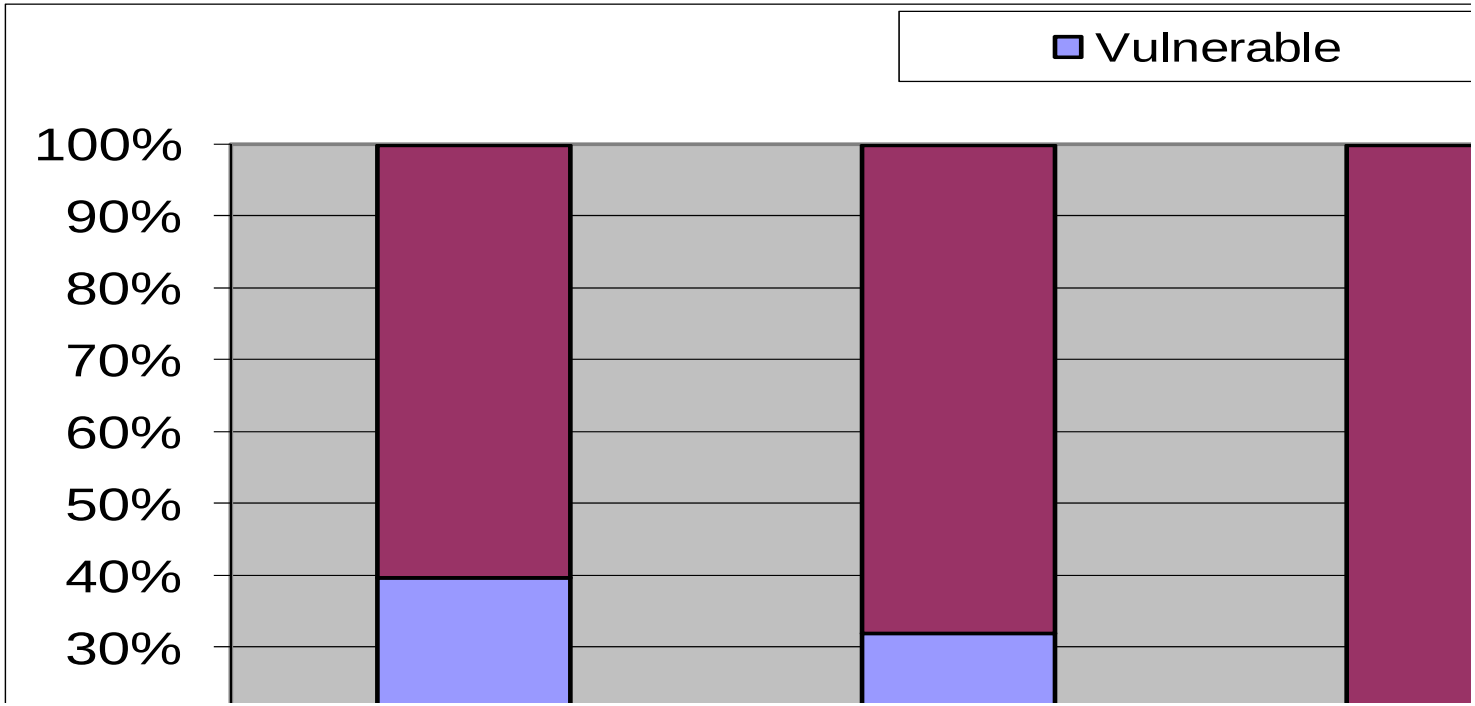


Table 1: Classification of Schools into Socioeconomic Groups for 4th Grade Students Taking the 2007 SIMCE Language and Mathematics Tests.

SOCIO-ECONOMIC GROUP	YEARS OF EDUCATION		HOUSEHOLD INCOME	THE VULNERABILITY INDEX (IVE)* MOTHER
	MOTHER	FATHER		
LOW	Less than 9	Less than 9	$0 - $134.000	60,01% and more
LOW-MIDDLE	9 - 10	9 - 10	$134.001 - $215.000	37,51% - 60%
MIDDLE	11 - 12	11 - 12	$215.001 - $375.000	20,01% - 37,5%
MIDDLE-HIGH	13 - 14	13 - 15	$375.001 - $800.000	0,01% - 20%
HIGH	More than 14	More than 15	$800.001 and more	0

* IVE stands for the percentage of vulnerable students in the school. It refers to the percentage of students benefiting from the National School Aid and Scholarships Program (JUNEAB) in each school.

Table 2: Distribution of Students and Schools across School Socioeconomic Status Groups and Sectors for 4th Grade Students Taking the 2007 SIMCE Language and Mathematics Tests.

SOCIO-ECONOMIC GROUP	ENROLLMENT			SCHOOLS		
	% PUB	% PV	% PNV	% PUB	% PV	% PNV
LOW	7%	2%		29%	9%	
LOW-MIDDLE	24%	7%		22%	6%	
MIDDLE	14%	21%		6%	12%	
MIDDLE-HIGH	1%	15%	0%	1%	9%	1%
HIGH		1%	6%		1%	5%
NATIONAL	**47%**	**46%**	**7%**	**58%**	**37%**	**5%**

PUB : Public School
PV: Private Voucher School
PNV : Private Non-Voucher School

Table 3: Classification of Schools into Socioeconomic Groups for 8th Grade Students Taking the 2007 SIMCE Language and Mathematics Tests.

SOCIO-ECONOMIC GROUP	YEARS OF EDUCATION		HOUSEHOLD INCOME	THE VULNERABILITY INDEX (IVE)*
	MOTHER	FATHER		
LOW	Less than 8	Less than 8	$0 - $138.000	57,51% and more
LOW-MIDDLE	8 - 9	8 - 9	$138.001 - $215.000	35,01% - 57,5%
MIDDLE	10 - 12	10 - 12	$215.001 - $375.000	17,51% - 35%
MIDDLE-HIGH	13 - 14	13 - 15	$375.001 - $1.100.000	0,01% - 17,5%
HIGH	More than 14	More than 15	$1.100.001 and more	0%

* IVE stands for the percentage of vulnerable students in the school. It refers to the percentage of students benefiting from the National School Aid and Scholarships Program (JUNEAB) in each school.

Table 4: Distribution of Students and Schools across School Socioeconomic Status Groups and Sectors for 8th Grade Students Taking the 2007 SIMCE Language and Mathematics Tests.

SOCIO-ECONOMIC GROUP	ENROLLMENT			SCHOOLS		
	% PUB	% PV	% PNV	% PUB	% PV	% PNV
LOW	8%	2%		19%	6%	
LOW-MIDDLE	25%	6%		23%	7%	
MIDDLE	15%	20%		9%	15%	
MIDDLE-HIGH	2%	14%	0%	1%	12%	1%
HIGH		1%	6%		0%	6%
NATIONAL	**51%**	**42%**	**7%**	**52%**	**41%**	**7%**
PUB : Public School PV: Private Voucher School PNV : Private Non-Voucher School						

Table 5: Distribution of 2007 SIMCE Language and Mathematics Test Scores across School Socioeconomic Status Groups and Sectors for 4th Grade Students

SOCIO-ECONOMIC GROUP	LANGUAGE			MATHEMATICS		
	PUB	PV	PNV	PUB	PV	PNV
LOW	(+)239	230	-	(+)224	210	-
LOW-MIDDLE	236	240	-	225	229	-
MIDDLE	248	(+)258	-	240	(+)250	-
MIDDLE-HIGH	274	278	-	269	273	-
HIGH	-	292	(+)300	-	291	(+)299
AVERAGE	**241**	**261**	**299**	**231**	**254**	**298**

(+) means that the average SIMCE score if higher for that school sector among schools with the same social group.
PUB : Public School
PV: Private Voucher School
PNV : Private Non-voucher School
- refers to categories with less than 0,5% of the total students.

Table 6: Distribution of 2007 SIMCE Language and Mathematics Test Scores across School Socioeconomic Status Groups and Sectors for 8th Grade Students

SOCIO-ECONOMIC GROUP	LANGUAGE			MATHEMATICS		
	PUB	PV	PUB	PV	PUB	PV
LOW	(+)233	225	-	(+)234	224	-
LOW-MIDDLE	235	238	-	236	240	-
MIDDLE	246	(+)258	-	248	(+)260	-
MIDDLE-HIGH	(+)292	277	-	(+)299	281	-
HIGH	-	299	301	-	308	(+)314
AVERAGE	**241**	**260**	**299**	**242**	**263**	**312**

(+) means that the average SIMCE score if higher for that school sector among schools with the same social group.
PUB : Public School
PV: Private Voucher School
PNV : Private Non-voucher School
- refers to categories with less than 0,5% of the total students.

Table 7: Distribution of Schools across Rural and Urban Areas and School Sector

Geographic Area	Public		Private Voucher		Private Non-Voucher		Total	
Urban	1.777	39,2%	2.328	51,3%	430	9,5%	4.535	51,3%
Rural	3.415	79,3%	876	20,3%	15	0,3%	4.306	48,7%
Total	**5.192**	**58,7%**	**3.204**	**36,2%**	**445**	**5,0%**	**8.841**	100%

Table 8: Distribution of Enrollment across Rural and Urban Areas and School Sector

Geographic Area	Public		Private Voucher		Private Non-Voucher		Total	
Urban	827.593	44,0%	914.139	48,6%	137.393	7,3%	1.879.125	87,6%
Rural	205.436	77,2%	57.760	21,7%	2.781	1,0%	265.977	12,4%
Total	**1.033.029**	**48,2%**	**971.899**	**45,3%**	**140.174**	**6,5%**	**2.145.102**	**100%**

CHAPTER FOUR

Parents' Choices in a Universal School Voucher System

I. INTRODUCTION

The Chilean school voucher system is universal, i.e. all parents have to choose a school, public or private, for their child. There is no legal residency limit on their choices. School vouchers automatically follow the student to the school in which they are enrolled. Hence, the design of the Chilean universal school voucher system is geared towards expanding the set of alternative schools for parents as much as possible. If parents consider many schools, and if their considerations are based on academics then expanding choice can induce healthy competition among schools and improve the educational outcomes for all.

However, the practice of choosing schools can be quite different from what the designers intend to accomplish with a universal school voucher system. In the ideal market for schools, parents would have no real or perceived limitation on the size and content of their school choice sets.[41] However, research has already shown that parents' choices are constrained by parental characteristics and non-academic considerations (See for example Schneider et al. 2000, Buckley and Schneider 2007).

A lesser studied constraint on parents' choices is schools' choices. School choice has almost always referred to parents choosing schools, in fact, we know that schools also choose students. Moreover, per student flat vouchers give schools an incentive to choose

[41] Throughout the chapter "choice set" refers to the set of alternative schools the parent considers before enrolling her child to a school.

parents and students who would require less school resources or who would make school more attractive to prospective parents. As a result, existing social cleavages may define which parents are desirable from the perspective of school authorities; hence, what is a feasible choice set for a given parent. The resulting segmented market may generate much less competition compared to what we would expect based on an ideal market for schools, and much more social segregation.

In fact, the practice of choosing students is common among schools in Chile. It is so common among private voucher schools that the new General Law of Education explicitly forbids it. However, for a long period of time schools have chosen students, a reality that parents in Chile may have considered in their choice sets. Existing evidence (Elacqua, Schneider, and Buckley 2006) suggests that parents' choice sets are clustered in socio-economic status (SES) rather than academic achievement. The reason behind such choice sets may be a reflection of schools' emphasis on the parent's demographic characteristics in choosing a student. In this chapter I investigate the screening of parents by schools across sectors in order to find out how schools choose their parents. If schools emphasize demographics in choosing a student, parents may be discouraged from applying to schools with different parents and tend to choose schools with similar parents. In addition to schools "cream skimming" students, such a tendency may further exacerbate social segregation of disadvantaged groups in society.

School voucher advocates, on the other hand, argue that school vouchers will improve the educational opportunities for children already living in segregated neighborhoods. First, school competition will be a tide that lifts all boats including the quality of schools

in poor neighborhoods (Hoxby 2001).[42] Second, and directly based on Friedman's (1962) prediction on what vouchers can achieve, school vouchers will give parents from disadvantaged backgrounds the same mobility enjoyed by wealthier parents who can move from one school district to another. Hence, children living in mostly poor inner-city neighborhoods could enjoy a better school environment by using their vouchers in the schools of wealthier neighborhoods.

In Chile, universal school vouchers give parents the chance to enroll their child in a school of their choosing literally and legally anywhere in the country. Hence, boundaries of urban segregation which often correspond to municipal borders in Chile should not constrain parents' school choices. However, we do not know the extent to which parents living in segregated neighborhoods consider schools in different districts and the effect of the school supply on their choices. This chapter examines the geographical limits of the parents' choices against a background of urban segregation. Hence, it investigates whether the promise of parental mobility is fulfilled in a universal school voucher system.

In brief, I examine two lesser studied constraints on parents' choices compared to the effect of parents' demographics on their information quality or parents' non-academic priorities in choosing a school. Screening by schools and whether parents are mobile across neighborhoods have not been adequately addressed in empirical studies of school vouchers. In Section IV (a), I examine screening of parents by schools from different

[42] A part of the promise of school vouchers is the improvement of school productivity, which has been interpreted as more academic quality for the same educational inputs. This dissertation does not focus on whether school vouchers improve schools, including schools in poor neighborhoods. Rather, this dissertation investigates another promise of school vouchers: parental mobility.

sectors. In Section IV (b), I investigate the determinants of parents' mobility in a universal school choice system. Before starting with the analyses, I introduce the panel study, the sample and the aggregate data sources which will be used in the rest of this dissertation.

II. DATA AND THE SAMPLE PARENTS

The data for this dissertation come from a four-wave panel of primary school parents in the Metropolitan Region (R.M.) of Santiago, Chile and a two-wave panel of the principals of these schools.[43] The panel consists of parents whose children enrolled in school for the first time in April and May of 2004, the first semester in Chile. The survey data in each wave come from face-to face interviews with a sample of 536 parents in the R.M. at the beginning of that school year and every six months thereafter for a total of four waves.[44] Testing of hypotheses on competitive education markets with a large private school supply is possible with the panel study because Santiago is the region in Chile where parents from all socioeconomic groups have the greatest opportunity to attend private schools. In rural areas, and smaller urban areas in Chile, students have more limited choice due to supply constraints.

The sample frame was constructed in two steps. First, a sample of schools stratified by socioeconomic status[45] and school type (public, private voucher, private non-voucher) was drawn.[46] The sample was weighted to match the proportions of each stratum with the

[43] National Science Foundation award number 0517933.
[44] The following panel waves have 481, 483, and 414 respondents respectively due to attrition. The nature of attrition and its implications are addressed in Chapter 7.
[45] The 2003 demographic categories the Ministry of Education assigns to each school was used in the stratification (see Appendix 1 Table 1).
[46] See Appendix 2 for sampling details.

actual population. Second, eight beginning students were selected at random from the selected schools and their parents were interviewed. Table 1 reports the distribution of the parental sample in the R.M., by school type. Table 2 reports the descriptive statistics of the schools in the sample. Because of stratified sampling the following analyses will use survey weights where appropriate.

Tables 1 and 2 Here

The bivariate analyses of survey parents across school sectors (See Table 1) show that students who enroll in each type of school are different from each other in many respects. Those attending private voucher and private non-voucher schools generally come from families that have much higher incomes, on average, and are headed by parents with substantially more schooling. Table 3 shows the distribution of parents across schools from different socio-economic status categories as defined by the Chilean government. Table 3 shows that schools from different groups are homogeneous in their parental bodies. Similarly, Table 4 shows that parents from voucher schools with tuition and religiously affiliated voucher schools tend to have higher education and income compared to parents from voucher schools with tuition and religiously affiliated voucher schools.

Tables 3-4 Here

In order to better see the effect of parental characteristics on being a voucher or a private voucher parent I regress parent's school sector (public school, private voucher school and private non-voucher school) on a set of parent characteristics. Table 5 presents the exponentiated coefficients of the multinomial logistic regression with being public school parent as the base category. The results show a clear difference between private

voucher and public school parents in education. Hence, the findings confirm what the bivariate analyses show: private voucher school parents have higher SES.

However, further dividing the private voucher school sector into tuition charging and non-tuition charging, and religious and non-religious groups helps us see the variation in parental SES within the private voucher school sector. First, a parent with higher education and a car is more likely to be a tuition charging voucher school parent than a non-tuition charging voucher school parent (See Table 6). Second, the only significant difference between parents in religious and non-religious private voucher schools is their frequency of church attendance. In brief, these findings show that, within the private voucher school sector, tuition charging schools have the highest SES; whereas religious schools have parents from different SES groups, and are likely to attract religious parents.

Tables 5 and 6 Here

I supplement the panel study data on parents and school by objective data on schools and their townships. The aggregate data on schools and *comunas*[47] from the Chilean Ministry of Education's publicly available data on all schools in the Metropolitan Region of Santiago for the years 2002-2006. School-level data include school sector, religious affiliation, socio-economic status, enrollment, and the number of vulnerable children. Comuna level variables include the communal poverty rates, number of schools across sectors, and various geographic and demographic variables.

[47] Comuna refers to neighborhoods in Santiago around which many municipal services are organized. There are 52 comunas in the Metropolitan Region of Santiago. The dissertation uses Gauri (1998) and Mizala and Romeguera (2004) translation of comuna as township.

III. PARENTS' CHOICE SETS AND THEIR LIMITS

In an ideal universal school choice system what would limit parents' choice sets would be their different educational needs and wants. The fact that the Ministry of Education's minimum curricular standards are considered high by a majority of the Chilean schools resulted in the adoption of the Ministry of Education's curriculum and testing content and schedule by public and private voucher schools. Gauri (1998) argues that as a result of high and uniform standards universal school choice could not lead to a supply of schools with different curricular and teaching foci in Chile. Hence, from Gauri's (1998) perspective the reason why educational innovation was stifled is not because school choice is not capable of generating pressures on schools to innovate but rather because government involvement exceeded what is allowable in an ideal school choice system.

However, Brown (1992) argues that problems of uncertainty and imperfect information affect organizational choices for schools. In a choice system, these problems make parents skeptical of educational innovation. Instead, parents are risk averse and choose conventional educational practices. As a result, Brown (1992) argues that public and private choice schools resemble each other over time. The enrollment considerations of choice schools put further pressure on them to adopt the mainstream educational practices that parents feel familiar with. Hence, it is the nature of parental choice that discourages schools from educational innovation.

If there is little variation in what different parents need and want in education, and if schools have an incentive to offer a similar educational product, then parents would have an easier time making a school choice decision: they would simply pick the academically

superior school. Research has shown, however, that the school choice decision is not that straightforward. First, even if parents prioritize academic quality over other school characteristics parents from different backgrounds do not have equal access to quality information on schools. Second, parents may have non-academic priorities in their school choice decision.

Research has shown that parents' information depends on their search strategy and the quality of their networks, which in turn depends on the parent's socioeconomic status (Schneider et al. 1997, Schneider et al. 2000). In the class conscious environment of Chile, it is very likely that social networks are extremely stratified. In fact, only 16% of the parents in the Chilean sample with only primary school education had educationally informed college graduates in their networks; whereas the same figure is 54% for the college graduates. As a result, despite their effort less educated parents can reach lower quality information in their networks compared to more educated parents.

Moreover, measures of academic quality such as test scores may not be easy to reach, or may be accessible based on parents' resources (Schneider and Buckley 2002). This is especially true in the case of Chile where before the electronic dissemination of SIMCE test scores via the Ministry's website[48], teachers and school authorities in low performing schools resisted making SIMCE information public because the public would blame the schools for low test scores, and not consider the effect of the parents' demographics on the educational quality of schools. Moreover, in a country with a high degree of inequality[49] it is very likely that parents' ability to access test score information via the

[48] See http://www.simce.cl/ .
[49] Chile's Gini index of income distribution is 54.3 (CIA 2004)

internet will differ based on family resources.[50] In the sample only 6% of the parents declared that they use internet in their school search, only 2.5 % use the Ministry of Education school search website. Almost 80% of the parents did not use a single formal source of information such as the municipality, provincial office, or the Ministry.

Given parents' informational difficulties, parents in school choice systems use short-cuts to information, or heuristics, (Kahneman and Tversky 1986) to reach school choice decisions.[51] However, the use of heuristics can lead to biased decisions (Coombs and Slovic 1979; Nisbett and Ross 1980). Buckley and Schneider show that charter school parents make large errors in reporting the achievement of their schools (Buckley and Schneider 2007: 140). These errors indicate that parents may be using school qualities such as the parents' SES level as an indication of academic quality. Parents can not control for the effect of parents' demographics on the school's academic achievement or isolate the school effect from other environmental effects and judge schools on the basis of what a specific school can contribute to a specific child. Publicly available test scores do not control for student demographics, either. As a result, parents may be misled by the school environment that comes with having a higher SES parent body.

Also, parents may choose schools for non-academic reasons. In the US context, the importance of a school's racial composition to parents (Henig 1996; Buckley and Schneider 2007) in their search behavior points to the potential stratifying effects of

[50] According to CIA's measure of being an internet user, only 25% of the Chileans are internet users, which includes people who regularly access the internet but also includes people who use the internet even a few times in several months (CIA 2008).
[51] For an extended discussion on heuristics and parents' use of school relevant information refer to Schneider et al. (2000) pp. 110-113, and Buckley and Schneider (2007).

unfettered school choice. Further, members of lower social class groups could be intimidated by and distrustful of the dominant group, and hence remove themselves from competition for seats in the best schools—which often have a preponderance of higher SES families (Wells and Crain 1992: 77-78). Lower income parents might not be as likely to choose higher performing schools with higher social status bodies even when their children might qualify for these schools or they could afford to pay the somewhat higher costs associated with them.

Hence, parental differences in resources or decision making strategies as explained above, and sometimes prioritizing of demographic characteristics of schools in the school choice decision can create further segregation of the system as parents are sorted across schools based on non-academic criteria. As a result, they intentionally or unintentionally leave out many schools in their choice decisions.

In the Chilean context, there is reason to expect similar sorting based on non-academic criteria. As shown in Tables 1-3, schools are indeed segregated by sector. The findings presented here are similar to what other researchers have shown: Chilean parents with more schooling and higher incomes are more likely to enroll their child in both private voucher and non-voucher schools rather than public schools (Elacqua, Schneider and Buckley 2006; Gauri 1998; Winkler and Rounds 1996). Hsieh and Urqiola (2006) find that the immediate impact of school vouchers was a quick sorting of students into schools based on their parent's SES. McEwan and Carnoy (2003) explain that parents in private schools have higher levels of schooling and income relative to public school parents. Moreover, parental choice is sensitive to school attributes such as test scores and the educational background of other parents in the school. Families have a relatively stronger

preference for schools that enroll students with highly educated parents. They also find that preferences for school attributes vary strongly in relation to parent education. Less-educated parents opt for schools with lower test scores and less-educated parents. The reverse is true of more-educated parent.

These findings are at odds with the hypothesis that less educated parents respond to the offer of higher performing, higher social class schools to a similar degree as do more educated parents, even when those schools are available in equal numbers and even when their cost is approximately the same. Similar to American parents the Chilean parents' quality of search for information may depend on their SES. Moreover, they may be intentionally prioritizing non-academic criteria in their decisions. Wells and Crain (1992) have argued that school choice is governed not only by resource availability and access to information but also by internalized viewpoints associated with social status. Hence, the stratification of the Chilean school system may be due to parental characteristics and preferences, as has been extensively studied in the school choice literature. Such stratification may affect how Chilean parents perceive their school options.

However, at least two other reasons may contribute to how Chilean parents construct their choice sets. First, schools can choose parents in a school choice system. If schools screen parents on the basis of demographic characteristics, then parents may restrict their choice sets to schools with similar parents. Second, neighborhood segregation may make it harder for parents to move across neighborhood boundaries. Hence, for a majority of parents available schools may still be in the vicinity of their residences. Unlike parents' difficulties in reaching and processing information on alternative schools, these two potential causes of stratification have not been adequately addressed in the literature.

Next, I turn to an empirical investigation of these two potential causes of restricted choice sets.

IV. SCHOOL SIGNALS AND PARENTS' CHOICE SETS

i. Schools choosing parents

Critiques of school choice argue that choice may put pressure on schools to prove their success while at the same time minimizing their costs. This incentive in the choice system may make schools select those students who will be easier and less costly to educate (Henig et al 1999; Henig and Sugarman 1999; Fiske and Ladd 2000; McEwan 2000; Schneider et al. 2000; Buckley and Schneider 2007). The empirical evidence for this argument has been scarce. Research has shown either no evidence of cream-skimming (Lacireno-Paquet et al. 2002) or moderate cream-skimming (Howell and Peterson 2002) in various school choice environments in the US.

However, these studies looked at aggregate data on schools' demographic and academic indicators in limited school choice systems with important restrictions on schools' ability to choose parents. Moreover, these studies do not investigate school-level processes of selection. In a universal school voucher environment where schools can legally choose students and determine their own admissions mechanisms the incentive to "cream-skim" the applicants may actually turn into practice. Schools have the ability to screen parents at the application stage not only based on academic merit, but also based on other criteria. Hence, schools may construct screening mechanisms such as parental interviews, either formal or informal, to pick the "desirable" students and parents.

The L.O.C.E of Chile does not allow selection of students in public schools, however parent interviews at the application stage are common. Private schools can legally choose

students. They have autonomy in designing their selection mechanisms (Departamento de Estudios y Desarrollo 2007a: 4-5). Hence, their institutional environment gives them enough room of maneuver to discourage applicants deemed undesirable based on the schools' criteria. These explanations must be considered in the Chilean context, where class divisions are strong and school sectors are stratified in parent SES. Schools may discourage parents from lower SES groups from enrollment both in order to reduce their costs and to keep a parent body attractive to parents using SES as a heuristic to assess the quality of a school.

Both Friedman (1962) and Chubb and Moe (1990) consider the for-profit motive of private choice schools a healthy feature of school choice. School choice advocates argue that reduced costs for the same educational product should still be considered a success because it indicates improved productive efficiency (Hoxby 2003). However, these predictions of the school choice advocates are based on the assumption that schools cannot affect the composition of their students' demographics, or any other student-level factor that may affect the cost of educating a child. However, if schools operate in an environment in which they have significant autonomy on admissions as in Chile it is likely that they may attempt to affect the demographic composition of their student bodies. Hence, the incentive to screen parents' SES or the child's behavioral and learning difficulties would be higher for schools in the private sector compared to the public sector. Public sector's lack of profit-motive and lack of autonomy on its administrative processes contribute to this difference.

The rationale both in Chubb and Moe (1990) and in Friedman's (1962) accounts of the market for schools emphasize the for profit nature of the voucher schools. Because they

use the ideal market as a model to set expectations on what vouchers can achieve they ignore other rationales that may lead schools to screen parents. Religious private voucher schools' mission may alter how the school reacts to market pressures. Bryk, Lee, and Holland (1993) explain that Catholic schools in the US promote a set of values and a common culture that may explain how the value added to their African-American students is higher compared to other schools. They also argue that these schools create a coherent constituency who are already committed to the school's values. In Chile, these schools may accept more students from minority low income groups because of their mission; however they may emphasize parental values more compared to non-religious private voucher schools (Elacqua, Contreras and Salazar 2008).

Based on these expectations I test the following hypotheses on schools' selection processes:

H_1: Non-religious private voucher school parents are more likely to be interviewed by the school compared to public school parents.

H_2: Religious private voucher school parents are more likely to be interviewed compared to public schools.

H_3: Private voucher school parents' are more likely to be screened with respect to their SES compared public school parents.

H_4: Religious voucher school parents are more likely to be screened with respect to parental values compared to public school parents.

To test the hypotheses I use survey questions on whether the parent was asked any of the following questions at the school during the application stage: her marital status, education level, income, her child's behavioral problems, her child's educational

problems, and the specific reasons for her application. I construct a model where the probability of being interviewed as a parent is a function of the school's characteristics, and parent's characteristics that have been found to be correlated with school choice outcomes (Schneider et al. 2000; Elacqua, Schneider and Buckley 2006; Buckley and Schneider 2007):

$$\Pr(Interview) = F(\beta_0 + \beta_1 Voucher_{Non-religious} + \beta_2 Voucher_{Religious} + \beta_3 Non-Voucher + \beta_4 Tuition + \beta_5 IVE + \beta_6 high-school + \beta_7 college + \beta_8 income + \beta_9 employed + \beta_{10} female + \beta_{11} church\_attendance + \beta_{12} length\_of\_residence)$$

where β are coefficients to be estimated and *Interview* indicates whether the parent had an interview; i.e. whether she was asked the questions mentioned above.

In a similar vein, to test the third and the fourth hypotheses I construct the following model:

$$\Pr(Screening_k) = F(\beta_0 + \beta_1 Voucher_{Non-religious} + \beta_2 Voucher_{Religious} + \beta_3 Non-Voucher + \beta_4 Tuition + \beta_5 IVE + \beta_6 high-school + \beta_7 college + \beta_8 income + \beta_9 employed + \beta_{10} female + \beta_{11} church\_attendance + \beta_{12} length\_of\_residence)$$

where β are coefficients to be estimated and k indexes over the schools' screening criteria. The models include school characteristics such as the sector of the school, whether the school charges tuition, school's SES, and parent characteristics such as the parent's socioeconomic status, and parent-level controls.

Equation 1 models the probability that a parent is interviewed or screened as a determinant in her child's selection to the school.

$$\Pr(Y = 1 \mid \mathbf{x}) = \frac{\exp(\mathbf{x}\boldsymbol{\beta})}{1 + \exp(\mathbf{x}\boldsymbol{\beta})} = \frac{1}{1 + \exp(-\mathbf{x}\boldsymbol{\beta})}$$

where X is a vector of right hand side variables and β is a vector of the coefficients. The reported odds ratios (Tables 7-9) are based on the Equation 2 below:

$$\frac{\Pr(Y=1\mid \mathbf{x})}{1-\Pr(Y=1\mid \mathbf{x})}=\Omega(\mathbf{x}) \quad \text{and} \qquad \Omega(\mathbf{x})=exp(\mathbf{x}\beta)$$

The independent variables for which coefficients are estimated are:

- **School sector**: represented by three indicator variables, indicating whether the parent has chosen a private voucher school with religious affiliation, a private voucher school without religious affiliation, or a private non-voucher school as opposed to a public school.
- **School SES:** represented by an indicator variable, indicating whether the chosen school charges tuition or not; and a continuous variable measuring the percentage of vulnerable children in the school (*Indice de Vulnerabilidad*, or IVE).
- **Parent SES:** represented by two indicator variables indicating whether the parent has completed high-school or college and a continuous variable measuring the household monthly income.
- **Demographic controls:** including two indicator variables on whether the parent is employed and the gender of the respondent parent, and two continuous variables measuring the frequency of a parent's church attendance per year and the number of years the parent has resided in the same township.

The results are presented in Tables 7-9. Table 7 shows that the odds that a parent will be interviewed are 2 to 1 and 8 to 1 for non-religious and religiously affiliated private

voucher school parents compared to public school parents. Hence, these findings show supportive evidence for the first two hypotheses presented above. The results show that religiously affiliated private voucher school parents, who are mostly Catholic school parents in Chile, are far more likely to have experienced a parental interview. The results also show that being a parent of a tuition charging school makes it far less likely that the parent will be interviewed, which may indicate the fact that the tuition itself is a screening method to attract parents with the resources and the interest to pay for their child's school.

Table 7 Here

Table 8 reports the results on the third and fourth hypotheses. First, the results show that the odds are 4 to 1 that a religiously affiliated voucher school parent has experienced an interview where her marital status was a subject compared to a public school parent. Neither private non-voucher nor non-religious private voucher school parents face odds significantly different from public school parents. Hence, the results show supporting evidence for the fourth hypothesis. However, panels 1-3 of table 8 show no support for the third hypothesis that non-religious private voucher school parents will be screened based on their SES more compared to public school parents. It seems that Catholic private voucher school parents have experienced more scrutiny about their income and education compared to public school parents. Once again the results in table 8 show the dampening effect of being a parent in a tuition charging private voucher on the odds of facing SES questions in the interview.

Table 8 Here

Having found no support for the third hypotheses I explore whether private voucher parents are screened with respect to their child's educational problems, which may increase the cost of educating a child. Table 9 shows that parents in non-religious private voucher schools are more likely to have been asked whether their child has a behavioral problem compared to public school parents; but no such significant effect appears in the screening of learning problems. Parents in religious private voucher schools seem to have experienced interviews with questions on the child's behavioral or learning problems much more compared to public school parents. The mixed results on non-religious private voucher parents can be interpreted differently. These schools may be paying more attention to the specific needs of the applicants compared to public schools, or trying to "screen out" the students who may increase their costs. If the former is true it is more likely that we observe questions on the specific reasons behind parents' application to a school in the private voucher school sector.

Table 9 Here

Table 10 shows that this is the case. The odds are almost 2.6 to 1 that a non-religious private voucher school parent has answered questions on the specific reasons for applying to the school compared to public school parents. However, once again religious private voucher school parents are far more likely to have answered such questions.

Table 10 Here

In brief, the results indicate that, contrary to the school voucher skeptics' claims, parents in nonreligious private voucher schools – a sector that has a large for-profit component- do not seem to have experienced more questions on their income or education compared to public school parents. Moreover, the results on the possibility of

screening the students with educational problems are mixed and can be interpreted in different ways. Perhaps the most striking result of the analyses is the degree to which religious private voucher school parents face scrutiny along several dimensions including their SES, marital status, and their child's educational problems, as well as the specific reasons behind their choices compared to parents from other sectors. Also, the results consistently show that parents of tuition charging schools do not face such scrutiny perhaps because the tuition itself is a prescreening mechanism that eliminates parents who can not afford or do not want to pay money from their personal funds to pay for their child's school.

ii. The effect of neighborhood segregation on parents' choice sets

The universal school voucher system abolishes school districts. It has been advocated as a means of giving students from disadvantaged neighborhoods the chance to enroll in schools in better neighborhoods. Hence, interested parents and students can have the exit option from the schools around their residences. In fact, this is one of the scenarios used by Milton Friedman to show the benefits of school vouchers (1962: 94). He argues that increased mobility of lower SES groups in school voucher systems is counter to the expectation that educational choice can bring about further segregation.

However, advocating school vouchers based on increased mobility of lower income parents assumes that the supply of schools in better districts with better academic quality is likely to create a similar response in parents from different SES groups. We do not know the extent to which parents from different SES backgrounds will have the ability and the willingness to become mobile in the urban landscape in search of better schools. By creating homogeneous zones in SES, urban segregation may increase the differences

between districts; hence it can make more expensive for parents to send their child to schools in better areas.

In Chile, the forced-relocations of the Pinochet era created homogenous townships within the Metropolitan Region of Santiago. Moreover, municipalization of most public services further exacerbated the urban segregation of social classes. As a result, township differences in SES increased, which may have increased the costs of sending the child to a school in a different district. In fact, socio-economic status of the town and educational funds in addition to the voucher required by the schools correlate. The data show that the percentage of people living at or below poverty level and the tuition charged by schools significantly correlate (Pearson's r=-0.41). As a result, because the parent's characteristics are better reflected in what the neighborhood school expects from parents, most parents may find it convenient to remain in their residential area. Only those parents who have the additional resources to become mobile may try to send their child to schools in different neighborhoods

Based on these expectations I investigate the extent to which parents become mobile across their residential areas in a universal school choice system, and the determinants behind such mobility. Following Elacqua, Schneider, and Buckley's (2006) strategy of investigating parents' choice sets I compare the location of the schools that parents considered before enrolling their child to a school and the parent's residential location. I use the *comuna* as the limit of the residential neighborhood because municipalization of the 1980s took place within comuna boundaries. In the sample almost 47% of parents considered only one school whereas 37 % considered 2 schools and 10 % considered 3 or more schools. I consider a set residentially clustered if the majority of choice set schools

is in the same comuna as parent's residence. If the choice set has two schools, the sets with the same residential comuna school and a neighboring comuna school is considered residentially clustered.

Table 11 shows that almost 78 % of the choice sets are clustered in comuna. Moreover, similar proportions of parents from public and private voucher schools seem to have residentially clustered choice sets. Looking across school SES groups in table 12, it is clear that a decisive majority, 95%, of parents in low-income schools have their alternative schools close to their homes. Most parents in other categories also choose to remain in the same comuna. This picture suggests that the universal school voucher system in Chile is very local, and parents' choices reflect the boundaries of comunas drawn by the former military regime.

Tables 11 and 12 Here

Next, I turn to an investigation of the determinants behind the variation in residentially clustered choice sets. As explained above it is very likely that in segregated urban neighborhoods only the parents with the resources to go outside their residential area will be able to use their vouchers in different places. Hence, I hypothesize that:

H_1: Higher household income increases parent's likelihood to have less residentially segregated choice sets.

H_2: Parent education increases parent's likelihood to have less residentially segregated choice sets.

H_3: Having a car increase parent's likelihood to have less residentially segregated choice sets.

Also, the supply of different schools in the same area can reduce the likelihood of parents to choose schools in different districts.

H_4: The number of alternative schools in the same area decreases the likelihood of parents to choose schools in different districts.

To test the hypotheses I use survey questions which asked parents the names of schools that they say they actively considered enrolling their child. I model parents' decision to choose residentially clustered alternative schools as a function of parent characteristics, comuna characteristics, and the availability of schools in the comuna:

$$\Pr(RCCS) = F(\beta_0 + \beta_1 high-school + \beta_2 college + \beta_3 income + \beta_4 car + \beta_5 poverty_{comuna} + \beta_6 km^2{}_{comuna} + \beta_7 public_{comuna} + \beta_8 voucher_{comuna} + \beta_9 non-voucher_{comuna} + \beta_{10} employed + \beta_{11} female + \beta_{12} church\_attendance + \beta_{13} length\_of\_residence)$$

where *RCCS* stands for residentially clustered choice set and β are coefficients.

Equation 1 models the probability that a parent's choice set is residentially clustered.

$$\Pr(Y = 1 \mid \mathbf{x}) = \frac{\exp(\mathbf{x\beta})}{1 + \exp(\mathbf{x\beta})} = \frac{1}{1 + \exp(-\mathbf{x\beta})}$$

where X is a vector of right hand side variables and β is a vector of the coefficients.

The reported odds ratios (Table 13) are based on the Equation 2 below:

$$\frac{\Pr(Y = 1 \mid \mathbf{x})}{1 - \Pr(Y = 1 \mid \mathbf{x})} = \Omega(\mathbf{x}) \quad \text{and} \qquad \Omega(\mathbf{x}) = exp(\mathbf{x}\beta)$$

The independent variables for which coefficients are estimated are:

- **Parent resources:** represented by three indicator variables indicating whether the parent has completed high-school or college and whether the parent has a car, and a continuous variable measuring the household monthly income. Having a car is included as a measure of mobility by the parents; and also of SES.

- **School supply**: represented by three continuous variables, measuring the number of public, private voucher, and private non-voucher schools in the same comuna of parent's residence.
- **Comuna characteristics:** represented by two continuous variables, measuring the size of the comuna in km^2, and the percentage of residents below poverty level in the parent's comuna.
- **Demographic controls:** including two indicator variables on whether the parent is employed and the gender of the respondent parent, and two continuous variables measuring the frequency of a parent's church attendance per year and the number of years the parent has resided in the same township.

Because the Chilean school voucher system is a universal school choice system instead of simply measuring concentration of private schools in the school environment as a proxy for competition from the private sector[52] I chose to include school concentration in all the sectors. Unlike in the US, the Chilean education system is not

option demand—it is a universal choice system. That is, whereas in the US parents must first "choose to choose" and only then choose a school, all parents in Chile must choose; there is no "default" school for their children (on the importance of this institutional design see Schneider et al. 2000). Moreover, parents can use their vouchers in any school. Hence, in principle, schools from all sectors can be considered substitutes for each other by a parent.

[52] See Belfield and Levin 2005 for an extensive review of 41 studies using measures of competition in the US.

The results are presented in Table 13. Indicators of parental resources except having a car are not statistically significant predictors of having a less residentially clustered choice set. Also, indicators of school supply are not significant predictors of residential clustering in the choice set except for the private non-voucher school indicator. The results seem to suggest that the strongest indicator of parents' geographically expanded choice set is whether the parent owns a car or not. The odds are 0.43 to 1 that a parent with a car has her alternative schools clustered in the township of her residence compared to a parent without a car. It seems that having a car is an important parental resource in the Chilean context, one that indicates mobility. Also, being employed decreases (p-value =.061) the likelihood of having a geographically clustered school choice set. Neither the parent's monthly household income nor her education affects the choice sets' geographical clustering. It seems that parents who work and have a car and live in neighborhoods with lower supply of private non-voucher schools have less residentially clustered choice sets.

The effect of private non-voucher schools on the choice set may mean that the parent's neighborhood has better schools as the private non-voucher schools in Chile tend to be geographically clustered in relatively wealthy areas with good schools. Hence, parents living in such neighborhoods may have little incentive to look for schools in other townships.

Table 13 Here

V. SUMMARY AND CONCLUSIONS

School voucher reform aims to expand the set of alternative schools for parents as much as possible. In a universal school voucher system, parents are not restricted by

school district boundaries, and they can send their child to any school including public, private, and religiously affiliated schools. However, parents have limits on the quality and the inclusiveness of their choices. School choice research has extensively investigated the effect of parental characteristics on the quality of the school choice decision and whether parents prioritize parent demographics or academic quality indicators in their search for a school. In this line of research school choice almost exclusively referred to parents' choices when in fact we know that schools choose students. In addition, although school vouchers have been proposed as an opportunity for families in poor neighborhoods to send their child to better schools in wealthier neighborhoods the extent to which parents use this opportunity has not been adequately addressed in the school choice literature,

Hence, in this chapter, I focused on the screening of parents by schools across sectors and the geographical limits of parents' choice sets as two lesser studied constraints on parents' choice sets. I found that private voucher and private non-voucher school parents are more likely to have experienced an interview at the admissions stage compared to public school parents. However, religious private voucher school parents seem to have the most experience with admissions interviews. I expected mostly for-profit non-religious private voucher schools to screen parents' socio-economic status and the student's educational needs to minimize their costs or to attract parents who use parental demographics as a short-cut to school quality. I also expected religiously affiliated schools to screen parents' values based on Bryk, Lee, and Holland's (1993) work on Catholic schools.

The results were sobering. Non-religious private voucher school parents, who are likely to be in for-profit schools, proved to be no more likely to have been screened demographically compared to public school parents, In brief, this chapter finds no evidence to support the claim that the profit-motive of non-religious private voucher schools will make them "cream-skim" the parents. On the other hand, the same parents have answered questions on their child's behavioral problems and the specific reasons for their application more compared to public school parents. These mixed findings may point to the non-religious private voucher schools' sensitivity to parent's needs or their desire to identify hard to teach students. Further research on the motives behind such questions is needed.

Religious private voucher school parents are more likely to have been screened by schools demographically, and across all the other questions compared to parents in other schools. Although table 6 shows that religiously affiliated voucher schools are not significantly different from non-religious private voucher schools in parental SES, the results in tables 8-10 show that they are definitely more inquisitive compared to all other schools. The findings point to the possibility of "cream skimming" by these schools based on non-academic criteria such as parent's marital status. The same findings may also mean religious private voucher school's greater effort to know their students' background. Further research should investigate the demographics of parents who apply and get rejected by these schools compared to those who are accepted.

The finding that parents of tuition charging schools are significantly less likely to have experienced interviews across all the questions considered in this chapter compared to non-tuition charging schools deserve attention. The tuition itself, however small, may

serve as a signal to ward off parents deemed undesirable from the point of view of the school by setting an explicitly non-academic criterion in the admissions decision. Hence, it can reduce the pool of alternative schools for parents with lower SES and exacerbate social stratification.

The findings on the geographical location of the schools in parents' choice sets showed yet another constraint on parents' choices. A decisive majority of parents in all school sectors and school SES groups considers schools in their residential township. Parents' choices typically reflect the municipal borders drawn by the former military government to divide the Metropolitan Region of Santiago into socio-economically segregated zones. Moreover, those parents who consider schools outside their neighborhoods are not significantly different in education or income from parents who do not consider such schools except in having a car and being employed. Having a poor municipality does not seem to induce more or less mobility, either. Hence, it is still the parent's resources such as having a car which determine whether the opportunity to enroll in schools of different townships can be taken.

Taken as a whole, the findings on screening by schools and parental mobility give reasons to be both optimistic and pessimistic about parents' ability to have a large universe of schools to choose from in a school voucher system. First, non-religious private school parents do not seem to be screened by their schools in parental SES more compared to public schools. The increase in the school supply in Chile after the school voucher reform of 1980 have been driven by mostly for-profit non-religious private voucher school sector. For-profit status of these schools made them suspect in their admissions decisions because they have the incentive to reduce their costs by "cream

skimming" the applicants. Analyses of the Chilean parents' school interview experiences, however, do not provide support for the voucher skeptics' fears of cream-skimming.

Second, screening of parental demographics is common in religious private voucher schools. Religious private schools have converted from private to subsidized status with the 1980 reforms and have kept their old internal administrative structures. Their mission and values have not made them suspect in cream-skimming parents, and the findings presented here show that their parents are not different from non-religious private voucher school parents except their religiosity. However, the results also show that they screen parents' demographics at the admissions stage. Future studies should show the exact use of the information collected in the parent interviews to rule out the possibility that religiously affiliated schools cream skim parents based on non-academic criteria.

Third, the findings suggest that tuition may make the use of interviews to screen parental demographics redundant. Tuition status may signal the expenses involved in enrolling the child in the school, and thereby help school avoid the parents from lower SES groups who would be "screened out" in an interview by making one of the enrollment criterion explicitly non-academic. Hence, the shared financing scheme established in 1996 which allowed tuitions place a financial constraint on parents' choice sets, and can cause further social stratification.

Fourth, even with universal school vouchers parents' choice sets are geographically clustered in their residential area, and a poor residential area does not affect the parent's propensity to consider schools outside her neighborhood. Only those who are mobile with a car and employment tend to take the opportunity of considering schools in different neighborhoods. The findings point to the fact that school voucher systems operate against

a specific social context which may significantly affect whether the promises of school vouchers are realized. The policy of municipalization and urban segregation by the former military regime may have increased the cost of crossing the boundaries of socio-economically segregated boundaries of townships. Schools in different SES neighborhoods may require different levels of extra-funds, parent's time and involvement. Also, class consciousness of Chileans may make parents from different SES groups skeptical about their admissions prospects in the schools of different townships. As a result, an important promise of school voucher reform, parental mobility, may be impaired.

Table 1: Parent Sample Characteristics across School Sectors

	Public	Private voucher	Private non-voucher
No. of first grade parents in school	208	232	96
Parent education < 8th grade	18.1%	8.6%	0.1%
8th grade	38.9%	29.8%	4.5%
High school	33.0%	37.9%	5.6%
College or more	9.9%	23.7%	89.8%
Average monthly household Income before taxes ($US)	$304	$486	$3,072
Family owns car	28.0%	35.6%	90.9%
Respondent employed	33.0%	34.9%	75.9%
Single parent	25.3%	20.0%	17.3%
Female parent respondent	91.5%	91.0%	80.5%
Student walks to school	72.2%	63.4%	14.6%
Average length of residence in municipality (years)	17.76	20.64	14.93
Goes to church every other week or every week or more	24%	39%	29%

Note: Rows of education across school sectors add up to 100 %, differences due to rounding.

Table 2: School Sample Characteristics

	Public	Private voucher	Private non-voucher
Religious Affiliation	0	12	3
Average tuition (USD)	8,6	15,7	102
Average Low-income students (%)	30	13	0
Average primary enrollment	738	824	441
Average school age (years)	15,0	15,0	11,8
Total Number of schools surveyed	26	28	12

Table 3: Parent Characteristics across Schools in Different Socioeconomic Groups

	Low	Low Middle	Middle	Middle High	High
No. of first grade parents in school	48	129	176	95	80
Parent education < 8th grade	31%	25%	6%	1%	-
8th grade	48%	37%	31%	10%	2.5%
High school	17%	33%	40%	47%	12.5%
College or more	4%	5%	22%	42%	85%
Average monthly household Income before taxes ($US)	216	290	425	756	2,569
Family owns car	17%	23%	33%	53%	87.5%
Respondent employed	21%	31%	32%	44%	76%
Single parent	31%	27%	21%	17%	12.5%
Female parent respondent	90%	90%	94%	81%	85%
Student walks to school	92%	79%	62%	41%	8.8%
Average length of residence in municipality (years)	19	18	19	16	13
Parent goes to church every other week or every week or more	27%	23%	35%	39%	31%

Note: Rows of education across school sectors add up to 100 %, differences due to rounding.

Table 4: Parent Characteristics across Voucher Schools

	Tuition	No Tuition	Religious	Non-Religious
No. of first grade parents in school	170 (32%)	366 (68%)	96 (17%)	440 (82%)
Parent education < 8th grade	8%	18%	4%	16%
8th grade	18%	43%	22%	27%
High school	41%	30%	42%	35%
College or more	33%	10%	32%	23%
Average monthly household Income before taxes ($US)	640	339	666	484
Family owns car	47%	23%	48%	35%
Respondent employed	39%	31%	48%	30%
Single parent	17%	25%	18%	20%
Female parent respondent	87%	94%	81%	93%
Student walks to school	52%	70%	41%	68%
Average length of residence in municipality (years)	18	21	19	18
Parent goes to church every other week or every week or more	40%	35%	47%	33%

Table 5: Choosing a Private School

	Voucher	Non-Voucher
Parent education	1.54** (0.278)	4.198*** (2.702)
Average monthly household Income before taxes ($US)	1.001** (0.001)	1.003** (0.001)
Family owns car	0.929 (0.351)	3.151 (2.667)
Respondent employed	0.802 (0.275)	0.839 (0.589)
Single parent	0.989 (0.355)	2.504 (2.206)
Length of residence in municipality (years)	1.015 (0.014)	1.005 (0.028)
Church attendance	1.002 (0.004)	0.997 (0.006)
N	512	
Pseudo R^2	0.314	

Note: Reported relative risk ratios are from survey weighted multinomial logistic regression of school sector on the independent variables. Base category is public school. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 6: Choosing a Private Voucher School

	With Tuition	With Religious Affiliation
Parent education	1.585* (0.397)	1.055 (0.253)
Average monthly household Income before taxes ($US)	1.001 (0.001)	1 (0)
Family owns car	2.424** (1.099)	1.504 (0.626)
Respondent employed	0.678 (0.311)	1.324 (0.509)
Single parent	1.234 (0.618)	1.494 (0.67)
Length of residence in municipality (years)	0.985 (0.017)	1.007 (0.015)
Church attendance	1.005* (0.003)	0.993** (0.003)
N	228	228
Pseudo R^2	0.104	0.047

Note: Reported odds ratios are from separate survey weighted logistic regressions of the column variables on the independent variables excluding public and private non-voucher schools. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 7: Interview with the Parent

Non-religious voucher school	2.102*** (0.609)
Religious voucher school	8.041*** (2.749)
Private non-voucher school	2.118*** (0.701)
Tuition charging school	0.382*** (0.10)
Index of vulnerability (IVE)	0.992 (0.007)
High-school graduate	0.984 (0.299)
College graduate	1.067 (0.291)
Monthly household income	1 (0)
Employed	1.305 (0.29)
Female	1.031 (0.341)
Church attendance	1.001 (0.002)
Years of residence in the comuna	0.983** (0.008)
N	512
Pseudo R^2	0.097

Note: Reported odds ratios are from survey weighted logistic regression of the column variable on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 8: Interview with the Parent on Her Demographics

	Marital Status	Education	Income
Non-religious voucher school	1.299 (0.389)	1.619 (0.497)	1.396 (0.405)
Religious voucher school	4.902*** (1.617)	4.999*** (1.694)	4.868*** (1.583)
Private non-voucher school	1.13 (0.403)	1.18 (0.443)	1.484 (0.493)
Tuition charging school	0.506*** (0.133)	0.435*** (0.117)	0.462*** (0.118)
Index of vulnerability (IVE)	0.991 (0.007)	1.004 (0.007)	0.995 (0.007)
High-school graduate	1.284 (0.409)	1.132 (0.368)	1.05 (0.321)
College graduate	1.452 (0.414)	1.175 (0.346)	1.316 (0.36)
Monthly household income	1 (0)	1 (0)	1 (0)
Employed	1.35 (0.311)	1.208 (0.286)	1.227 (0.272)
Female	1.265 (0.441)	1.087 (0.387)	0.906 (0.294)
Church attendance	1.002 (0.002)	1.002 (0.002)	1 (0.002)
Years of residence in the comuna	0.994 (0.008)	0.998 (0.008)	0.99 (0.008)
N	512	512	512
Pseudo R^2	0.075	0.061	0.065

Note: Reported odds ratios are from separate survey weighted logistic regressions of the column variables on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 9: Interview with the Parent on Child's Behavior and Learning Problems

	Behavior	Learning Problem
Non-religious voucher school	2.075*** (0.701)	1.685 (0.573)
Religious voucher school	2.758*** (1.04)	2.506** (0.942)
Private non-voucher school	1.281 (0.534)	1.331 (0.539)
Tuition charging school	0.466*** (0.137)	0.443*** (0.13)
Index of vulnerability (IVE)	1.011 (0.008)	1.004 (0.008)
High-school graduate	0.957 (0.352)	1.083 (0.395)
College graduate	0.932 (0.317)	0.923 (0.314)
Monthly household income	1 (0)	1 (0)
Employed	1.492 (0.395)	1.559* (0.408)
Female	1.532 (0.662)	2.38* (1.129)
Church attendance	0.998 (0.002)	0.997 (0.003)
Years of residence in the comuna	0.993 (0.01)	0.985 (0.01)
N	512	512
Pseudo R^2	0.037	0.042

Note: Reported odds ratios are from separate survey weighted logistic regressions of the column variables on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 10: Interview with the Parent on Her Reasons for Application

Non-religious voucher school	2.652*** (0.836)
Religious voucher school	10.993*** (3.895)
Private non-voucher school	2.885*** (1.022)
Tuition charging school	0.405*** (0.114)
Index of vulnerability (IVE)	0.991 (0.007)
High-school graduate	1.288 (0.42)
College graduate	1.078 (0.313)
Monthly household income	1* (0)
Employed	1.581** (0.372)
Female	1.537 (0.546)
Church attendance	0.998 (0.002)
Years of residence in the comuna	0.979** (0.009)
N	512
Pseudo R^2	0.131

Note: Reported odds ratios are from survey weighted logistic regression of the column variable on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 11: Residentially Clustered Choice Set around Parent's Comuna across School Sectors, proportions

	Public	**Private voucher**	**Private non-voucher**	***Total***
Not-clustered	0.175	0.199	0.337	0.218
Clustered	0.825	0.801	0.663	0.782

Table 12: Residentially Clustered Choice Set around Parent's Comuna across School SES groups, proportions

	Low	Low-middle	Middle	Middle-high	High	*Total*
Not-clustered	0.047	0.15	0.21	0.151	0.333	0.213
Clustered	0.953	0.85	0.79	0.849	0.667	0.787

Table 13: Residentially Clustered Choice Set

High-school graduate	1 (0.471)
College graduate	1.406 (0.625)
Monthly household income	1 (0)
Car	0.431** (0.155)
Poeverty Level (% in comuna)	202.572 (698.73)
Comuna size (km^2)	1.004** (0.002)
Public schools in comuna	1 (0.01)
Private voucher schools in comuna	1.008 (0.005)
Private non-voucher schools in comuna	1.048** (0.022)
Employed	0.509* (0.183)
Female	2.099 (0.952)
Church attendance	1.001 (0.003)
Years of residence in the comuna	1.028** (0.014)
N	293
Pseudo R^2	0.165

Note: Reported odds ratios are from survey weighted logistic regression of the column variable on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

CHAPTER FIVE

Competition and School Sectors

I. INTRODUCTION

One tenet of school choice theory holds that competition will induce traditional public schools to improve their academic performance due to the fear of losing students to other schools. As Chubb and Moe (1990) explain, because private choice schools' autonomy makes them effective organizations compared to traditional, government-operated public schools their success will put pressure on the enrollment of other schools. Combined with Friedman's (1990) emphasis on rooting out bad schools by enrollment losses, the market model of education predicts that school vouchers will put pressure on public schools to improve themselves.

This view is anchored in the belief that public schools are open to competitive pressures and that they have the means to improve themselves in response to that pressure. The first of these assumptions, while perhaps the most basic, has been the subject of little empirical examination to date. We do not know whether public school authorities perceive the competitive pressures assumed to be unleashed by the voucher system. If they perceive competitive pressures, a series of new questions follow: whom do they see as their competition? What other characteristics define their competition sets? Are their competitors similar in academic quality or in parental demographics? These are

among the many questions that need to be answered before reaching any conclusion on the efficacy of school choice in improving public schools' academic outcomes.[53]

In order to investigate how public and private voucher school sectors perceive competition, and whether the existence of alternative schools affect their perceptions, I focus in this chapter on the perceptions of primary school principals in Santiago, Chile, about the competitive environment they face. First I review the debate on school vouchers' effect on schools. I continue by bivariate analyses of the school principals' perceptions, testing of the hypotheses on perceptions of competition, and the analyses of the principals' competition sets.[54] Last, I summarize the findings and discuss their implications for market-based education reform.

II. PUBLIC SCHOOLS IN AN EDUCATION MARKETPLACE

In contrast to the lively debate on school choice and parents, research on the supply side—i.e. on the behavior of schools in a school choice environment—has been largely confined to the difference the private sector makes in terms of standardized test scores, or to the patterns of student sorting at the system level depending on the regulation of the school choice design (Fiske and Ladd 2003; Epple and Romano 1998; 2003). So far, we know very little on the extent to which the supply side assumptions of the market models of school choice hold.[55]

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[53] In this chapter I am primarily interested in public schools' perceptions of competition. Whether public schools have the capacity to alter their practices once they perceive competition in the choice environment is a separate question for future research.

[54] Competition set refers to the set of schools the principal says her school competes with for enrollment.

[55] Note that Paul Hill et al. (2002) emphasizes the importance of supply, as do Chester E. Finn, Bruno V. Manno, and Gregg Vanourek (2001), in the context of charter school choice. The central focus here, given the Chilean case, is on choice through vouchers.

This is surprising since the seminal theoretical work supporting school choice emphasized the gains from privatization on the supply side. For instance, Milton Friedman's proposal (1962) for school vouchers justified the privatization of public education on grounds of increased efficiency. Given the assumption of idle school resources and holding technology constant, Friedman argued that competition would make the traditional public schools more efficient users of the resources they already have in producing academic achievement (see also Hoxby 2000; 2003).

In addition, the basic motivation that drives most research in school choice has been the concern that public schools do not fulfill the variety of tasks they are expected to accomplish, including their central function of teaching core academic subjects. As a result the idea that their performance can be improved by introducing market-like pressures has been an attractive one. But, it is unclear whether public school organizations would respond to potential funding losses despite the mechanisms of democratic control (Chubb and Moe 1990).

Other advocates of educational vouchers are more optimistic regarding the responsiveness of the public schools to their environments and claim that educational vouchers will pressure schools to be more responsive to the needs of consumers. For instance, Hoxby (2003: 286) argues that: "choice puts pressure on schools to move away from policies that are, on average, favored more by staff than by parents and toward policies that are favored more by parents than staff…"

In addition, voucher advocates argue that given freedom from regulation, schools of choice will develop innovative curricula and academic programs and that they will craft

school organizations that are more attuned to local preferences and values (e.g. Fuller 2000). These successful private school models, proponents argue, will eventually be emulated by the public schools and other low-quality private schools. However, voucher skeptics question whether public and private schools are really run that differently (e.g. Cuban 2004). For instance, as mentioned in Chapter 4, Brown (1992) expects the convergence of curriculum and educational methods in public and private sectors over time.

Looking at the contours of the school choice debate on the supply side, one is struck by the extent to which the arguments are based on normative theories of expected behavior. The expectation that schools of choice will unleash competitive pressures on the existing public schools, which then makes the public schools improve, depends on the assumptions that the existing public schools perceive market pressures, have the wherewithal and the incentives to respond to these pressures, and that the schools of choice are really competitive.

Although one might think that the funding losses would automatically translate into awareness of the competitive environment, it is less than obvious whether public schools perceive and respond to such effects. Moreover, schools losing students also have to be held accountable for competition to work. Overcrowded public schools, high capital costs to service more students, and as in the case of Chile transfer of funds to public schools in need may make schools indifferent or even enthusiastic about losing students to neighboring schools.

Moreover, Elacqua, Schneider, and Buckley (2006) find that parents' choice sets are clustered in socio-economic status rather than in academic quality, which supports the

view that parents might be shopping for, as they put it, "class, not the classroom" in the school choice market. As a result, schools of choice may respond to these parental pressures by competing with other schools based on parental demographics rather than student achievement. If parents prioritize "class" over academic success in this way, such a pattern of competition is unlikely to provide a heightened urgency to improve academic outcomes when a public school incurs student losses. These schools would know that they may not be able to stop student losses, despite genuine attempts at academic improvement, unless they alter the SES of their parents.

III. DATA AND METHODS

In this chapter, I use two survey items that ask principals whether their schools are in competition with other schools for pupils. The first item asks the principal the number of schools in her competition set. The second item asks the principal whether her school competes with schools in the same sector. I cross check the affirmative responses to the second item with the numbers given in the first item and construct a variable which indicates that the school principal's competition set has at least one school either in the first or in the second panel wave or in both panel waves. This new variable shows that out of 67 schools 41 principals say that their school competes with at least one school in at least either one of the panel waves. Moreover, in a third survey item, principals were asked the names of three schools that their school competes with for students. I also used objective data on these competition sets and on the sample schools.

First, I analyze the extent to which school characteristics are related to the number of schools in the competition set. In the simple bivariate analyses, I am particularly interested in how school competitiveness differs by school sector and school socio-

economic group. Consequently, I present my hypotheses on the principals' perception of competition and present the multivariate analyses to test these hypotheses. Second, I analyze how school principals construct their competition sets. Due to the relatively small size of the sample, I cannot use a multivariate model explaining variation in competition set types. Rather the descriptive analyses look at whether these sets are clustered on several dimensions such as school demographics or test scores. Also, I compare the sample schools' characteristics to their competitors to gauge whether competitors have higher academic achievement or higher socio-economic standing.

Given the unsettled nature of the debate about what drives school competition I start this analysis without an established model of competitive attitudes of school principals. Furthermore, I am not building a holistic model of whether schools compete with other schools or not; rather I am modeling school principals' perceptions of competition, which can be shaped by both the school characteristics and the educational environment that they are embedded in.[56] I believe that school principals are in a position to affect school outcomes, and that principal perceptions of competition matter in the production of school outcomes. In fact, the results of this work may shed light on how competitive markets develop for schools and education.

IV. BIVARIATE ANALYSES OF COMPETITIVE ATTITUDES

To see how competitive attitudes differ by school characteristics, I present bivariate analyses of whether the school competes with one or more school across school

[56] I do not have data on the personal characteristics of the school principals; I acknowledge, however, that principals' characteristics might be relevant indicators of their educational attitudes and should be included in holistic models explaining school responses to competition.

characteristics (Table 1).[57] Table 1 shows the results of the bivariate analyses for several school characteristics. 39 % of the sample principals say that their schools compete with 1 or more schools. The differences between public school principals and private voucher

school or private non-voucher school principals are quite large. Almost all public school principals, 92%, say that they compete with other schools compared to only 30% of the private voucher school principals and 26% of the private non-voucher school principals.

Table 1 Here

Looking at the socio-economic status (SES) of the schools' parental body, as expected the least competitive principal attitudes are to be found in high income schools. Almost half the middle income school principals says that they compete with other schools.[58] The percentage of principals who say that their school competes with at least another school for enrollment declines to 37 % in low income schools.

To summarize, the bivariate analysis suggests that principals from public schools and from schools with middle income parents are more likely to say that their schools compete with other schools. This sounds counter to the expectation that a relatively successful voucher school should be more competitive because its revenues depend more directly on their enrollment. The findings also suggest that the most exclusive private schools are largely insulated from the competitive pressures of the universal school voucher environment.

[57] Because of the lack of variation in the number of competitors I collapsed one or more competitors into one category. Out of 67 schools only 6 schools compete with only 1 school.

[58] I used the demographic categories the Ministry of Education assigns to each school as explained in Chapter 3.

V. MULTIVARIATE ANALYSES OF COMPETITIVE ATTITUDES

As explained in Sections I and II, the expectation that public schools will improve in a school voucher system is based on the assumption that they perceive competition in the environment. If the assumption holds, public school authorities should feel that they are in competition with other schools for enrollment. Moreover, based on Chubb and Moe's (1990) description of private schools' organizational effectiveness and their accountability structure we would expect private voucher schools to perceive more competition, and exert more competitive pressures on other schools compared to other schools. Hence, I expect that the existence of private voucher schools in the environment increases the likelihood that school authorities perceive competition.

Because private non-voucher elite schools operate in their niche market and have their exclusive clientele they compete the least with other schools for enrollment. Hence, I use the private non-voucher schools sector as the base category to judge whether public and private non-voucher schools compete with other schools. Based on the above-mentioned expectations I test three hypotheses on the school principals' perceptions of competition:

H_1: Public school principals perceive more competition compared to private non-voucher schools.

H_2: Private voucher school principals perceive more competition compared to private non-voucher schools.

H_3: The density of private voucher schools in the environment makes principals more competitive.

I operationalize principals' perception of competition as declaration of competition with one or more schools. I define the educational environment as township (comuna)

based on the findings presented in Chapter 4 Section IV (b). Given the geographical clustering of schools in the Santiago region, I hypothesize that township best captures the competitive pressures from other schools.

In order to test the hypotheses I construct a model where the probability of principals perception of competition with one or more schools is a function of the school's characteristics, and the density of schools across different sectors in the township:

$$\Pr(Competition) = F(\beta_0 + \beta_1 Public + \beta_2 Voucher + \beta_3 Public\_School_{Comuna} + \beta_4 Voucher\_School_{Comuna} + \beta_5 Non\_Voucher\_School_{Comuna} + \beta_6 SchoolSES + \beta_7 Test\_Scores + \beta_8 Enrollment)$$

where β are coefficients to be estimated. Equation 1 models the probability that a principal says that her school competes with one or more schools in either one of the panel waves or both.

$$\Pr(Y = 1 \mid \mathbf{X}) = \frac{\exp(\mathbf{X\beta})}{1 + \exp(\mathbf{X\beta})} = \frac{1}{1 + \exp(-\mathbf{X\beta})}$$

where X is a vector of right hand side variables and β is a vector of the coefficients.

Odds ratios can be calculated based on the Equation 2 below:

$$\frac{\Pr(Y = 1 \mid \mathbf{X})}{1 - \Pr(Y = 1 \mid \mathbf{X})} = \Omega(\mathbf{X}) \quad \text{and} \qquad \Omega(\mathbf{X}) = exp(\mathbf{X}\beta)$$

The independent variables for which coefficients are estimated are:

- **School sector**: represented by two indicator variables, indicating whether the principal is from a public school or a private voucher school. Private non-voucher school sector is the base category.

- **The density of schools:** represented by three continuous variables measuring the number of public, private voucher, and private non-voucher schools per km^2 in the township of the principal's school.
- **School SES:** represented by the percentage of students considered not vulnerable based on the Index of Vulnerability (IVE).
- **School's academic quality:** represented by the 2004 SIMCE test score of the school.
- **Enrollment:** represented by the number of children enrolled in the school in 2004.

The school sector and the school density variables follow directly from the hypotheses. However, the inclusion of school SES, academic quality, and enrollment as control variables in the model requires clarification. Higher school SES may indicate resources to compete with other schools for enrollment. Test scores may attract parents to a school and reduce the threat of other schools' recruitment effort. On the other hand, high enrollment may attract potential recruiters and increase the awareness of competition. The results are presented in Table 2.

Table 2 Here

The results presented in table 2 provide supporting evidence for the first hypothesis but not for the other hypotheses. Public school principals are far more likely to say that they compete with other schools compared to the relatively less competitive private non-voucher schools. The finding suggests that the necessary condition for the improvement of public schools, i.e. awareness of competition, is in place. However, contrary to what school voucher proponents would predict, voucher schools are not significantly different

from private non-voucher schools in terms of competing with other schools based on principals' declarations. Moreover, findings show no support for the idea that the presence of private voucher schools will increase competitiveness.

These results are contingent on a specific definition of the education environment, township. Township was chosen based on the evidence presented in Chapter 4 showing the geographical clustering of parents' choice sets within the residential township. The expectation was that because most students remain in the same township school competition will also take place mostly among schools in the same township. However, school competition unleashed by the presence of voucher schools may take place in smaller areas. In Santiago, private voucher schools may choose to settle in places close to public schools especially in poor neighborhoods where parental mobility is much more limited and most students from low income families walk to school. Hence, I further explore the effect of changing the size of the educational environment in the model to a 1 km. circle with the school at the center. I use the same model and equations presented above except that I use the number of public, private voucher, and private non-voucher schools per km^2 as measures of the density of schools in the environment. The results are presented in Table 3.

Table 3 Here

The results presented in Table 3 once again shows that principals in public schools are more likely to say that they compete with other schools compared to private non-voucher schools. Also, voucher schools are not significantly different from private non-voucher schools in terms of competing with other schools based on principals' declarations with a 1 km^2 definition of the educational environment. However, reducing the size of the

geographical environment showed that the number of private voucher schools in the immediate environment does result in an increase in the likelihood of competing with one or more schools.

The change in the results once I reduce the competitive environment to 1 km^2 may be due to a combination of several reasons. First, voucher schools may enter the market in places close to other schools where there is a higher possibility for recruitment. Hence, a 1 km^2. definition of the competitive market captures their competitive effects on other schools better compared to the township definition, which is a larger geographical unit. In fact, Bettinger (1999) shows that the location of charter schools in the US is influenced by the performance of public schools. Second, the density of more exclusive private non-voucher schools which are smaller in number yet clustered close together in a township may create a safe environment for other schools in the same township, which in turn may explain the finding in Table 2 where the private voucher schools do not affect principals' competitiveness but Private non-voucher schools reduce it.

So far I focused on a specific dimension of competition which is geographical proximity. I found suggestive evidence on private voucher schools' use of geographical proximity to other schools as a recruitment strategy. However, competition may take place along several other dimensions such as school sector, academic achievement, and parental SES. Investigating the competition sets of principals can shed light on these dimensions not captured by geographical proximity. Next, I turn to a discussion of the competition sets of the sample schools.

VI. THE COMPETITION CONSTRUCT AND THE COMPETITION SETS

The literature focusing on the systemic effects of school choice policies (Hsieh and Urquiola 2006; Urquiola 2005; Ladd and Fiske 2001), uses competition measures that are typically private sector concentration ratios (Belfield Levin 2005 for an extensive review of 41 studies in the US, Goldhaber and Eide 2003) or idiosyncratic proxy measures for competition that has some substantive affinity with concentration ratios (Bayer and McMillan 2005; Rothstein forthcoming; Hoxby 2000).

In contrast, I look directly at who school principals say are their competitors. In the survey, principals were asked to name 3 schools that they compete with. Out of 39 school principals who say that their schools compete with 1 or more schools only 26 principals supplied specific names, which produced 26 competition sets. Due to the limited number of the competition sets and the size of a competition set the analyses will be purely descriptive.[59]

The same competition set can be analyzed along several dimensions. Are schools in the competition set more alike in academics or in their socio-economic group? Do schools in the competition set tend to come from the same school sector? Are they located close to one another? In fact, it is possible to pose further questions regarding the competition set about schools' curricular focus or religious orientation. Because of the exploratory nature of the investigation here, however, I will examine competition sets

[59] In fact, the strategy I follow in analyzing the limited number of competition sets should be considered a preliminary study plan for future investigations into school competition, where data collection specifically focuses on competition and sample size is large enough to have statistically meaningful definitions of cluster.

mainly along two dimensions: academics and the socio-economic characteristics of the parental body.

To do so, I use the 2004 SIMCE mathematics score, mother's average years of schooling and the school SES as defined by the Ministry of Education. In addition I also included enrollment, as schools of different sizes might find it difficult to compete with each other in a school voucher environment because small schools may have smaller revenues compared to high enrollment schools.

I use the following strategy in analyzing the competition sets: for the three continuous dimensions (test scores, enrollment, and mother's average education), I check to see if the competitor schools are clustered on the distribution of the school system. If the lowest score school in the competition set is within 1 population standard deviation of the highest score school in the set, that set is considered "clustered" on that dimension. For the ordinal scale of the socio-economic status of schools, a competition set is considered clustered in that dimension if (a) all three schools are from the same group or (b) two schools are from the same group and the third school is from the adjacent group. For the nominal variable school sector, if two or more of the schools are from the same sector that competition set is considered clustered in the school sector.[60]

I also look at the relationship between the principal's school and the schools in the competition set. For the continuous dimensions, I consider the set and the school similar if the competitor schools are within 1 population standard deviation of the school. For socio-economic status and the school sector, if the majority of the competitors are from

[60] If there is only one school in the competition set, it is counted as a missing value in Tables 7 and 8.

the same category I consider them similar. I also check for the direction of the relationship, i.e., whether competitors have higher or lower scores on each dimension compared to the principal's school. If the majority of the competitors' scores are higher for test scores or for school average of mothers' education I treat that competition set as having a higher score on those dimensions compared to the principal's school. For SES, I consider a competition set higher SES compared to the principal's school if the majority of the competitors are from a higher SES. I consider a competition set similar if the majority of competitor schools are from the same sector as the principal's school.

Tables 4 and 5 Here

Because of the limited number of observations it is hard to draw conclusions from Tables 4 and 5 about the clustering of competition sets on certain dimensions. However, there seems to be suggestive evidence that the competition sets are relatively clustered in school SES, and school sector. Table 5, however, shows an interesting result. No competition set has a majority of lower SES schools except one school, whereas 18 of the 22 competition sets have higher SES schools. Moreover, when there is no such majority in the set, it is always the case that at least one competitor is from a higher SES group and the others are from the same SES group. Despite the limitations of the sample size, the chance of observing such a clear pattern purely by chance is rather low.[61] I have no similar pattern for test scores. There are almost as many lower test score sets as higher

[61] Assuming that I have a competition set of three schools, and assigning equal probabilities for observing any of the five categories of school SES, the probability of observing at least one higher SES school by chance for a middle income school would be 25/35 and the probability of observing this pattern in all the competition sets would be $(25/35)^{26}$, which is approximately 0.00016.

ones. It seems that schools tend to choose their competitors from higher SES schools, and not necessarily from schools with higher test scores. When I look at the competition sets that have a majority of higher SES schools, I observe that 12 of these 18 majority higher SES sets belong to public school principals.

VII. SUMMARY AND CONCLUSIONS

Throughout the chapter I investigated some of the basic supply side assumptions of the market model of school vouchers that are central to the idea that competition will improve public schools: whether schools of choice exert competitive pressures on other schools, and whether public schools engage in competition with other schools. Analyses of the principals' responses to the survey items suggest that traditional public school principals do perceive competitive pressures in the school choice environment. Furthermore, the presence of schools of choice in the immediate environment intensifies the principals' perceptions of competition. The results seem to confirm that these two necessary conditions for achieving academic improvement through competition hold.

These conditions, however, may not be sufficient for achieving better academic outcomes. First, competition may revolve around demographics rather than academic quality. Looking at the competition sets of school principals I found descriptive evidence that school principals feel challenged by higher SES schools, and not by schools of higher academic quality. Schools may fear losing their more affluent students to higher SES schools, and competition may become a chase after higher SES students. If, at the same time, these parents do not prioritize academics over demographics, schools would not have much incentive to improve themselves academically. In fact, Schneider, Elacqua and Buckley (2006) find evidence that parents prioritize SES in their school choice sets.

Second, the findings suggest that private voucher schools are perceived as potential recruiters, assuming a 1 km^2 definition of the school environment, but their principals do not feel that their schools are exposed to competition from other schools. The results in both Tables 2 and 3 do not provide evidence to the idea that the schools of choice themselves will be competitive enough to produce the expected innovation and academic achievement, which would set an example to public schools.

The findings also shed light on competition strategies of private voucher schools. The voucher school effect on perceived competition disappears when I geographically enlarge the competitive environment from 1km to comuna, suggesting that private voucher schools may locate close to schools that they can recruit from. The entry of voucher schools into specific hubs of schools requires further study to clarify how competition takes place in voucher systems. They may locate near failing public schools to attract frustrated parents, or in poor neighborhoods to attract students with a higher SES school image.

For instance, new private voucher schools located in poor urban areas in Chile have sought to attract families, by endowing themselves with symbols previously associated with elite private schools, such as uniforms and English names.[62] Similarly, studies on school choice reforms in New Zealand and the UK indicate that, instead of implementing curricular and pedagogical innovations, schools have focused efforts on symbols than connote academic prestige (school uniforms and crests, etc.) associated with elite schools

[62] Among the most arresting examples is the "Mel Gibson" English School in Valparaiso. There are also no fewer than three "Snoopy" schools in the country. Like the "Mel Gibson" school, all three "Snoopy" schools are located in low-income neighborhoods.

(Lubienski 2003). In contrast, Hoxby (1998) finds that schools operating in metropolitan areas in the United States where parents can choose among schools exhibit more challenging curriculums, stricter academic requirements, and more structured and discipline-oriented environments. In fact, school responses to competition in Chile range from huckster advertising in low-income communities to genuine innovations and improvements in educational, as opposed to promotional, efforts. More work needs to be done to identify which schools are adopting which strategies.

Table 1: Survey Weighted Percentages of Whether the School Competes with One or More Schools, by School Characteristics

	Compete
School Sector	
Public	92.46 (6.73)
Private-voucher	30.5 (10.18)
Private non-voucher	26.02 (16.17)
Socio-economic status of the school [63]	
Low	37.76 (14.45)
Medium-low	43.79 (15.26)
Medium	52.52 (20.5)
Medium-high	29.04 (22.58)
High	0 (0)
N = 67	

Note: Standard errors in parentheses.

[63] I used the five SES categories used by the Ministry of Education as explained in Chapter 3 into three by combining low-middle and middle income, and high-middle and high income categories.

Table 2: School Competes with One or More Schools

Public school	2680.93*** (7902.996)
Voucher School	5.832 (11.435)
Density of public schools in township	1.02 (0.034)
Density of private voucher schools in township	1.026 (0.026)
Density of private non-voucher schools in township	0.9* (0.053)
School SES	31.468*** (37.22)
Test Scores	0.912* (0.045)
Enrollment	1.008*** (0.003)
N	67
Pseudo-R^2	0.60

Note: Reported odds ratios are from survey weighted logistic regression of the column variable on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 3: School Competes with One or More Schools, environment defined as 1 km^2

Public school	1.11E+07** (8.67E+07)
Voucher School	60.727 (208.573)
Density of public schools in 1 km^2	2.247 (2.509)
Density of private voucher schools in 1 km^2	4.457*** (2.37)
Density of private non-voucher schools in 1 km^2	1.23 (0.418)
School SES	138.516** (319.583)
Test Scores	0.953* (0.025)
Enrollment	1.012** (0.006)
N	66
Pseudo-R^2	0.73

Note: Reported odds ratios are from survey weighted logistic regression of the column variable on the independent variables. Robust standard errors are in parenthesis. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 4: The Number of Principal Competition Sets that Cluster in a Given Dimension, by School Sector [64]

	SIMCE 2004 mathematics test scores	Years of schooling for the mother, school average	School SES	School Sector	Enrollment
Public School	8	6	9	8	7
Private Voucher School	3	4	3	5	0
Private Non-Voucher School	2	3	3	2	3
Number of clustered sets	13	13	15	15	10
N	22	20	22	20	22

Note: The total number of principal competition sets is 26. Number of competition sets is reported.

[64] The totals for each dimension do not add up to 26, the number of competition sets, because of missing values of competitors on the dimensions and the fact that I consider competition sets with 1 school a missing value on Tables 7 and 8.

Table 5: Principals' Schools Compared to Schools in Their Competition Sets[65]

	SIMCE 2004 mathematics test scores	Years of schooling for the mother, school average	School SES	School Sector
Similar Competition Set	14	12	3	7
Competition Set Higher	11	10	18	
Competition Set Lower [66]	11	12	1	
N	22	20	22	20

Note: The total number of principal competition sets is 26. Number of competition sets is reported.

[65] I do not include the enrollment dimension here because its population standard deviation might not be useful in judging similarity on this dimension.

[66] Differences between "Competition set higher" and "Competition set lower" are due to competition sets that have 2 schools and do not have a higher or lower majority compared to the principal's school.

CHAPTER SIX

Parental Satisfaction I

I. INTRODUCTION

Greater parental satisfaction is an important promise of school voucher reform. If Friedman's (1962) proposal is applied and a universal school voucher system is instituted, parents could vote among different schools by their feet, and the final allocation would improve the welfare to society as parents' needs and wants better match their child's school. As a result, one would expect to observe improvements in the satisfaction of parents in both sectors in a school voucher system compared to parental satisfaction levels in these sectors in a traditional public school system. Over time, "shopping" behavior of schools would even equalize whatever parental satisfaction difference has existed across different school sectors as failing schools are forced to close down, regardless of their public or private status, and the remaining schools try to cater to their parents' needs to keep their students.

Although Friedman's school voucher proposal mimics some of the features of the ideal model, as explained in Chapter 2, it is an institutional reform proposal which creates a hybrid system of public finance, and public and private governance of schools. Differences in the governance of schools may affect the satisfaction of parents in public and private voucher schools in a universal school voucher system. However, his account of the market for schools does not help produce empirical propositions on parental satisfaction differences among schools in an established school voucher system.

On the other hand, Chubb and Moe's (1990) institutional theory of democratic control versus market accountability in education help us set reasonable expectations on public and private schools' comparative organizational effectiveness in different contexts with or without school choice. In fact, their proposal for school vouchers aims to spread the benefits of market accountability in education to a larger segment of the population by expanding the private sector through public funds. From Chubb and Moe's (1990) point of view autonomy of the private schools and the fact that they are first and foremost accountable to their parents make these schools more sensitive to their parents; hence, their parents become more satisfied with their child's school. As a result, as long as public and private schools resemble the ideal types described by Chubb and Moe (1990), parental satisfaction differences across school sectors persist.

The review of the Chilean public and private school sectors in Chapter 3 shows that the governance of these two sectors resemble to a great extent the Chubb and Moe (1990) accounts of democratic control versus market accountability. Moreover, the fact that the private school supply is substantial in urban areas make the Chilean case particularly useful to test theories on inter-sectoral differences in education. Hence, in this chapter I start testing the hypothesis that private voucher schools satisfy their parents more compared to public schools based on Chubb and Moe's (1990) theory of democratic control versus market accountability in education. In this chapter, I first investigate parents' satisfaction with their schools across school sectors in the first semester at the chosen school. The following chapter is devoted to testing the same hypothesis over time.

I set out to investigate parental satisfaction not only because it is one of the most important justifications of school voucher reform in market models education but also

because in an education system with democratic governance, this prediction of increased satisfaction is central to the enduring success of school voucher reform that, like any controversial education reform, requires a vocal constituency for adoption and survival. Thus, the success of voucher reform inherently depends on the success of a new voucher school sector in satisfying parents with the educational experience. Moreover, if the voucher schools cannot achieve greater parental satisfaction, they can neither serve as laboratories of best practices to be emulated by other schools, nor bring about the predicted increases in efficiency or educational productivity.

Parental satisfaction, however, is a broad term and not all types or dimensions of parental satisfaction are equally desirable from the point of view of those that support greater parental choice as a means to increase the academic quality of the schools. For instance, some parents may be satisfied with the racial homogeneity of their schools whereas others may value teachers' competence more, and yet others may be more concerned about the values of the school or the school's infrastructure. In brief, even if voucher parents are empirically more satisfied with their schools, this raises further questions about which dimensions of voucher schools are driving this effect and whether those school characteristics are central to academic achievement.

In this chapter I investigate whether private voucher school parents are more satisfied with their schools compared to public school parents in the first semester of their child's schooling experience. After briefly reviewing the literature on parental satisfaction and school choice, I present a cross-sectional analysis of how parents evaluate their schools across different sectors. After looking at levels of satisfaction by means of bivariate analyses, I present my hypotheses and multivariate analyses of parental satisfaction.

II. SCHOOL CHOICE AND PARENTAL SATISFACTION

The school choice reform that builds most strongly on market-like mechanisms is educational vouchers (Belfield and Levin 2005). Not surprisingly, vouchers have been hotly debated since at least Milton Friedman's seminal 1962 essay, in which he argues for public funding for schooling but against public governance, which he argues reduces efficiency and limits consumer sovereignty. However, his account of the market for schools does not help explain inter-sectoral differences in parental satisfaction once a school voucher system is instituted. On the other hand, Chubb and Moe (1990) reinvigorated the push for vouchers by adding to the economic rationale an institutional perspective that emphasizes the different constituencies of markets and politics, hence differences between public and private schools.

According to Chubb and Moe, market accountability could eliminate the inefficiencies of democratic accountability, and parental pressures combined with free entry into the education market by private schools should create efficient schools and more satisfied parents. As explained above, Chubb and Moe base their argument on the institutions governing public and private schools, with the conclusion that private schools' autonomy and their accountability to parents can make them flexible enough to cater to their parents' needs. As a result, private school parents become more satisfied with their schools.

Parental satisfaction has been a central theme of school choice reform broadly defined. The link between school choice and parental satisfaction is the concept of "allocative efficiency." Education is a complex, multifaceted "good," and choice allows parents to select schools that deliver the kind of education they want for their children. From this

perspective, choice should lead to higher parental satisfaction with schools because it increases the ability of parents to match their preferences for specific values, needs, or pedagogical approaches with a school's offerings (Raywid 1989; Goldring and Shapira 1993; Schneider et al. 2000; Schneider and Buckley 2003; Buckley and Schneider 2007).

Another way in which school choice is tied to higher parental satisfaction is that the competition built into school choice systems is hypothesized to improve the schools themselves by inducing productive efficiency and educational innovation. First, because their survival depends on the enrollment of students, failing schools in a market environment must improve or lose their "customers" (Hoxby 2000; Teske et al. 2000; Howell and Peterson 2002). Second, because parents are searching for schools that match their preferences, private choice schools can better adapt themselves to parental needs and develop practices that can be emulated by other less successful schools (Teske et al. 2000; Buckley and Schneider 2004).

In short, unlike traditional public schools, private voucher schools will generally feel market pressures more keenly and be more able to flexibly shape their policies based on their customers' needs. Coupled with the concept of "allocative efficiency" we would expect higher parental satisfaction in voucher schools. In fact, if we believe that choice schools in general and voucher schools in particular provide a better educational experience the choice school advantage in parental satisfaction should grow over time.

The empirical evidence on parental satisfaction with choice schools seems to indicate either a choice school advantage or an initial choice school advantage which diminishes over time (Green, Howell, and Peterson 1998, Peterson 1998, Schneider Teske Marschall 2000, Witte 2000, Moe 2001, Howell and Peterson 2002, Schneider and Buckley 2003).

For instance, a cross-section of voucher recipients in Cleveland who previously attended public schools were much more satisfied with every aspect of their choice school than applicants who did not receive the voucher but attended public school instead (Green, Howell, and Peterson 1998). Similarly, evaluations of the Milwaukee parental choice program showed that parental satisfaction with choice schools increased significantly over satisfaction with prior public schools in all five years of the program (Witte 2000). Howell and Peterson (2002) compared parents who used the vouchers they won in a scholarship lottery to parents who applied but did not win the lottery but would have used a voucher had one been offered to them. The results show a large satisfaction gap between the two groups in favor of the scholarship recipients. However, the results also show a decline in voucher parents' levels of satisfaction over time, which still remains above the satisfaction of those who did not receive a voucher.

Unlike relatively better off choice parents of the previous studies, in a four wave panel of K-12 parents in Washington D.C. Buckley and Schneider (2007) find declines in the initial satisfaction of charter school parents, which almost wipe out the entire charter school advantage of the first panel wave results. Buckley and Schneider (2007) first show a clear satisfaction difference between charter school parents and parents of traditional public schools in favor of the former despite their rigorous approach to controlling for selection bias or motivational factors that might inflate charter school parents' evaluation of their schools. However, once they extend their analyses to include all the panel waves and the time spent at the school charter parents' satisfaction declines steadily across all school characteristics they consider.

The existing body of evidence on choice parents' satisfaction is based on choice programs that adopt market features in a larger environment of public school assignment systems. We do not know parental satisfaction differences across sectors in large-scale school choice systems such as the Chilean universal school voucher system where there is a substantial private voucher school supply. In order to see whether a universal school voucher reform can create a satisfied constituency that maintains satisfaction with the school qualities that matter the most for academic achievement I use the Chilean case to test hypotheses on parental satisfaction.

III. PARENTAL SATISFACTION ACROSS SCHOOL SECTORS

In order to measure parental satisfaction I use two groups of survey items in the first panel wave. The first group asks parents to evaluate their schools on a 7-point scale that runs from "very bad" to "excellent".[67] In addition to their overall school evaluation parents were asked to place their evaluations of their principals, teachers, and the school infrastructure also on this scale. A second group of survey items asks the parents to state their level of satisfaction with a number of school features such as discipline, academic quality, school values, and extra-curricular activities. These items use a five-point scale that runs from "very dissatisfied" to "very satisfied." These survey items were asked in all panel waves and are also used in Chapter 7.

i. Bivariate analysis of parental satisfaction

I first analyze the distribution of these evaluations across public schools and private

[67] This scale, the typical academic grading scale in Chile, is easily understood by Chilean parents.

voucher schools in the first wave of data collection, when students and parents were new to the schools.[68] Figure 1 shows the parents' evaluations/satisfaction with their schools by enrollment in private voucher schools and public schools. As the figure clearly illustrates, the proportion of parents in private voucher schools with high levels of satisfaction is larger than that of their public school counterparts. About 54% of voucher school parents consider their schools as excellent (a score of 7) as opposed to 25% of public school parents. In fact, the differences between the proportion of private voucher parents and public school parents who consider their schools, teachers, principals, and infrastructure "excellent" or who say that they are strongly satisfied with the given aspect of the school range between 6% (principal) and 31% (school values). The differences displayed in figure 2 are all significant at $p < .01$ (all reported p-values are two-tailed).

Figure 1 Here

ii. Parental satisfaction across schools sectors in the first semester

Based on Chubb and Moe's (1990) theory of the differences between public and private schools' accountability structures I expect to find private voucher school parents more satisfied with their schools compared to public school parents. Chubb and Moe consider private choice schools such as private voucher schools as no less autonomous and as equally effective as other private schools despite their public finance. In fact, their voucher proposal aims to proliferate effective organizations in education by creating the private voucher school sector.

Chubb and Moe (1990) argue that private schools are more autonomous in their

[68] Unless otherwise noted, all analyses below are estimated using appropriate survey weights.

governance and more attuned to the needs of their parents, which make them more effective organizations. However, it is not exactly clear which school outcomes make the school effective in their account of successful schools. In the hypothesis below I consider evaluation of the school rather than satisfaction with certain aspects of the school. However, I explore satisfaction with several school characteristics to understand the overall school evaluation.

There are many characteristics of schools that are linked to student academic achievement. Although there is a lack of consensus on what specific characteristics and qualities make a good teacher (let alone how to measure them), teacher quality has been considered the most important school-related factor influencing student achievement (King, Rice 2003; Rivkin, Hanushek, and Kain 2005). Likewise, the effective schools literature has shown that principal quality affects academic achievement at a school in various ways such through personal managerial skills and instructional leadership (Heck 1993; Wimpelberg, Teddlie, and Stringfield 1989).

Another school characteristic linked to academic achievement is the school's value system, which affects primarily the expectations from the students. The effect of school values on student achievement depends on the extent to which the values emphasize academic achievement. For instance, Coleman, Hoffer and Kilgore (1982) show that the discipline and focus on academics that are hallmarks of Catholic schooling can be adopted in the traditional public schools with positive effect on student achievement. A focus on extracurricular activities, on the other hand, has been associated with school value systems that emphasize academic achievement less (Coleman 1960, 1961). Another school characteristic linked to achievement is the physical infrastructure of the school.

School infrastructure and facility quality may affect teacher quality through recruitment and retention (Buckley, Schneider and Shang 2005), and it can facilitate or hinder the effectiveness of teaching and learning (Schneider 2002; Buckley, Schneider, and Shang 2002). However, parents may value a better infrastructure as a sign of higher social standing. Just as schools of choice use symbols associated with elite schools in New Zealand and Britain (Lubienski 2003, 2005) private voucher schools may use better facilities as a signal of educational prestige. Hence, higher parental satisfaction with teachers and discipline on the one hand and extra-curricular activities and school infrastructure on the other may mean academic or non-academic preferences in the overall evaluation of the school.

Based on these expectations I test the following hypothesis:

H_1: Private voucher school parents are more satisfied with their schools compared to public school parents.

Instead of testing hypotheses on satisfaction with several school qualities, I explore how parents evaluate these school characteristics by using the same model I construct to test the hypothesis above. I construct a model where the probability of being satisfied with the school or its several qualities is a function of the school's characteristics, and parent's characteristics that have been found to be correlated with school choice outcomes (Schneider et al. 2000; Elacqua, Schneider and Buckley 2006; Buckley and Schneider 2007):

$$\Pr(Satisfaction) = F(\beta_0 + \beta_1 Voucher + \beta_2 Non\_Voucher + \beta_3 Religious\_Affiliation_{school} + \beta_4 School\_SES_{low\_middle} + \beta_5 School\_SES_{middle} + \beta_6 School\_SES_{middle\_high} + \beta_7 School\_SES_{high} + \beta_8 education + \beta_9 lenght\_of\_residence + \beta_{10} female + \beta_{11} church\_attendance + \beta_{12} monthly\_income + \beta_{13} number\_of\_contacts)$$

I model the probability of observing parent's satisfaction in a category on the relevant satisfaction scale as a linear function of the independent variables plus a set of cut points using an ordered logit model:

$$\Pr(Y_j = i) = \Pr(\tau_{i-1} < \mathbf{\beta X} + \varepsilon < \tau_i), \text{ and}$$
$$\Pr(Y_j = i) = \frac{1}{1 + \exp(-\tau_i + \mathbf{\beta X})} - \frac{1}{1 + \exp(-\tau_{i-1} + \mathbf{\beta X})},$$

where *j* indexes over satisfaction with school, principal, teacher, academics, values, discipline, and extracurricular activities; τ stands for cut-points; *i* stands for the category; ε is the logistically distributed error term; **X** is a vector of right hand side variables; and **β** is a vector of coefficients.

I include the following **independent variables** in the models[69]: a private voucher school indicator coded 1 if the respondent's child is enrolled in a private voucher school; a private non-voucher school indicator coded 1 if the respondent's child is enrolled in a private non-voucher school; a religious affiliation indicator if the school is affiliated with a religious denomination; a set of school-level socio-economic level indicator variables[70] with low income as the reference category; parental education as measured by years of

[69] Because school's SIMCE test score proved to be a redundant variable in the model testing the hypothesis, i.e. overall school evaluation model, it has been excluded from the set of right-hand side variables for which I estimate coefficient.
[70] Again we use the Ministry of Education school socio-economic status classification.

schooling; residential mobility measured by the number of years the respondent has spent in the same comuna;[71] parental income measured by the previous month's reported income in Chilean Pesos; the gender of the respondent, coded 1 if the respondent is female; church attendance measured by the number of times in a year the respondent visits church (as a measure of religiosity); and the number of contacts the respondent spoke with in order to gather information on schools before enrolling the child in that particular school. I include the number of contacts variable in the models in order to account for differences in parental motivation and involvement in the child's schooling.

Table 1 Here

Table 1shows the exponentiated coefficients (e^{β}) which can be interpreted as the odds of observing the outcome variable in the categories above compared to the category and the categories below for a unit change in the right-hand side variable (and the model assumes that the effect of the covariates is constant over all levels of the dependent variable). I am primarily interested in the relative impact of private voucher school enrollment on overall school satisfaction. I also explore parental satisfaction across several school characteristics at the beginning of the school year as compared to the public schools. As table 1 shows, the observed effect of enrollment in a private voucher school on overall parental satisfaction compared to enrollment in public schools is positive and statistically significant on all six parental evaluation measures including the

[71] You don't need this footnote this late in the dissertation Comunas are recognized neighborhoods in Santiago around which many municipal services are organized. They are roughly equivalent to "boroughs" in New York or "arrondisements" in Paris, although Santiago has relatively many comunas (52). Over 70% of primary school students in the Metropolitan region of Santiago go to school in their home comuna (Ministry of Education 2002).

overall school evaluation measure. Simply put, private voucher school parents are, holding all else equal, more likely to report higher "grades" or evaluations of every dimension of their child's school. For example, the odds of private voucher school parents reporting their child's teacher as "excellent" compared to the other six categories combined are almost 3 times as large (2.92, $p < .05$) as for public school parents.[72] The private voucher school effect is especially large for evaluations of school values (4.88, $p < .01$) and evaluations of the school infrastructure (3.25, $p < .01$).

In addition to enrollment in a private voucher school, enrollment in a school with religious affiliation is related to higher parental evaluations on all measures except for the evaluation of the teacher and academic quality. Higher school socio-economic status predicts an increase in the evaluations of the teacher and of the infrastructure as well. The relationship, however, reverses for the evaluation of school values. Interestingly enough, enrollment in a high SES school predicts, on average, a decrease in the parents' satisfaction with the school values.

So far I have assumed that there are no problems of self-selection into schools or schools' selection of parents. Unlike in the US, the Chilean education system is not option demand—it is a universal choice system. That is, whereas in the US parents must first "choose to choose" and only then choose a school, all parents in Chile must choose; there is no "default" school for their children (on the importance of this institutional

[72] Alternatively, one could compute the change in estimated predicted probabilities (holding other covariates at their sample means or modes). In the case of teacher satisfaction, private voucher school parents are more likely to grade their teacher with an "excellent" (.5836 vs. .3279) and less likely to rate them in any other category; this is a common pattern across all outcomes. These predicted probabilities can be computed from the results in table 3 or are available on request.

design see Schneider et al. 2000). This fact suggests that the problem of selection bias, in which the effect of private voucher schools on satisfaction is confounded by parents self-selecting on unobserved covariates, is mitigated in analysis of Chilean educational choice.[73] However, using the first wave data of the same panel study, Schneider, Elacqua, and Buckley (2006) show that parents' school choice sets are tightly clustered in demographics of the schools' students. Most parents include only schools with similar student demographics in their choice sets. The study finds that test scores differ widely across the schools that parents consider. In brief, despite the Chilean universal school voucher design we cannot assume random allocation of students across all schools; rather parents seem to sort themselves into schools based on student demographics. Moreover, Chapter 4 shows that schools screen parents' demographics at the admissions stage; and the evidence in Chapter 5 suggests that school principals' competition sets do not include lower SES schools.

As a result, the school socio-economic status variables included in the previous analyses become endogenously determined due to selection based on parental demographics. In order to address the problem I apply the two-stage conditional maximum likelihood (2SCML) method (Rivers and Vuong 1988; Alvarez and Glasgow 1999). To estimate the models in the 2SCML method, I first estimate a parental school-SES choice model (See Appendix I), obtain the residuals from this reduced form regression, and add these residuals to the ordered logistic regressions of parental

[73]However we acknowledge the fact that it is rare to find alternative schools in rural Chile. As we note above, our study is confined to the populous Santiago Metropolitan Region where there are multiple alternative schools for parents to choose from.

satisfaction as an additional variable with a corresponding parameter to be estimated. In other words,

$$Y_i^* = X_i B_1 + E_i \delta + \varepsilon_{1i} \quad (1)$$

$$E_i = X_i B_2 + Z_i \gamma + \varepsilon_{2i} \quad (2)$$

where *i* in these models indexes over cross-sectional observations and E is the endogenous variable, *X* is the vector of independent variables as in the previous models and Bs stand for the vector of coefficients for the outcome variable and the endogenous variables.

$$\hat{\varepsilon}_{2i} = E_i - \hat{\gamma} Z_i - \hat{\beta}_2 X_i \quad (3)$$

$$Y_i^* = X_i \beta_1 + E_i \delta + \hat{\varepsilon}_{2i} \lambda + \varepsilon_{1i} \quad (4)$$

Then, I proceed by the cumulative logistic model:

$$C_{ik} = \Pr(Y_{ik} < k) \quad (5)$$

$$\log\left(\frac{C_{ik}}{1 - C_{ik}}\right) = X_i' \beta \quad (6)$$

where *k* indexes over the ordinal categories.

Unlike the two stage least squares method (2SLS), 2SCML can be used for binary or ordinal dependent variables. However, the 2SCML method requires a continuous right-hand side endogenous variable when the response variable is ordinal. I use "index of vulnerability" which measures the percentage of vulnerable students at a school as a measure of school SES, instead of the four indicator school SES variables used in the previous analyses.[74] Figure 2 shows that the school SES categories and the school vulnerability index are highly correlated. The polyserial correlation between the two

[74] The index is the percentage of students considered vulnerable at a school by the Chilean National Administration of School Aid and Scholarships. The "vulnerable" status is determined by household surveys that measure parental education, welfare, and need for educational assistance of the student.

measures is 0.85 in the sample.

Figure 2 Here

Table 2 Here

In Table 2 I repeat the same analyses as reported in table 1, now using the index of vulnerability for measuring school SES. The voucher school effect remains strong for overall school evaluation and for all the school characteristics considered except satisfaction with the principal. The voucher school variable has a p of 0.08 for satisfaction with extra-curricular activities.

Table 3 Here

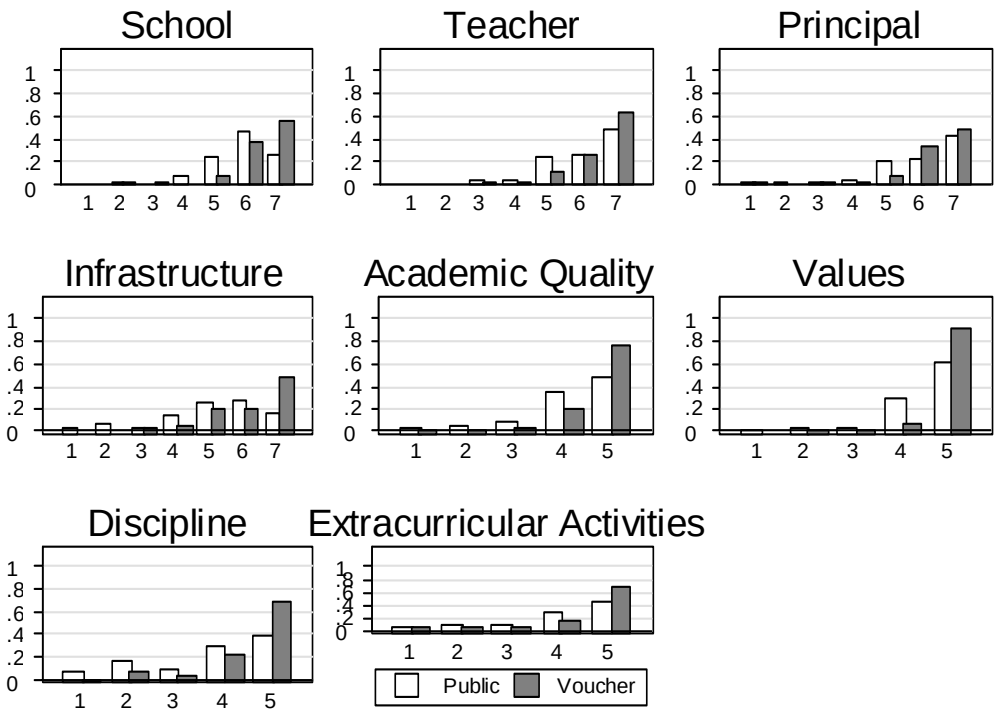
The 2SCML results are presented in table 3. Taking parental sorting based on student demographics into account attenuates somewhat the voucher school effect. Enrollment in a voucher school is no longer a significant predictor of satisfaction with the principal or with extracurricular activities; and the p-value for satisfaction with the child's teacher is .06. However, across the board, voucher school parents are still more satisfied with their school and most of the school characteristics considered. The odds of private voucher school parents reporting their school as "excellent" overall compared to the other six categories combined are almost 5 times as large (4.97, p <.01) as for public school parents. Once again the private voucher school effect is especially large for evaluations of school values (5.01, p <.01) and evaluations of the school infrastructure (5.14, p <.01).[75]

[75] For comparison with the 2SCML models, see Appendix II for 2SLS results in which the dependent variables are treated as continuous. Index of vulnerability is instrumented by the number of private voucher schools and the number of private non-voucher schools in the same township. These instruments closely parallel the availability of middle- and high-income schools in the environment. The results are substantively similar.

Briefly, the cross-sectional results on parental satisfaction in the first semester of the schooling experience show that private voucher school parents give significantly higher evaluations to their schools compared to public school parents. Hence, the evidence presented here supports Chubb and Moe's (1990) expectation that private voucher schools satisfy their parents more compared to public schools. The results suggest that private voucher schools cater to parents' needs and wants more compared to public schools, which results in high overall evaluations.

However, it is not clear what goes into high overall evaluations for voucher schools. The analyses of satisfaction with several school qualities provide suggestive evidence on school features that may make private voucher school parents give higher overall evaluations to their schools. Private voucher schools' infrastructure and values seem to make their parents particularly happy with their schools. On the other hand, taking into account parental sorting based on demographics attenuated the effect of voucher school enrollment on satisfaction with principal, teacher, and extra-curricular activities. These results, however, are confined to the first semester and may reflect the psychological investment of having recently chosen a school. Hence, the results may indicate the marketing effort of the private voucher schools more than their true qualities, which may be revealed over time as the child goes through the schooling experience. In order to understand whether high satisfaction of private voucher parents is driven by the true qualities of their schools, I turn to the investigation of parental satisfaction over time in Chapter 7.

Figure 1: Proportions of Responses to Survey Items on Parental Evaluation/Satisfaction in First Semester across School Sectors.



Note: All public/private voucher school differences are statistically significant at $p < .01$, two-tailed.

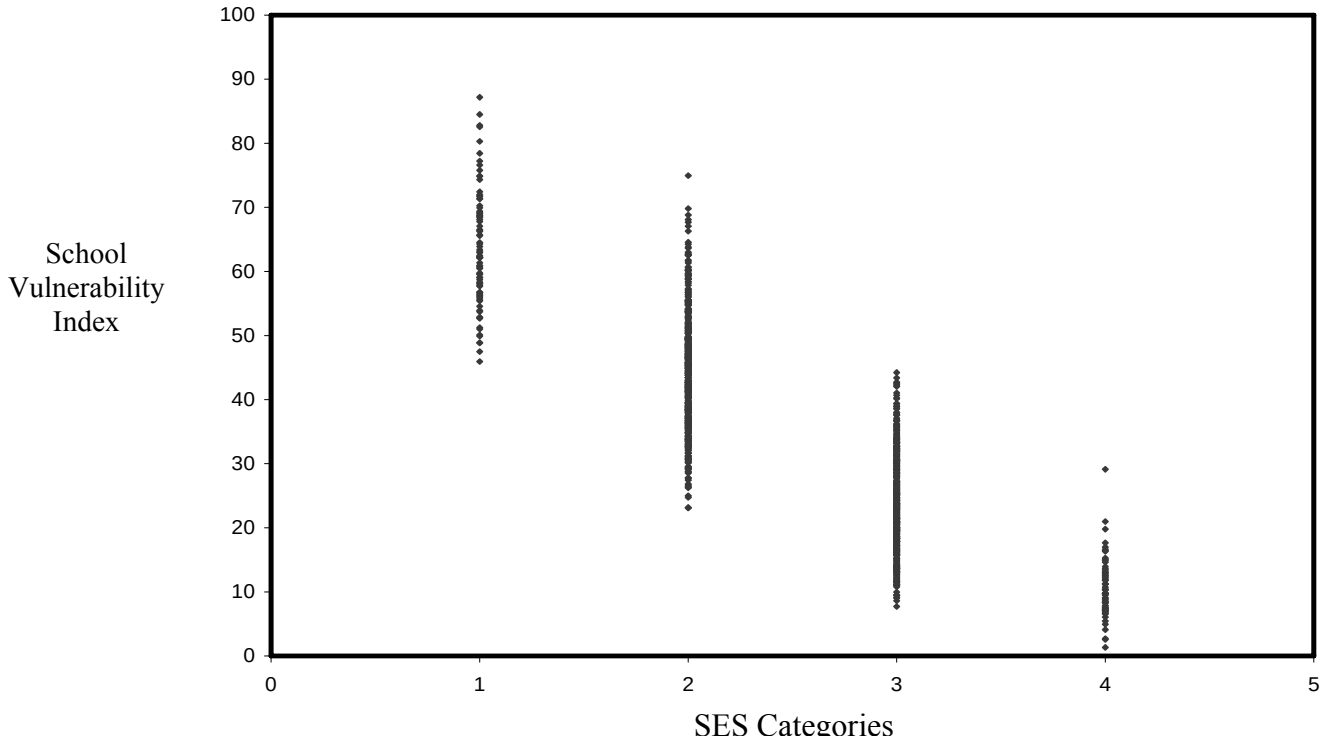
Table 1: Parents with Students in Private Voucher Schools Appear More Satisfied in the First Year.

	School	Teacher	Principal	Infrastructure	Academics	Values	Discipline	Extracurricular Activities
Private Voucher	2.908	2.919	2.412	3.252	2.873	4.877	3.140	2.107
	(0.950)**	(0.905)**	(0.886)*	(0.924)**	(0.868)**	(2.021)**	(0.925)**	(0.767)*
Private Non-Voucher	1.375	4.052	1.841	0.475	3.721	2.340	4.344	1.705
	(1.224)	(2.431)*	(1.322)	(0.214)	(2.197)*	(1.647)	(2.896)*	(0.925)
Religious Affiliation	2.264	0.971	2.387	3.340	1.746	2.751	1.296	2.542
	(0.676)**	(0.292)	(0.741)**	(0.941)**	(0.519)	(1.084)*	(0.381)	(0.813)**
Low-middle Income	1.453	5.226	3.033	6.467	1.897	0.372	1.452	5.778
	(1.408)	(3.006)**	(2.626)	(3.835)**	(1.350)	(0.198)	(0.940)	(4.536)*
Middle Income	2.257	3.593	1.139	6.387	1.677	0.488	1.985	4.229
	(2.187)	(2.009)*	(0.961)	(3.612)**	(1.181)	(0.252)	(1.245)	(3.195)
High-middle Income	1.940	2.670	1.461	13.055	1.800	0.267	1.638	6.967
	(1.918)	(1.552)	(1.290)	(7.737)**	(1.316)	(0.156)*	(1.100)	(5.550)*
High Income	2.788	1.328	1.438	20.338	1.274	0.183	1.351	3.358
	(3.621)	(1.036)	(1.576)	(14.182)**	(1.183)	(0.155)*	(1.240)	(3.077)
Years of Schooling	0.978	0.994	0.989	0.997	0.974	0.992	0.987	0.999
	(0.016)	(0.009)	(0.010)	(0.015)	(0.013)*	(0.022)	(0.017)	(0.015)
Years In Comuna	0.994	1.002	1.011	1.006	1.016	0.997	1.008	1.007
	(0.011)	(0.009)	(0.010)	(0.010)	(0.011)	(0.016)	(0.010)	(0.012)
Female Respondent	2.321	2.978	1.392	2.064	1.528	1.652	2.020	1.891
	(1.119)	(1.130)**	(0.504)	(0.776)	(0.612)	(0.644)	(0.999)	(0.862)
Church Attendance	0.999	1.000	0.997	1.002	1.001	1.004	1.005	1.001
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.005)	(0.003)	(0.002)
Monthly Income	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Number of Contacts	1.148	1.065	1.151	1.080	1.041	0.990	1.075	1.088
	(0.057)**	(0.058)	(0.068)*	(0.055)	(0.056)	(0.066)	(0.058)	(0.064)
Cutpoint 1	0.005	0.094	0.015	0.263	0.040	0.007	1.610	0.110
	(0.008)**	(0.114)	(0.018)**	(0.263)	(0.038)**	(0.006)**	(.988)	(1.034)
Cutpoint 2	0.016	0.273	0.017	1.383	0.235	0.043	.204	1.265
	(0.020)**	(0.240)	(0.020)**	(1.222)	(0.208)	(0.034)**	(.941)	(.985)
Cutpoint 3	0.078	3.537	0.143	3.595	0.596	0.061	.624	1.825
	(0.103)	(2.716)	(0.160)	(2.973)	(0.515)	(0.047)**	(.910)	(.988)*

Cutpoint 4	0.210	19.077	0.269	9.112	3.927	0.638	2.215	3.142
	(0.251)	(15.160)**	(0.281)	(7.655)**	(3.357)	(0.468)	(.912)**	(1.016)**
Cutpoint 5	1.796	---	1.674	52.782	---	---	---	---
	(2.085)		(1.700)	(46.434)**				
Cutpoint 6	20.880	---	11.606	165.369	---	---	---	---
	(24.034)**		(11.668)*	(150.991)**				
Observations	497	513	473	514	517	515	519	483

Note: Reported coefficients are from independent ordered logistic regression of each dependent (column) variable on the row variables. Coefficients are exponentiated and can be interpreted as odds ratios. Exponentiated heteroscedasticity-consistent standard errors in parentheses. Sample size varies over model due to listwise deletion of missing values. Asterisks denote: * significant at 5% level; ** significant at 1% level.

Figure 2: School Vulnerability Index and SES Categories are Highly Correlated.



Note: The Figure is based on data from all the schools in the Metropolitan Region of Santiago, Chile.

Table 2: Parents with Students in Private Voucher Schools Appear More Satisfied in the First Year.

	School	Teacher	Principal	Infrastructure	Academics	Values	Discipline	Extracurricular Activities
Private Voucher	5.522	2.150	1.295	5.075	2.676	5.335	3.673	1.951
	(2.015)**	(0.773)*	(0.510)	(1.735)**	(0.967)**	(2.513)**	(1.281)**	(0.743)
Private Non-Voucher	4.528	1.377	1.198	3.090	2.818	1.080	3.806	1.501
	(2.644)**	(0.708)	(0.679)	(1.430)*	(1.788)	(0.671)	(2.255)*	(0.845)
Religious Affiliation	2.216	0.920	2.262	3.058	1.715	2.753	1.274	2.415
	(0.667)**	(0.271)	(0.710)**	(0.827)**	(0.506)	(1.083)*	(0.371)	(0.759)**
Index of Vulnerability	1.024	1.001	1.003	1.029	1.001	0.997	0.998	1.009
	(0.011)*	(0.009)	(0.009)	(0.010)**	(0.010)	(0.012)	(0.010)	(0.010)
Years of Schooling	0.984	0.993	0.989	1.007	0.974	0.992	0.987	1.002
	(0.014)	(0.009)	(0.011)	(0.013)	(0.013)*	(0.022)	(0.017)	(0.015)
Years In Comuna	0.992	1.003	1.011	1.004	1.016	0.998	1.008	1.006
	(0.011)	(0.009)	(0.010)	(0.010)	(0.011)	(0.015)	(0.010)	(0.012)
Female Respondent	2.376	2.857	1.345	1.994	1.496	1.681	2.055	1.744
	(1.102)	(1.040)**	(0.489)	(0.690)*	(0.585)	(0.662)	(0.966)	(0.734)
Church Attendance	0.999	1.000	0.997	1.001	1.001	1.004	1.005	1.001
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.005)	(0.003)	(0.002)
Monthly Income	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of Contacts	1.132	1.059	1.149	1.052	1.038	0.993	1.073	1.076
	(0.054)**	(0.056)	(0.067)*	(0.051)	(0.056)	(0.067)	(0.058)	(0.062)
Cutpoint 1	-4.930	-3.939	-5.041	-2.325	-3.826	-4.140	-2.092	-1.387
	(1.141)	(1.186)	(0.960)	(0.850)	(0.780)	(0.897)	(0.837)	(0.751)
Cutpoint 2	-3.842	-2.869	-4.915	-0.666	-2.046	-2.258	-0.281	-0.236
	(0.897)	(0.787)	(0.907)	(0.752)	(0.676)	(0.800)	(0.785)	(0.713)
Cutpoint 3	-2.224	-.315	-2.768	0.287	-1.118	-1.909	0.138	0.315
	(1.007)	(0.653)	(0.778)	(.064)	(0.637)	(0.774)	(0.753)	(0.688)
Cutpoint 4	-1.233	1.347	-2.140	1.215	0.767	0.434	1.726	1.610
	(0.816)	(.661)	(0.690)	(0.661)	(0.639)	(0.687)	(0.753)	(0.721)
Cutpoint 5	0.916	---	-0.320	2.973	---	---	---	---
	(0.758)		(0.626)	(0.698)				

Cutpoint 6	3.383	---	1.591	4.110	---	---	---	---
	(0.764)		(0.639)	(0.743)				
Observations	497	513	473	514	517	515	519	483

Note: Reported coefficients are from independent ordered logistic regression of each dependent (column) variable on the row variables. Coefficients, except for cutpoints, are exponentiated and can be interpreted as odds ratios. Exponentiated heteroscedasticity-consistent standard errors are in parentheses for the model variables. Sample size varies over model due to listwise deletion of missing values. Asterisks denote: * significant at 5% level; ** significant at 1% level.

CHAPTER SEVEN

Parental Satisfaction II

I. INTRODUCTION

In Chapter 6, I tested the hypothesis that private voucher school parents are more satisfied compared to public school parents based on Chubb and Moe's (1990) theory of democratic control versus market accountability in education. I argued that the Chilean public schools and private voucher schools closely resemble the ideal public and private schools types described by Chubb and Moe. Chilean public schools are embedded in municipal and national bureaucracies and have rigid limitations on their employment practices compared to private voucher schools; whereas Chilean private voucher schools are autonomous in their governance and their employment practices are regulated by a flexible labor code. The empirical results from the first panel wave conducted in the first semester at the chosen school provide supporting evidence to the proposition that private voucher schools increase parental satisfaction. Hence, private voucher schools seem to perform well in terms of parental accountability in the first cut of the analysis.

However, education is a multi-faceted experience good. As the parent and the child go through the schooling experience, they may learn new features of the school that may make them more or less content with their school choice. For instance, parents may not be able to isolate the effect of school demographics on indicators of academic quality and may use school SES as a heuristic to school's effectiveness in teaching. However, if these parents observe that their child is not improving her academic skills they may become upset with their schools. Also, if schools project an inflated image of themselves through

promotional activities it may take parents some time to see the true qualities of the school.

Based on these considerations, in this chapter I investigate satisfaction with private voucher schools over time. First, I discuss the importance of studying parental satisfaction over time. Second, I present my hypothesis on overall satisfaction with the school and discuss my empirical approach in testing the hypothesis, including the methods for modeling panel attrition. Third, I present the result and show the trajectory of change in parental satisfaction. Last, I discuss the results of both the cross-sectional findings of Chapter 6 and the results presented in this chapter in the context of the Chilean universal school voucher system.

II. PARENTAL SATISFACTION OVER TIME

Time is relevant to understanding the effect of enrollment in a specific type of school on parental satisfaction in at least three ways. First, education is a complex and multifaceted good (Schneider et al. 2000). Unlike other private goods such as automobiles, it is hard to find and comprehend third party information on schools. Informational difficulties of parents in their school choice decision have been well documented (Schneider et al. 2000; Buckley and Schneider 2007).

Moreover, education is an experience or even a post-experience good (Weimer and Vining 2004). Such goods create a problem for the consumer because their true quality is revealed only by use or long after consumption. The problem inherent in such goods is thus an information asymmetry between the producer and the consumer. Producers typically have more information about the good and they have no incentive to reveal their

information. This asymmetry can create a "market for lemons" (Akerlof 1970) where low quality goods with low prices replace high quality goods.

In the context of private voucher schools, school authorities may try to project a desirable image of their schools in order to attract more students. To that end, less successful voucher schools may use symbols such as uniforms associated with successful schools. It may take parents some time to understand whether the school can actually contribute to their child's success.

Second, when parents consider a school for enrollment they may not be able to disentangle the effect of various school qualities on their perception of a school. For example, parents may attribute the academic success of a school solely to its effectiveness in instruction, ignoring the effect of parental demographics on academic outcomes. However, once parents observe their own child's academic progress over time they may realize that they overestimated the academic quality of their schools, especially if their child's test scores remain the same.

Third, regardless of information asymmetries and the problems they give rise to, time alone may have an effect of its own on parents' evaluations of the school. A good experience at the beginning might color the parents' future perceptions and enforce their subsequent positive experiences creating "loyalty." Likewise, an initial bad experience may dampen the effect of subsequent positive experiences.

Although the survey items that measure parental satisfaction in each panel wave inquires about the current attitudes, I expect to observe the effect of both informational asymmetries and time dependency on current parental satisfaction with schools over the course of the entire study. For these reasons, a single snapshot of parental attitudes yields

an insufficient picture of the satisfaction with the school; rather, it is necessary to see whether private voucher school parents' initial high satisfaction with their schools persists over time.

III. STUDYING CHANGE IN PARENTAL SATISFACTION OVER TIME

Chubb and Moe's (1990) account of the organizational effectiveness of public and private schools and their prediction of higher parental satisfaction in the private sector does not take into account the experience good nature of education or the possibility of misleading promotional activities of private voucher schools. Such effects may decrease satisfaction with schools across public and private sectors over time. However, if private voucher schools are consistently more effective than public schools, then despite decreases in parental satisfaction private voucher school parents should still be more satisfied with their school compared to public school parents over time. I address this expectation by taking advantage of the longitudinal structure of our data. Consequently, I hypothesize that:

H_1: Private voucher school parents are more satisfied with their schools compared to public school parents over time.

Following the strategy of Chapter 6, I also explore parents' satisfaction with several school qualities using the same two groups of survey items. The first group asks parents to evaluate their schools on a 7-point scale that runs from "very bad" to "excellent". In addition to their overall school evaluation parents were asked to place their evaluations of their principals, teachers, and the school infrastructure also on this scale. A second group of survey items asks the parents to state their level of satisfaction with a number of school features such as discipline, academic quality, school values, and extra-curricular

activities. These items use a five-point scale that runs from "very dissatisfied" to "very satisfied."

I construct a model where the probability of being satisfied with the school or its several qualities is an additive linear function of time spent at school, school's characteristics[76], the conditional effect of time and school on each other, and parent's characteristics that have been found to be correlated with school choice outcomes (Schneider et al. 2000; Elacqua, Schneider and Buckley 2006; Buckley and Schneider 2007):

$$\Pr(Satisfaction) = F(Time, Schools\_sector, Time * School\_sector, School\_SES, Religious\_Affiliation_{school}, Parental\_Demographics)$$

The independent variables for which I estimate coefficients are:

- **Time**: represented by the semesters spent at the schools, its square and interaction with the school sector indicators. Because time might not have a simple linear effect on parental satisfaction with the school, I include a flexible specification of the link between time and satisfaction. Specifically, I am interested in examining the extent to which there may be diminishing marginal effects of time. In addition, I include an interaction terms with time and school sectors because I am also interested in the impact of time on the effect of enrollment in schools in different sectors.

[76] Because school's SIMCE test score proved to be a redundant variable in the model testing the hypothesis, i.e. overall school evaluation model, it has been excluded from the set of right-hand side variables for which I estimate coefficient.

- **School sector**: represented by two indicator variables indicating enrollment in private voucher or private non-voucher schools with public schools as the base category.
- **School SES:** represented by four indicator variables corresponding to low-middle, middle, middle-high, and high SES groups as defined by the Chilean Ministry of Education (See Chapter 3)
- **Religious affiliation of the school:** represented by an indicator variable indicating whether the school belongs to a religious denomination.
- **Parental demographics:** represented by two indicator variables on whether the parent is employed and the gender of the respondent parent, and three continuous variables measuring the frequency of a parent's church attendance per year and the number of years the parent has resided in the same township, and the monthly household income.

The first panel wave was conducted in the first semester of the 1st year in primary school.[77] The second wave was conducted at the end of that school year and two more panels were conducted at the beginning and the end of the next school year.

Because I have repeated measurements on the same parents, I can estimate true panel data models such as unit fixed effects (Baltagi 2001, Hsiao 2005). Such a model would, however, eliminate most of the interesting covariates of our study that are time invariant. Random effects models would allow the inclusion of time invariant covariates but with

[77] Recall that all parents must choose a school at that point.

the additional assumption that these covariates are uncorrelated with the unit effects. Although this problem may be solved by applying instrumental variables models they become very sensitive to which variables are treated as exogenous to the random effects (Hausman and Taylor 1981, Amemiya and MaCurdy 1986 or Breusch, Mizon and Schmidt 1989).

Instead I propose the use of a generalized estimating equations (GEE) approach (Liang and Zeger 1986). The choice of GEE is based on both the perceived weaknesses of the above-mentioned models for the purpose of this chapter as well as the ease with which one can deal with the problem of panel attrition in a generalized estimating equations framework. In Liang and Zeger's GEE model, the within subject correlations among the repeated outcomes can be accounted for by introducing a working covariance matrix in which it is only necessary to specify the form of the two moments. Fitzmaurice et al. (1993) contend that while the GEE approach leaves the joint distribution of the outcome variable unspecified, for most standard longitudinal designs it yields valid estimates of the parameters only with a modest loss of efficiency. Moreover, the GEE approach can easily accommodate non-ignorable attrition (that is, attrition conditional on the missing values themselves as opposed to fully explainable by observed covariates) with the plausible assumption that intermediary missingness—disappearing form the panel in certain waves and getting back to the panel later—is missing completely at random (MCAR) (Fitzmaurice and Laird 2000).

i. Nonignorable Panel Attrition

Although a panel study is a rare and precious source of information about social phenomena, the problem of panel attrition poses a challenge for unbiased estimation.

Drop-out from the study between the first and second waves is not significant. However, attrition increased thereafter: the sample size was 483 in the third wave and 414 in the fourth wave. The rank biserial correlation between parental evaluations of the school and attrition (a dichotomous variable) starting after the second wave is relatively small but significant (approximately .10 at $p < .05$). Figure 1 shows that especially those parents who left the panel after the third wave may show higher satisfaction with their schools compared to other parents.

Figure 1 Here

Non-ignorable attrition has important substantive implications for the results on the effect of the private voucher sector. If those parental characteristics that predict attrition are widely represented among private voucher school parents and at the same time are significant predictors of satisfaction with the schools, then our estimate of the relationship between private voucher school enrollment and parental satisfaction may be biased. The direction of the bias depends on the effect of those characteristics on parental satisfaction. The preliminary analyses of data show that those who leave the panel might show higher parental satisfaction, and if this is not accounted for it confounds the results on the effect of the private voucher school sector. I thus expect that once attrition is taken into account in estimation the results will show a stronger private voucher school effect on parental satisfaction.

Panel data models typically assume that attrition from the panel is ignorable; i.e., the probability of dropout does not depend on the unobserved responses (Little and Rubin 1987). However, in most panel studies investigating social phenomena it is likely that deciding not to participate in a panel is related to outcome variables that, in turn, are

predicted by several time-invariant demographic determinants. There have been mainly two approaches to modeling panel attrition to avoid the bias that results from assuming ignorable dropouts when in fact the dropouts are nonignorable, i.e. related to the outcomes.

As Little (1993, 1994) explains, the first approach, selection models, treat the probability of dropout as conditional on the possibly unobserved outcomes. This approach requires restrictive assumptions on the dropout for identifiability, and can be computationally impractical, particularly for categorical or limited dependent variables. The second approach, mixture models, include both a model of the distribution of panel outcomes conditional on the dropout patterns and also a model of the marginal distribution of the dropout patterns. Among other approaches within the mixture model framework such as pattern mixture models (Little 1994), linear mixed effects models for repeated responses using dropout times as covariates (Hogan and Laird 1997) stand out as the most versatile because they have been extended to generalized linear models that can deal with a variety of outcome variables (Follman and Wu 1995). Building on Hogan and Laird (1997), Fitzmaurice and Laird (2000) develop a generalized linear mixture model for dealing with nonignorable dropouts for a variety of discrete and longitudinal outcomes.

For an outcome variable, Y_i, Fitzmaurice and Laird (2000) consider models conditional on the time of the dropout of the general form:

$$g(E[Y_{ij} \mid D_i, X_{ij}]) = Z'_{ij}\beta$$

where Y_{ij} denotes the outcome variable at time t_j; the X_{ij} are (possibly time-varying) covariates; and D_i denotes the nonignorable dropout time.

However, our primary interest is the marginal expectation of the repeated outcomes averaged over the distribution of the dropout times,

$$E(Y_{ij} \mid X_{ij}) = \mu_{ij} = \sum_{l=2}^{m+1} \pi_l \, \mathrm{g}^{-1}(Z'_{ij} \beta),$$

where Z'_{ij} depends on the dropout patterns and , and X_{ij} , and π_l depends on X_i. For simplicity assume that there are no covariates. A model with separate intercepts and slopes for each of the distinct dropout patterns is unidentifiable.

$$g(E[Y_{ij} \mid D_i]) = \beta_0^{(l)} + \beta_1^{(l)} t_j \quad (l=2,3,..)$$

β are not estimable for one of the incomplete data patterns. Estimation of the slope requires at least two repeated outcomes but those parents who drop out at the second wave have only a single outcome. The following model, however, is identifiable.

$$g(E[Y_{ij} \mid D_i]) = \beta_0 + \beta_1 + t_j + \beta_2 D_i + \beta_3 (t_j \times D_i)$$

The problem is solved by assuming a model with random intercepts and slopes that depend linearly on the dropout times. In order to account for time dependence among the repeated outcomes additional assumptions on the joint distribution of the outcome variable is needed, which is particularly problematic in the case of categorical response variables. Fitzmaurice and Laird (2000) use the Liang and Zeger (1986) method for incorporating within subject correlation in generalized linear models. They make use of the flexibility of GEE where the joint distribution of Y_i is left unspecified.

ii. Estimation

In the cross-sectional analyses of Chapter 6, I examined the relative impact of the voucher sector on various school characteristics, finding that it is linked to all eight outcome measures and appears to have the largest impact on satisfaction with school

infrastructure and school values. I also contend above that the questions of what exactly parents are satisfied with and whether those school characteristics are central to academic quality need to be answered before reaching conclusions on the success of private voucher schools.

In order to investigate the effect of private voucher school enrollment on parental satisfaction over time, I estimate a series of independent GEE models. The GEE for β are given by

$$u_\beta(\beta) = \sum_{i=1}^{N} G'_i V_i^{-1}[Y_i - E(Y_{ij} \mid D_i; \beta)] = 0,$$

where $G_i = \partial E(Y_{ij} \mid D_i; \beta) / \partial \beta$, and $V_i = V_i(\alpha, \beta)$ is the $m_i \times m_i$ working correlation matrix of Y_i (Liang and Zeger 1986).[78]

In the analyses below, I model the same outcome variables employed in the cross-sectional model. If attrition can be assumed to be completely at random I would need only to estimate the following cumulative logistic model:

$$C_{ijk} = \Pr(Y_{ijk} < k)$$
$$\log\left(\frac{C_{ijk}}{1 - C_{ijk}}\right) = X'_{ij}\beta$$

[78] Unlike random intercept models, GEE results on the marginal relationships between the covariates and the dependent variables are population averaged. Hence, the results of these two models diverge from each other depending on the size of intra-class correlation of the latent responses,

$\hat{\rho} = \frac{\hat{\psi}}{\hat{\psi} + (\pi^2/3)}$, where $\hat{\psi}$ is the random intercept variance

The random intercept models with the same model specification and a cumulative logistic link function produced intra-cluster correlations ranging from .38 to .55. Accordingly, we did not assume a fixed working correlation matrix as commonly done in most GEE models. Instead we only assumed that between any two elements of a cluster the correlation is the same.

where *k* indexes over the ordinal categories, *j* indexes over time, and *i* indexes over the units. The matrix X_{ij} contains the same independent variables listed above. The GEE results using a cumulative logistic link function are presented in table 1. Table 2 "GEE Regression Results Assuming Ignorable Panel Attrition" shows a summary of the results of table 1.

Tables 1-2 Here

Table 1 shows little relationship between enrollment in a private voucher school and other school characteristics. It seems that the negative effect of the end of the school year, scrutiny of well educated parents, and the socio-economic status of the school dominate the parents' evaluations of these school characteristics. The positive impact of religious affiliation on the parental evaluations remains consistent across several school characteristics. Private voucher school enrollment is no longer a strongly significant predictor of higher satisfaction with school values.

Given these findings I suspect that the effect of private voucher school enrollment is biased toward zero due to panel attrition, which is plausible if we believe that attrition is related to parental demographics which are differentially represented across school sectors as mentioned above. By estimating a mixture model that includes dropouts and the interaction of dropouts and the other covariates, despite some inefficiency, we may still find a stronger private voucher school effect. Moreover, the significance of the GEE estimates of the dropout variables can serve as test of the null hypothesis that attrition is ignorable for a given outcome variable (Park and Lee 1997). Accordingly, I present estimates in Appendix 1 of the mixture model with the same cumulative logit link function as in (2) and (3) and with the same covariates except that I also included dummy

variables for dropout after first wave (D1), dropout after second wave (D2), dropout after third wave (D3), and the interaction of dropouts (D*=1 if the respondent dropped at any point in the panel) with all of the other covariates.

Table 2 "GEE Regression Results Assuming Nonignorable Panel Attrition" shows a summary of the results of Appendix 1. The estimates suggest that attrition is nonignorable and once it is accounted for the private voucher school effect becomes stronger for a set of school characteristics.[79] By conditioning the mean of the distribution of the outcome variables on dropout times, a stronger relationship between private voucher school attendance and parental satisfaction appeared with those school characteristics that are perhaps less predictive of academic achievement. Despite the increase in the number of parameters that are estimated, the estimated precision of the private voucher school coefficient increased for overall school evaluation, the school values, and extracurricular activities. Moreover, private voucher enrollment continues to be strongly related to parents' evaluations of their schools' infrastructure. However, private voucher school enrollment remains an insignificant predictor of satisfaction with teachers, principals, academic quality, and discipline.

Figure 2 Here

However, the findings mentioned above are not readily interpretable because of the interaction terms that include school sector indicators. Figure 2 shows the probability of

[79] Checking for the significance of the dichotomous dropout variables in explaining the outcome variables shows that for the majority of the models dropouts are nonignorable; and that especially dropping out after the second wave is significant for those school qualities that enrollment in the voucher school variable significantly explains.

high satisfaction/evaluations over time for those variables that private voucher school enrollment significantly explains in the GEE model with nonignorable dropout, namely overall school evaluation, evaluation of the infrastructure, satisfaction with school values and satisfaction with extra-curricular activities. Levels of overall satisfaction, as well as satisfaction with the specific subdomains, over time in figure 2 shows that private voucher school parents start with relatively high satisfaction with their schools. Although time diminishes those positive evaluations, at the end of the second school year private voucher school parents are still more satisfied on these dimensions than are the parents in other school sectors. The decrease in their probability of being highly satisfied is much slower compared to other groups. Public school parents, for the most part, start with low probabilities of being satisfied in the first semester and this relatively low evaluation further deteriorates over time.[80]

IV. CONCLUSIONS

The results presented in this chapter seem to suggest that enrollment in a private voucher school predicts higher overall satisfaction with the school compared to public school parents over time. Hence, the chapter presents supportive evidence for Chubb and Moe's empirical proposition of higher parental satisfaction in the private school sector. Despite declines in parental satisfaction private voucher school parents are better off at any point during the panel in terms of overall satisfaction with the school compared to public school parents.

[80] An interesting exception is that public school parents seem to show higher probabilities of being highly satisfied with their school infrastructure over time.

Overall parental satisfaction with the private voucher schools starts out high and remains so over time. It is difficult to be certain, however, what parents mean when they consider their schools "excellent" overall; we do not know the mix of school characteristics they have in mind when they make this broad evaluation. Although the analyses presented in this chapter do not attempt fully to explain the relationship between satisfaction overall and specific school characteristics, the chapter sheds some light on this question by analyzing additional school characteristics as outcome variables. The results show that private voucher school enrollment is not unequivocally related to satisfaction across all aspects of school quality Across the school qualities investigated voucher schools fare better in terms of satisfying parents with school characteristics that may not be directly central to academic achievement.

For example, the strong cross-sectional voucher school effect on parental satisfaction does not persist over time for school characteristics such as teacher quality or academic programs. In contrast, the private voucher school effect does remain significant for a subset of school qualities that are less associated with academic achievement, such as values and infrastructure . The obvious question is how private voucher parents lose their relative higher satisfaction with teachers, principals, and academic quality yet, at the same time, remain more highly satisfied with their schools overall. There may be two complementary explanations of this phenomenon.

One answer may lie in what parents seek in the universal school voucher environment of Chile. Schneider, Elacqua and Buckley (2006) argue that class rather than classroom performance drives much of choice in Chile. Their results might explain why the results show persistent overall school satisfaction in the voucher sector despite the decline in

satisfaction with academic quality over time—if private voucher schools continue to maintain the non-academic "standards" that parents chose them for in the first place, then they may continue to value the schools regardless of the schools' academic performance.

In fact, the importance given to socio-economic status of the school in parental evaluations is reflected in the recruitment effort of the private voucher schools. For years, private voucher schools located in poor urban areas in Chile have sought to attract families by endowing themselves with symbols previously associated with elite private schools, such as uniforms and English names (Espinola 1993). We should bear in mind that the parents and the schools are operating in an environment where there is high social stratification across school sectors. Chilean voucher schools seem to recruit predominantly from the middle class; and evidence here shows that the voucher school parents have relatively higher satisfaction with school values even as they grow disillusioned with the academic performance of the schools.

Second, schools do not have to honestly reveal their true qualities in their efforts to recruit parents and their children. As suppliers of an experience good, private voucher schools have a strong incentive to project a desirable image of key school characteristics that they think parents value.[81] In the competitive universal school choice environment, promotional messages of private voucher schools may not reflect the truth—especially on those hard to achieve school qualities related to academic achievement.[82] It is clearly more

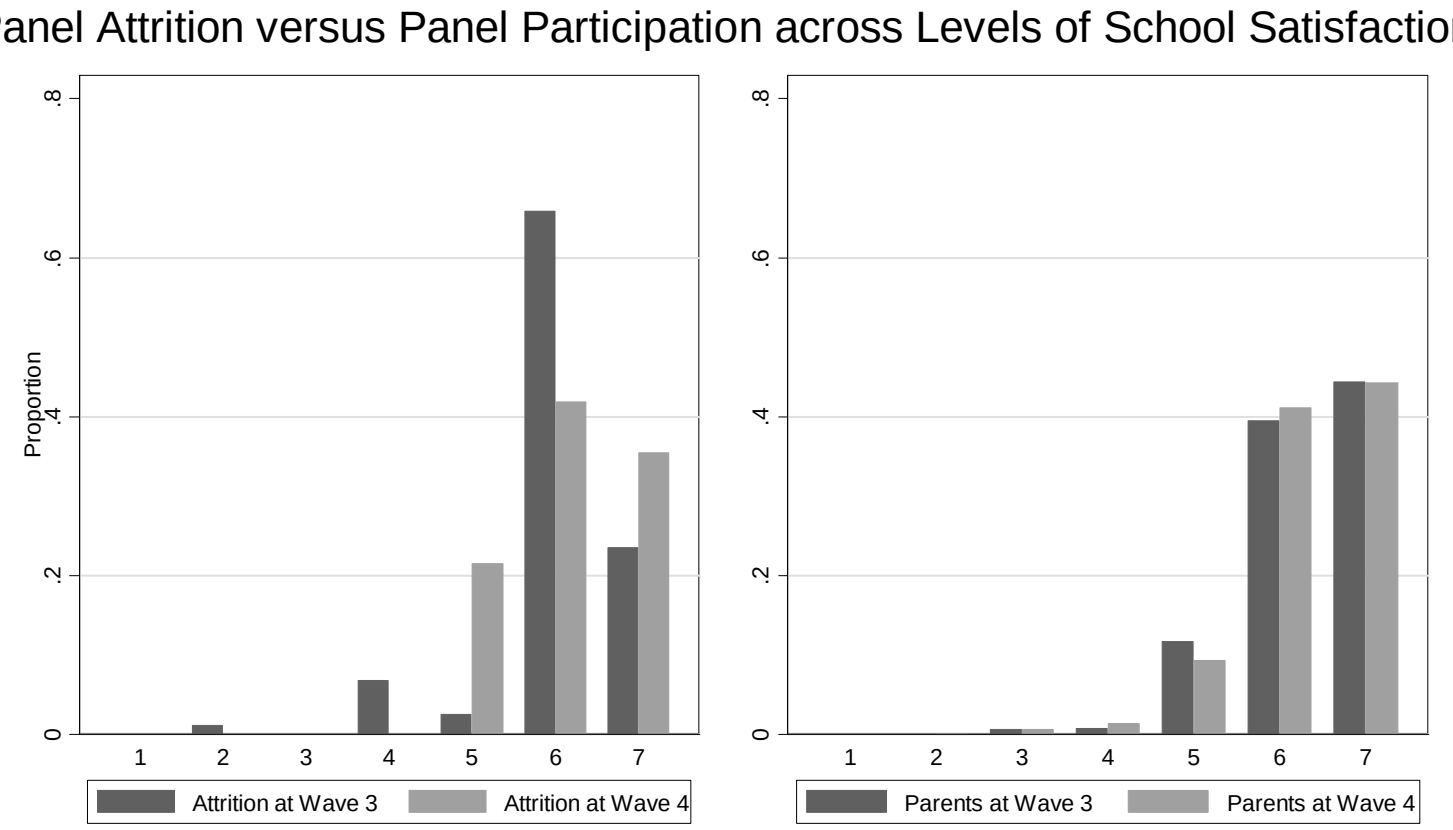
[81] Figure 5 shows that school principals report that they use various promotional tools to convey promotional messages.

[82] The analysis of the principal survey data showed that virtually no voucher school in the sample uses test scores in its advertising,

difficult to misrepresent the quality and condition of a school's infrastructure and even its attention to values (through, for example, church affiliation) than it is to misrepresent the academic quality of the school. Thus parents may be systematically overestimating the school's academic quality (based on inflated claims). As their post-enrollment experience accumulates, their satisfaction with academic performance perhaps inevitably declines.

Figure 3 Here

Figure 1: Parents who Exit the Panel Starting with Wave 3 Appear More Satisfied.



Note: Reported satisfaction levels are based on first panel wave results.

Table 1: GEE Regression Results with the Modeling Assumption that Panel Attrition is Ignorable.

	School	Teacher	Principal	Infrastructure	Academic Quality	Values	Discipline	Extracurricular Activities
Panel wave	0.510	0.240	0.059	0.553**	-0.388	-0.937***	-0.646**	-0.273
	(0.322)	(0.313)	(0.316)	(0.254)	(0.306)	(0.348)	(0.295)	(0.326)
Panel wave^2	-0.101	-0.061	-0.045	-0.082*	0.070	0.170***	0.110*	0.045
	(0.062)	(0.061)	(0.062)	(0.050)	(0.061)	(0.068)	(0.059)	(0.063)
End of school year	-0.370***	-0.078	-0.122	-0.214***	-0.216***	-0.326***	-0.094	0.045**
	(0.078)	(0.077)	(0.075)	(0.066)	(0.089)	(0.099)	(0.084)	(0.084)
Private voucher school	1.394***	0.484	0.448	1.715***	0.124	1.182*	0.476	0.892*
	(0.490)	(0.466)	(0.464)	(0.413)	(0.483)	(0.638)	(0.465)	(0.527)
Private voucher school*panel wave	-0.717*	-0.327	-0.127	-0.861**	0.455	-0.248	0.034	-0.237
	(0.430)	(0.406)	(0.415)	(0.358)	(0.424)	(0.537)	(0.414)	(0.448)
Private voucher school*panel wave^2	0.125	0.058	0.057	0.139**	-0.080	0.055	-0.008	0.021
	(0.084)	(0.080)	(0.082)	(0.071)	(0.084)	(0.104)	(0.082)	(0.087)
Private nonvoucher school	0.641	0.447	-0.205	0.112	0.401	-0.671	0.253	0.238
	(0.604)	(0. 557)	(0.539)	(0.476)	(0.598)	(0.777)	(0.560)	(0.566)
Private nonvoucher school*panel wave	-0.509	-0.295	0.296	-0.006	-0.346	1.067	-0.157	0.017
	(0.532)	(0.482)	(0.477)	(0.392)	(0.528)	(0.679)	(0.492)	(0.496)
Private nonvoucher school*panel wave^2	0.095	0.044	-0.038	-0.045	0.086	-0.202	0.027	-0.021
	(0.104)	(0.094)	(0.096)	(0.080)	(0.104)	(0.130)	(0.099)	(0.098)
Low middle income school	0.109	0.298	0.032	0.555**	0.157	-0.127	-0.124	0.155
	(0.235)	(0.234)	(0.262)	(0.240)	(0.236)	(0.253)	(0.209)	(0.238)
Middle income school	0.447**	0.168	0.0367	0.663**	0.238	0.075	0.391**	-0.044
	(0.231)	(0.225)	(0.259)	(0.234)	(0.241)	(0.256)	(0.207)	(0.240)
High middle income school	0.612**	0.484**	0.160	1.204***	0.821***	0.460*	0.748***	0.300
	(0.250)	(0.255)	(0.276)	(0.257)	(0.271)	(0.288)	(0.177)	(0.265)
High income school	0.640**	0.347	0.172	0.763 **	1.164***	0.967**	0.516**	-0.041
	(0.332)	(0.329)	(0.355)	(0.367)	(0.344)	(0.401)	(0.228)	(0.324)
School has religious affiliation	0.448***	0.259**	0.445***	0.828***	0.428***	0.794 ***	0.290**	0.629***
	(0.112)	(0.117)	(0.115)	(0.114)	(0.124)	(0.128)	(0.092)	(0.116)
Years of Schooling	-0.021**	-0.017**	-0.016*	-0.022**	-0.021***	-0.009	-0.016***	-0.008

	(0.009)	(0.008)	(0.010)	(0.010)	(0.005)	(0.009)	(0.006)	(0.010)
Years in comuna	0.001	0.003	0.003	0.006	0.006	-0.002	0.003	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.004)	(0.005)
Female respondent	0.172	0.160	-0.034	0.038	-0.053	0.115	-0.131	0.101
	(0.202)	(0.213)	(0.212)	(0.207)	(0.214)	(0.245)	(0.151)	(0.198)
Church Attendance	0.001	0.000	0.001	0.001	0.003**	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Monthly income	-0.000	-0.000	-0.000	-0.000	-0.000*	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sample Size	1810	1842	1685	1837	1839	1843	1842	1767
Log Likelihood	-2073.6	-1967.2	-2103.2	-2589.11	-1799.2	-1410.04	-2237.3	-2082.3
Sample Size	1810	1842	1685	1837	1839	1843	1842	1767

Note: Reported coefficients are from independent GEE regression of each dependent (column) variable on the row variables. Robust standard errors are given below the GEE coefficients. Sample size varies over model due to list-wise deletion of missing values. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

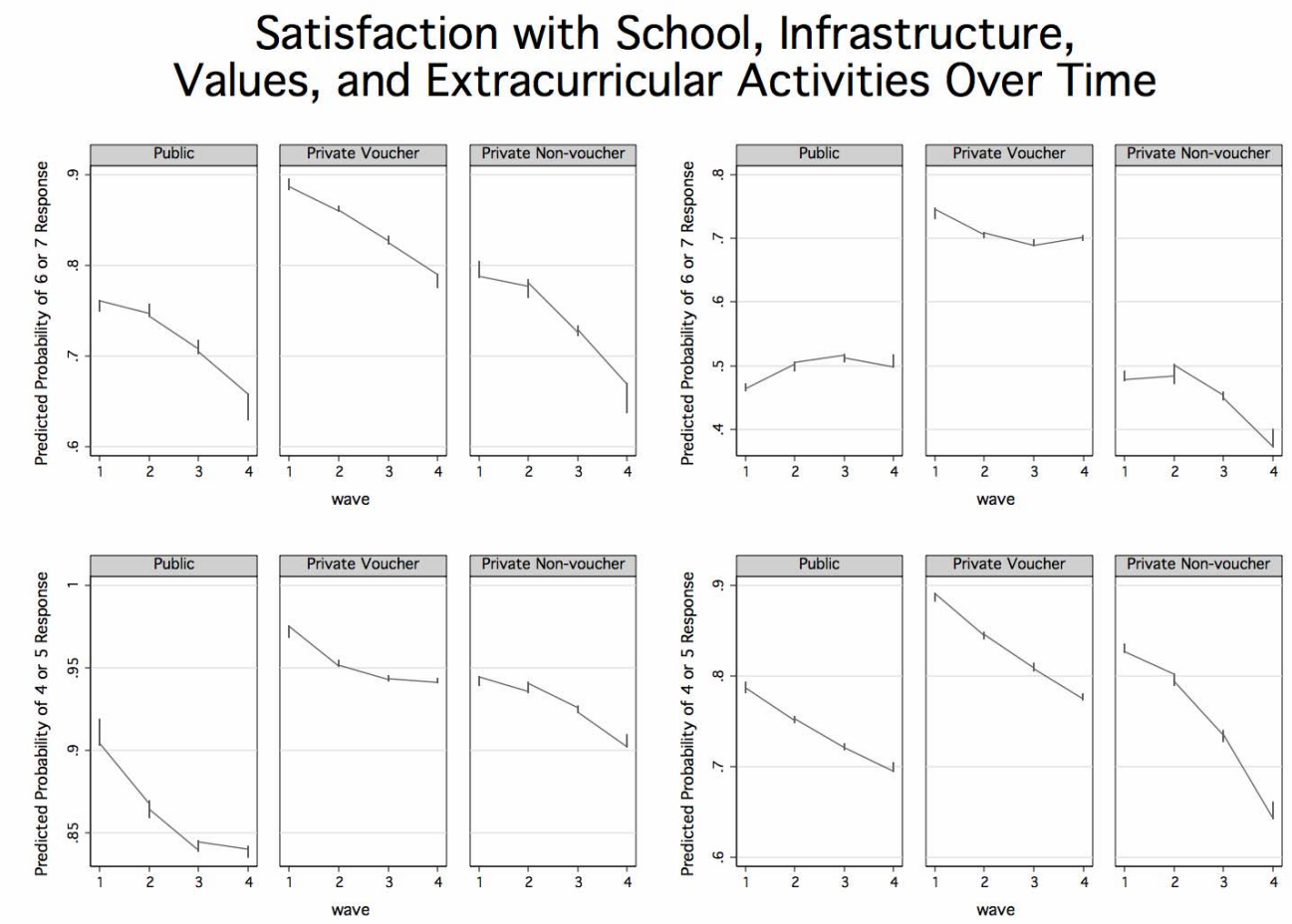
Table 2: Parents with Students in Private Voucher Schools Remain Satisfied with School Infrastructure, School Values, and Extracurricular Activities.

GEE Regression Results Assuming Ignorable Panel Attrition	School	Teacher	Principal	Infrastructure	Academic quality	Values	Discipline	Extracurricular activities
Private voucher school	1.394***	0.484	0.448	1.715***	0.124	1.182*	0.476	0.892*
	(0.490)	(0.466)	(0.464)	(0.413)	(0.483)	(0.638)	(0.465)	(0.527)
Private voucher school*panel wave	-0.717*	-0.327	-0.127	-0.861**	0.455	-0.248	0.034	-0.237
	(0.430)	(0.406)	(0.415)	(0.358)	(0.424)	(0.537)	(0.414)	(0.448)
Private voucher school*panel wave^2	0.125	0.058	0.057	0.139**	-0.080	0.055	-0.008	0.030
	(0.084)	(0.080)	(0.082)	(0.071)	(0.084)	(0.104)	(0.082)	(0.087)
Sample Size	1810	1842	1685	1837	1839	1843	1842	1767
GEE Regression Results Assuming Nonignorable Panel Attrition								
D1	1.876	.22067	0.812	1.124	1.447	-1.019	0.074	-1.175
	(1.223)	(.2823)	(0.877)	(0.702)	(1.081)	(0.879)	(0.676)	(0.747)
D2	-1.341***	-0.502	-0.635	-1.023***	-0.289	-1.056**	-0.349	-1.127***
	(0.348)	(0.374)	(0.434)	(0.364)	(0.404)	(0.451)	(0.376)	(0.403)
D3	-0.722**	-0.507*	-0.232	-0.189	-0.143	0.073	-0.059	-0.557*
	(0.295)	(0.292)	(0.377)	(0.298)	(0.317)	(0.376)	(0.305)	(0.300)
Private voucher school	1.816***	0.652	0.460	1.709***	0.021	1.438**	0.360	1.199**
	(0.550)	(0.605)	(0.517)	(0.471)	(0.545)	(0.703)	(0.540)	(0.599)
Private voucher school*panel wave	-1.019**	-0.499	-0.148	-1.020**	0.445	-0.558	0.026	-0.402
	(0.477)	(0.548)	(0.454)	(0.400)	(0.458)	(0.583)	(0.467)	(0.496)
Private voucher school*panel wave^2	0.174	0.090	0.064	0.179**	-0.068	0.118	0.004	0.056
	(0.092)*	(0.108)	(0.089)	(0.078)	(0.089)	(0.112)	(0.091)	(0.095)
Private voucher school*D	-1.015	-0.676	0.206	0.625	0.182	-0.638	-0.012	-0.591
	(0.987)	(1.041)	(1.111)	(1.007)	(1.020)	(1.424)	(0.939)	(1.105)
Private voucher school*panel wave*D	0.791	0.802	-0.093	-0.012	0.249	1.003	0.419	0.241
	(0.971)	(1.048)	(1.145)	(0.990)	(1.006)	(1.289)	(0.938)	(1.070)
Private voucher school*panel	-0.109	-0.146	0.028	0.014	-0.074	-0.212	-0.122	-0.033

wave2*D	(0.215)	(0.230)	(0.261)	(0.226)	(0.225)	(0.270)	(0.213)	(0.241)
Sample Size	1,810	1,842	1,685	1,837	1,839	1,843	1,842	1,767

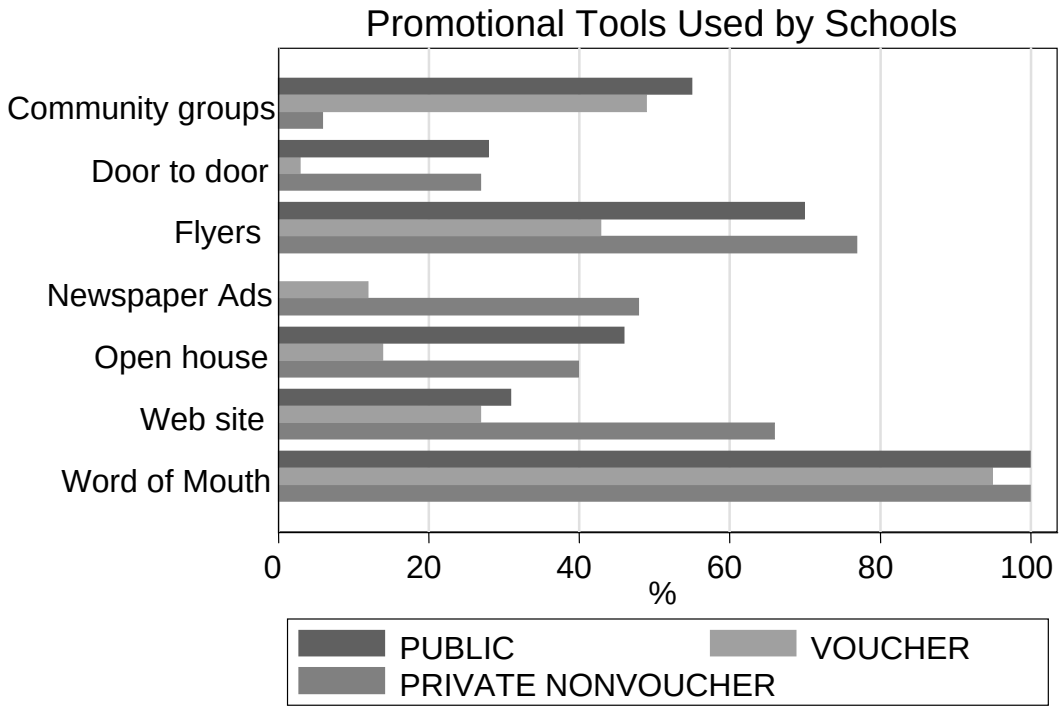
Note: Reported coefficients are from the results of independent GEE regression of each dependent (column) variable on the row variables in Table 1 and APPENDIX 7-1. Robust standard errors are given below the GEE coefficients. Sample size varies over model due to list-wise deletion of missing values. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Figure 2: Private Voucher School Parents Show Higher Levels of Satisfaction with School, Infrastructure, and Extracurricular Activities Over Time Compared to Public School and Private Non-Voucher School Parents.



Note: Graphs are loess-smoothed plots of predicted probabilities from the GEE models with nonignorable dropout (results presented in table 7). Outcome variables, clockwise from left top, are overall school, infrastructure, values, and extracurricular activities.

Figure 3: Primary Schools in Chile Use a Variety of Promotional Tools.



CHAPTER EIGHT

Exit, Voice, and Loyalty in a Universal School Voucher System

I. INTRODUCTION

Friedman (1962) argues that school vouchers permit competition to develop among schools. The injection of competition would promote a healthy variety of schools to develop (Friedman 1962: 93). This would introduce flexibility to the system because parents can choose from among many schools; and dissatisfied parents can switch to another school. As a result, parents' satisfaction increases; and bad schools are rooted out because they incur enrollment losses. In brief, parents' exit behavior is central to having a healthy market for schools.

Chubb and Moe (1990: 32) argue that school vouchers expand the private sector and make schools first and foremost accountable to parents. Parents and students play a much more central role in private education compared to a system of democratic control of schools based on three basic assumptions (Chubb and Moe 1990: 33). First, schools would have a strong incentive to please their client parents in a market system. As a result, what parents and students want and what schools provide would have a better match. Second, if parents and students do not like the service of a school they could exit and find another school whose offerings better meet their needs. Third, schools would be subject to natural selection. Schools that fail to satisfy their clientele would go out of business and those that are more likely to satisfy their clienteles would prosper and proliferate.

In brief, exit of parents from failing schools, and their ability to find alternative schools are central to the success of school voucher reform in creating more satisfied parents and better schools. Despite the salience of parental exit, school choice literature has not adequately addressed parents' willingness to leave their schools when there are alternatives. In this chapter, I explore parents' willingness to leave their schools when academic quality declines. Furthermore, I explore the effect of the availability of schools on parents' willingness to exit failing schools.

Because of the absence of prior investigations on the relationship between exit from failing schools and the availability of alternative schools, instead of testing hypotheses on parents' willingness to exit, I will explore parents' reactions to organizational failure, i.e. declining academic quality. However, Albert Hirschman (1970) in his classic work, *Exit, Voice and Loyalty,* explained that organizational failure might lead to a multitude of outcomes. Hence, in exploring parents' willingness to exit from their schools, I also investigate whether parents also use voice, or simply remain loyal to their chosen school when academic quality declines.

II. EXIT, VOICE AND LOYALTY IN THE MARKET FOR SCHOOLS

The link between school choice and greater parental exit and voice is based on parents' search of schools that best satisfy them. Education is a complex, multifaceted "good," and choice allows parents to select schools that deliver the kind of education they want for their children (Raywid 1989; Goldring and Shapira 1993; Schneider et al. 2000; Schneider and Buckley 2003; Buckley and Schneider 2007). From this perspective, choice should lead to higher parental exit as they exercise their ability to leave schools

that do not to match their preferences for specific values, needs, or pedagogical approaches.

Albert Hirschman (1970) in his classic work, *Exit, Voice and Loyalty,* explained that organizational failure might lead to a multitude of outcomes. Hirschman pointed out that if competition is to effectively reform the practices of organizations voice and loyalty must complement exit in the market. If clients leave a company too quickly they may not find the time to understand their failures or to effectively respond to competition. Hirschman (1970) also wondered whether school vouchers might lead to a rapid exit from public schools by families most able to demand improvements in the school system. School choice opponents fear exactly this outcome. In Hirschman's terminology competition eliminates voice by making exit more likely.

On the other hand, the threat of parental exit, core to any voucher program, is hypothesized to improve the schools themselves by inducing productive efficiency and educational innovation. Because their survival depends on the enrollment of students, failing schools in a market environment must improve or lose their "customers" (Hoxby 2000; Teske et al. 2000; Howell and Peterson 2002). This could also make private voucher schools more appreciative of parental voice compared to other sectors—since parental feedback is essential to improving services to retain students.

There could be system-wide effects as well: because parents are searching for schools that match their preferences, private voucher schools can better adapt themselves to parental needs and develop practices that can be emulated by other less successful schools (Teske et al. 2000; Buckley and Schneider 2004). In brief, the key to achieving a

maximally efficient school system under a school choice system is mobile parents who are ready to communicate their wishes and bear the burden of exit when dissatisfied.

However, school choice skeptics argue that because parents might sort themselves into schools based on non-academic criteria competition induced parental exit might have stratifying effects along socio-economic and racial lines (Henig 1994, Witte 1999, Schneider et al. 2000, Fairlie and Resch 2002, Weiher and Tedin 2002).

Moreover, parents who are the most demanding and who value education highly might be the ones that exit a failing school first. Hirschman (1970) himself wondered whether the loss of such parents can be justified by the incentives for improvement unleashed by the threat of parental exit from failing schools. The easy option of abandoning a school may undermine the incentive to guide and pressure school authorities directly to improve their services. In the case of education such school involvement may also be key to student and family engagement which contributes to learning (Belfield and Levin 2005). In fact, McMillan (2004) has found some evidence of this in reviewing the impact of choice on parental participation and student achievement.

Despite the controversy surrounding the extent to which parents might exit their schools and its possible consequences, we know very little about the determinants of parental exit due to competition. The market analogy in the case of K-12 education might have serious limits in terms of the ease of exit. Parents would be less willing to change their schools in the middle of the school year despite their dissatisfaction. Moreover, in an environment of school choice they might tend to like what they choose—it is well-known that consumers place higher value on things they already possess than identical items that they are thinking of buying (see, e.g., Kahneman and Tversky 1979 on how the

loss of existing possessions looms larger than potential gain). Having invested materially and psychologically in a school, parents might be less willing to exit a school for a better school.

Finally, even if choice does create opportunities for exit and voice, it is unclear who seizes those options. It might be that the characteristics of schools or parental characteristics are much more important compared to the effect of school competition, and given unequal school quality and socioeconomic differences between parents, choice may exacerbate inequalities.

In this chapter, I explore the effect of school competition on parental propensity to exit the school and to talk with school authorities (that is, exercise voice) when academic quality declines. I also explore the likelihood of parents to stay at the chosen school despite declining academic quality, i.e. loyalty. I investigate the effects of public, private voucher, and private non-voucher school competition on public and voucher school parents. In doing so, I pay attention to inter-sectoral differences in how parents are affected by competition in their attitudes toward their schools. Below, I present longitudinal analyses of parental attitudes in a universal school voucher system, also controlling for school and parent level factors that might affect exit and voice.

III. STUDYING CHANGE IN THE PROPENSITY OF PARENTS' REACTIONS TO SCHOOL FAILURE

i. Measuring Parental Exit, Voice, and Loyalty

My goal is to measure whether parents are inclined to change their schools, whether they are likely to contact school authorities when schools perform poorly, or whether they are likely to remain in their chosen school, and whether or not those propensities are

evenly distributed across types of schools and types of parents in a universal school voucher system. In order to measure parental propensity of exit and voice I use two groups of survey items. The first group asks parents their probability of changing the school, talking to the principal, and talking to the inspector if academic quality declines. The second group of items repeats the same questions, but instead of using the broader terms "academic quality," these questions focus specifically on the System of Measurement of the Quality of Education (SIMCE) scores—Chile's standardized national test.[83]

Both groups of items are measured on a 5-point scale that runs from "very probable" to "improbable". These survey items were asked in all panel waves.[84] These items are used as outcome variables of the models in Table 2. In addition, I construct a binary variable for parental loyalty to the school represented by an indicator variable indicating whether or not the parent has chosen the "improbable" category in the items that measure parents' propensity to exit the school, and talk to the principal or the inspector.

ii. The relevance of time to the study of parental exit, voice, and loyalty

Time is relevant to understanding the effect of competition on parental exit and voice

[83] Chile's national standardized test, Sistema de Medición de la Calidad de la Educación (the System of Measurement of the Quality of Education—SIMCE), assesses students in grades 4, 8, and 10 in language, mathematics, history and geography, and natural sciences (See Chapter 3).

[84] Si la calidad academica bajara en X escuela, con qué probabilidad usted:

1. Trataría de cambiar de escuela
2. Conversaría con el director(a)
3. Conversaría con el inspector(a)

Si los puntajes de SIMCE bajara en X escuela, con qué probabilidad usted:

4. Trataría de cambiar de escuela
5. Conversaría con el director(a)
6. Conversaría con el inspector(a)

Item response categories: Muy probable/algo probable/probable/no muy probable/improbable.

in at least two ways. Parents in the panel might change their propensity to exit the school or voice their discontent as they go through the schooling experience and become more familiar with what their schools offer. Education is a complex and multifaceted good (Schneider et al. 2000), and is, in many aspects, an experience or even a post-experience good (Weimer and Vining 2004). Such goods create a problem for the consumer because their true quality is revealed only by use or long after consumption. Unlike other private goods such as automobiles, it is hard to find and comprehend third party information on schools. Informational difficulties of parents in their school choice decision have been well documented (Schneider et al. 2000; Buckley and Schneider 2007).

Second, time alone may have an effect of its own on parental attitudes toward the school. A good experience at the beginning might color the parents' future perceptions and enforce their subsequent positive experiences creating "loyalty." Likewise, an initial bad experience may dampen the effect of subsequent positive experiences, making exit more likely.

For these reasons, a single snapshot of parental attitudes yields an inadequate picture of the effect of competition on parental exit and voice. I address this question by taking advantage of the longitudinal structure of the data. As noted in Chapters 4 and 7, the first panel wave was conducted in the first semester of the 1st year in primary school.[85] The second wave was conducted at the end of that school year and two more panels were conducted at the beginning and the end of the next school year. All in all, four consecutive school semesters were covered in the study. Because time might not have a

[85] Recall that all parents must choose a school at that point.

simple linear effect on parental satisfaction with the school, I include a flexible specification of the link between time and satisfaction in the models presented below.

IV. ANALYSES AND THE RESULTS

Because there are repeated measurements on the same parents, I can estimate true panel data models such as regression with fixed effects at the unit level (Baltagi 2001; Hsiao 2005). Such a model would, however, eliminate the interesting covariates of the models that are time invariant. Random effects models allow the inclusion of time invariant covariates. However, as explained in Chapter 7 Section III (a), attrition may result in biased estimates if the determinants of attrition are correlated with the outcomes the models predict.

Hence, in order to check the relationship between parental exit, voice, and loyalty, and attrition, I compute the rank bi-serial correlation between the ordinal measures of exit and voice and whether the parent dropped-out at any point in the panel. I also compute the tetrachoric correlation between the dichotomous variable which represents parental loyalty and whether the parent dropped-out at any point in the panel.

Table 1 Here

Because of the correlations presented in Table 1, instead of using the methodological approach adopted in Chapter 7 for the study of parental satisfaction, I proceed by constructing random effects models with a latent response formulation of ordinal outcomes for parental exit and voice and a latent response formulation of binary outcomes for parental loyalty:

$$\Pr(Y_j) = F(School\_supply, Schools\_sector, School\_Supply * School\_sector, School\_SES, Religious\_Affiliation_{school}, Enrollment, Parental\_Demographics, Time)$$

where j indexes over exit, talking to the principal and talking to the inspector when academic quality declines; exit, talking to the principal and talking to the inspector when SIMCE score declines; and loyalty to school. Using the random intercept model:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \ldots + \beta_p X_{pit} + \varsigma_t + e_{it},$$

where i indexes over the parents, t indexes over panel waves, and p indexes over the independent variables for which coefficients are estimated using the latent response formulation for ordinal outcomes assuming observed ordinal responses reflect continuous responses.

The independent variables for which I estimate coefficients are:

- **School supply**: represented by three continuous variables, measuring the number of public, private voucher, and private non-voucher schools in the same "township" of parent's residence. Based on the discussion of parents' choice sets in Chapter 4, I chose "township" as the way to define the competitive environment in which a school operates.
- **School sector**: represented by two indicator variables indicating enrollment in public school or private voucher schools with private non-voucher school as the base category.
- **Interaction terms with school supply and school sector:** represented by a series interaction terms of public and private school indicators with the three continuous variables representing school supply.

- **School SES:** represented by the Index of Vulnerability measuring the percentage of vulnerable children at school.
- **Religious affiliation of the school:** represented by an indicator variable indicating whether the school belongs to a religious denomination.
- **Enrollment:** The number of students at the school in year 2004.
- **Parental demographics:** represented by three indicator variables indicating that the respondent is female, married and working; and four continuous variables measuring the parent's years of schooling, frequency of a parent's church attendance per year, the number of years the parent has resided in the same township, and the monthly household income.
- **Time**: represented by the semesters spent at the schools, its square, and whether the interview was conducted close to the end of the academic year. Because time might not have a simple linear effect on the outcome variables investigated here, I include a flexible specification of time. Specifically, I am interested in examining the extent to which there may be diminishing marginal effects of time. Also, I control for end of the school year effects as parents may be more sensitive to school performance as the student evaluations of the academic year gets closer.

Because the Chilean school voucher system is a universal school choice system instead of simply measuring concentration of private schools in the school environment as a proxy for competition from the private sector[86] I chose to include school concentration in all the sectors. Unlike in the US, the Chilean education system is not option demand—it is a universal choice system. That is, whereas in the US parents must

[86] See Belfield and Levin 2005 for an extensive review of 41 studies using measures of competition in the US.

first "choose to choose" and only then choose a school, all parents in Chile must choose; there is no "default" school for their children (on the importance of this institutional design see Schneider et al. 2000). Moreover, parents can use their vouchers in any school. Hence, in principle, schools from all sectors can be considered substitutes for each other by a parent.

However, the socioeconomic segregation of the school system in Chile casts doubt on whether parents really do consider schools from different sectors as viable alternatives. If they do not, the effect that the concentration of different school sectors in the same township has on parental exit, voice, and loyalty would be different based on the sector of the parent's school. I investigate this potentially conditional relationship by including the interaction terms mentioned above.

The results of the models are presented in Tables 2 and 3. Because of the various interaction terms contained in the models the effect of school sector on parental exit, voice, and loyalty has not been readily interpretable. Based on the regressions results, Figures 2 and 3 show the change in predicted propensity of parental exit, voice, and loyalty over four panel waves across school sectors.

Tables 2 and 3 Here

Figures 1 and 3 Here

The results of the exploratory multivariate analyses can be summarized as follows:

Regarding parental **exit**,

- I find no evidence that the concentration of public schools or private voucher schools in the same comuna increases parental exit. In fact, the results show that

being surrounded by more private voucher schools slightly dampens public school parents' likelihood of leaving their schools if test scores decline.

- Compared to private non-voucher schools, which have a relatively loyal clientele, both public and private voucher school parents show a higher propensity to exit their schools.
- The concentration of private non-voucher schools in the same comuna has a dampening effect on parental exit if school quality declines. However, the relationship is conditional on being a private voucher school parent. In fact, the only evidence for greater exit due to competition comes from private voucher schools surrounded by private non-voucher schools. Those private voucher school parents would be slightly more inclined to exit their schools.

Regarding parental **voice**,

- I find evidence that increased availability of public schools in the comuna makes parents more likely to raise their voices and talk to the inspector[87] both when academic quality declines and when SIMCE scores decline. However, being a voucher school parent slightly reduces this propensity.
- I find no evidence that surrounding private voucher schools make parental voice more likely. In fact, it has a dampening effect on public school parents' propensity to voice discontent.
- Compared to private non-voucher school parents voucher school parents are significantly more likely to talk to the inspector if school quality or test scores decline. Moreover, the concentration of private non-voucher schools in the same

[87] School principals in Chile are responsible from educational planning and leadership, whereas the inspectors are responsible from day to day operations of the school.

comuna makes voucher school parents slightly more likely to contact the principal.

Regarding **parental loyalty**:

- Compared to private non-voucher school parents, public school parents are more likely to remain loyal to their schools when academic quality declines, or specifically test scores decline. Surrounding public schools marginally decrease this tendency; whereas surrounding private voucher schools marginally increase loyalty.
- Parents of schools with many students are more likely to stay loyal to their schools compared to parents of small schools.

In brief, the results show that the most important determinant of parental exit and voice in a universal school choice system is school sector, not the level of competition coming from schools in different sectors. The finding on the effect of enrollment on parental loyalty to the school may be driven by the fact that most public schools have more students compared to private non-voucher schools in Chile. Moreover, competition from schools in a different sector seems to dampen the likelihood of parental exit and voice rather than boosting parents' inclination to change the school or complain to school authorities when the school performance deteriorates. The exception to this finding is the private voucher school parents whose behavior is affected by the availability of private non-voucher schools, and not by the other voucher schools or the public schools in the same comuna.

V. CONCLUSIONS

The sweeping market reforms that took hold in Chile during the 1970s and 1980s placed considerable emphases on customer sovereignty and minimum government. As part of that movement, the military government of Chile put in place a voucher school system that seem to closely parallel economics textbook accounts of how a school voucher system should be organized. Although there have been several groups with different perspectives supporting the school voucher movement in the US, proponents of market based models of education have been the most vocal in academia. It has been argued that the behavior of dissatisfied customers who have the exit option would eventually lift all the boats in K-12 education.

My results, however, indicate that the reality of a deregulated education market place might be quite different. The results show no support for the argument that increased competition brings about a higher likelihood of parental exit from public schools. Even when the relationships between parental exit or voice and the availability of choice options are significant the effects are modest and may not be of sufficient magnitude to have an imminent impact on schools. In fact, exit might be far more difficult than simple voucher models predict, not only because of the nature of schooling at the K-12 level, but because social stratification fragments what on paper looks like a highly competitive market.

In Chile, school sector and socioeconomic status seem to overlap (see table 1). Given the scale of socio-economic stratification across school sectors it would be naïve to consider these sectors as perfect substitutes for each other for parents with the same

educational wants and needs.[88] If parents do not perceive the other sector's schools as viable alternatives their concentration in the same comuna, perhaps outcrowding the other sectors' schools, might reduce the number of alternative schools for the parent. In fact,

the results indicate that surrounding public and private voucher schools have slightly dampening effects on the exit or voice of the other sector's parents. Moreover, the only evidence, found of cross-sector competitive effects relates voucher and non-voucher private schools, rather than public and voucher schools. It seems that the social "stigma" associated with attending municipal schools, where the average parent comes from a low socioeconomic background, precludes public school parents from considering voucher alternatives; whereas middle or high middle income average voucher school parent can consider private non-voucher schools for enrollment.

Overall these findings highlight an important aspect of deregulation in the education market place: Public and private sectors continue to live side by side in school choice systems. Existence of different school sectors has consequences for parents' choices and for the competition among schools. Sectoral divides may exacerbate societal divides, creating the context in which parents can group themselves with similar parents. In fact, the flaw explaining the absence of large scale competitive pressures unleashed by the exit of dissatisfied parents might be the limited design of the universal choice system, rather than an inherent weakness of school voucher policies.

[88] Elacqua, Schneider, and Buckley (2006) show that parents' demographic preferences affect their school choice sets more than the schools' academic performance.

Instead of cross-sector competitive effects, I found that the most important determinant of parental exit and voice is school sector. If competition is not felt fiercely because of a stratified education market place, and if parents are not likely to leave their schools when their schools fail, the main difference between a public school assignment system and a school voucher system would become the existence of varied school sectors with their different organizations and relationships with the parents. I have found some evidence supporting this argument in private voucher school parents' higher likelihood of voice and in public and private voucher schools' higher likelihood of exit compared to private non-voucher schools.

On the other hand, Benveniste, Carnoy and Rothstein (2003) give a convincing account of how sectoral divides do not guarantee the existence or lack of certain school practices generally attributed to schools from private or public sectors. The results, however, indicate a sectoral divide in parental attitudes toward the schools. Future research should find out why these two sectors, public schools and private voucher schools in Chile, are so different from each other in terms of parental voice and in their parents' propensity to exit. Specifically, qualitative studies looking at the specifics of the schools' organizations and their relationships with the parents would greatly enhance our understanding of whether choice schools in a voucher system can cultivate greater parental involvement.

Table 1: Correlations between Attrition and Parental Exit, Voice and Loyalty

	Attrition	p>|t|	N
If academic quality declines:			
Exit	-0.010	0.819	529
Talk to Principal	0.010	0.823	531
Talk to Inspector	0.054	0.225	513
If SIMCE score declines:			
Exit	0.051	0.253	496
Talk to Principal	0.078	0.080	498
Talk to Inspector	0.079	0.081	482
Loyal	0.140	0.101	477

Note: Rank biserial correlation coefficients and tetrachoric correlation coefficients for "loyalty" reported.

Table 2: Parental Exit and Voice

	Academic Quality Drops			***SIMCE Scores Drop***		
	Exit	**Talk to Principal**	**Talk to Inspector**	**Exit**	**Talk to Principal**	**Talk to Inspector**
Public Schools in Comuna	1.024 (0.015)	1.005 (0.013)	1.028** (0.013)	1.021 (0.014)	1.015 (0.014)	1.03** (0.013)
Private Voucher Schools in Comuna	1.006 (0.008)	1.001 (0.007)	1.006 (0.007)	1.006 (0.007)	1.002 (0.008)	1.009 (0.007)
Private Non-Voucher Schools in Comuna	0.969** (0.015)	0.995 (0.014)	1.003 (0.014)	0.983 (0.015)	0.987 (0.015)	1.004 (0.014)
Public School	**6.331*** **(3.604)**	**0.676** **(0.344)**	**2.2** **(1.129)**	**5.703*** **(2.982)**	**0.821** **(0.438)**	**2.225** **(1.087)**
Private Voucher School	**3.439**** **(1.863)**	**1.312** **(0.641)**	**5.365*** **(2.659)**	**2.282*** **(1.139)**	**1.802** **(0.928)**	**4.893*** **(2.31)**
Public Schools in Comuna*Public School	0.978 (0.016)	0.998 (0.015)	0.986 (0.014)	0.987 (0.015)	1.001 (0.016)	0.99 (0.014)
Voucher Schools in Comuna*Public School	0.991 (0.009)	1 (0.008)	0.992 (0.008)	0.983** (0.009)	0.988 (0.009)	0.984** 0.008
Private Non-voucher School in Comuna*Public School	1.014 (0.019)	1 (0.017)	0.996 (0.017)	1.014 (0.018)	1.014 (0.018)	0.998 (0.016)
Public Schools in Comuna*Voucher School	0.978 (0.016)	0.995 (0.015)	0.973* (0.014)	0.983 (0.015)	0.982 (0.016)	0.971** (0.014)
Voucher Schools in Comuna*Voucher School	0.993 (0.009)	0.993 (0.008)	0.99 (0.008)	0.992 (0.008)	0.99 (0.008)	0.989 (0.007)
Private Non-voucher School in Comuna*Voucher School	1.07** (0.03)	1.044* (0.026)	1.028 (0.025)	1.069*** (0.028)	1.093*** (0.03)	1.017 (0.023)

Index of Vulnerability	1.003	1	1.015**	1.013*	1.011	1.017***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
Religious Affiliation	0.68*	0.721	1.144	0.835	0.832	1.371
	(0.158)	(0.152)	(0.242)	(0.183)	(0.184)	(0.276)
Enrollment	1	1	1	1	1	1
	(0)	(0)	(0)	(0)	(0)	(0)
Years of Education	1.063*	0.92***	0.888***	1.015	0.907***	0.884***
	(0.038)	(0.029)	(0.028)	(0.034)	(0.031)	(0.027)
Employed	1.136	1.056	0.808	0.771	0.95	0.775*
	(0.203)	(0.17)	(0.128)	(0.129)	(0.16)	(0.117)
Years in Comuna	0.997	0.987**	0.984***	0.994	0.986**	0.985***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Church Attendance	1.003**	1.002	1	1.002*	1.002	1
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mother	1.175	0.972	0.912	1.055	0.762*	0.793*
	(0.195)	(0.142)	(0.132)	(0.169)	(0.117)	(0.111)
Married	1.023	0.968	1.08	1.021	1.043	1.173
	(0.185)	(0.157)	(0.174)	(0.173)	(0.177)	(0.18)
Semester	8.527***	1.091	1.348	0.101***	0.21***	1.146
	(2.228)	(0.27)	(0.324)	(0.025)	(0.052)	(0.277)
Semester-squared	0.582***	0.926	0.932	1.685***	1.392***	0.991
	(0.031)	(0.045)	(0.045)	(0.084)	(0.069)	(0.048)
End of year	0.727***	0.614***	0.584***	1.506***	0.922	0.773**
	(0.084)	(0.067)	(0.062)	(0.157)	(0.097)	(0.082)
N	1794	1793	1717	1728	1735	1662
Log Likelihood	1005.001	998.127	1012.903	1153.001	1002.003	1015.500

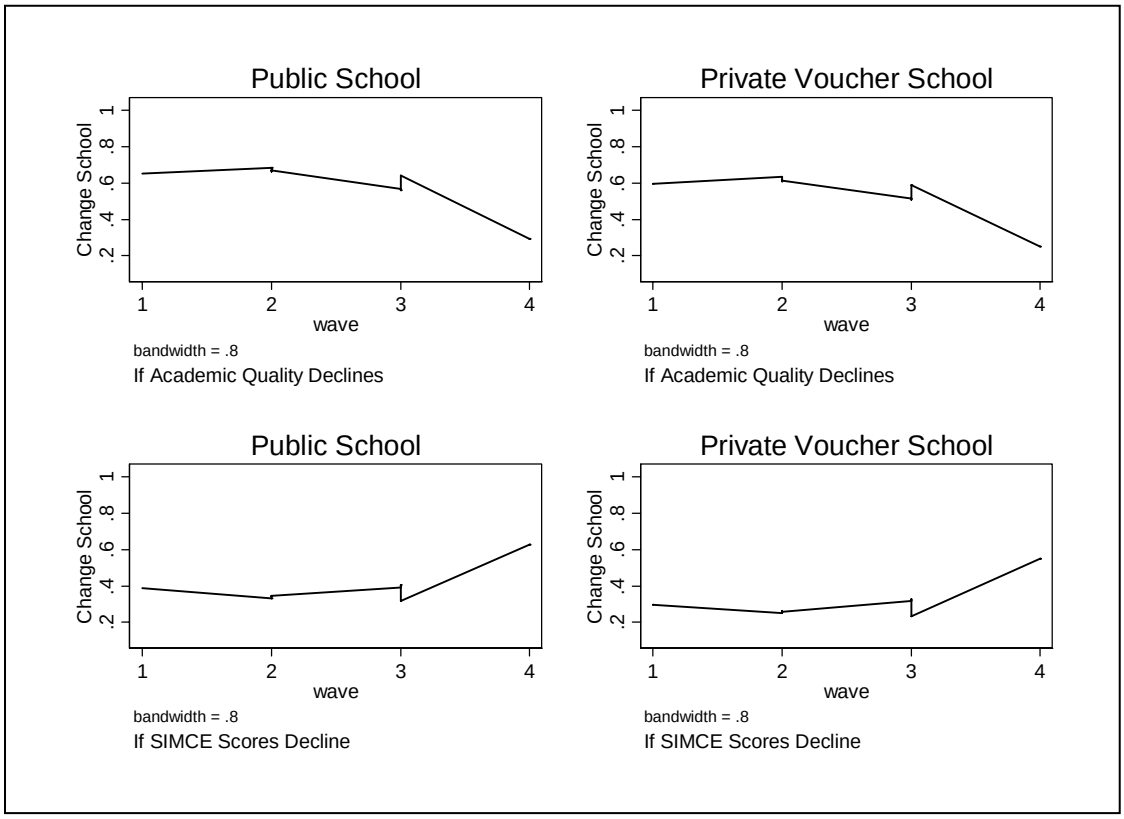
Note: Reported odds ratios are from survey weighted random intercept proportional odds models. Coefficients are exponentiated and can be interpreted as odds ratios. Robust standard errors in parentheses. Sample size varies over model due to list-wise deletion of missing values. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Table 3: Loyalty

Public Schools in Comuna	1.019 (0.028)
Private Voucher Schools in Comuna	0.972* (0.016)
Private Non-Voucher Schools in Comuna	1.002 (0.025)
Public School	2.19** (0.684)
Private Voucher School	0.471 (0.253)
Public Schools in Comuna*Public School	0.999** (0)
Voucher Schools in Comuna*Public School	1.001* (0)
Private Non-voucher School in Comuna*Public School	1.001 (0.001)
Public Schools in Comuna*Voucher School	1.014 (0.013)
Voucher Schools in Comuna*Voucher School	1.006 (0.008)
Private Non-voucher School in Comuna*Voucher School	0.95 (0.049)
Index of Vulnerability	1.02** (0.009)
Religious Affiliation	1.073 (0.377)
Enrollment	2.295*** (0.514)
Years of Education	1.514*** (0.198)
Employed	0.804 (0.186)
Years in Comuna	0.995 (0.008)
Church Attendance	1 (0.002)
Mother	0.645 (0.215)
Married	0.739 (0.188)
Semester	0.723 (0.228)
Semester-squared	1.08 (0.068)
End of year	1.229 (0.173)
N	1,836
Log Likelihood	-1001.424

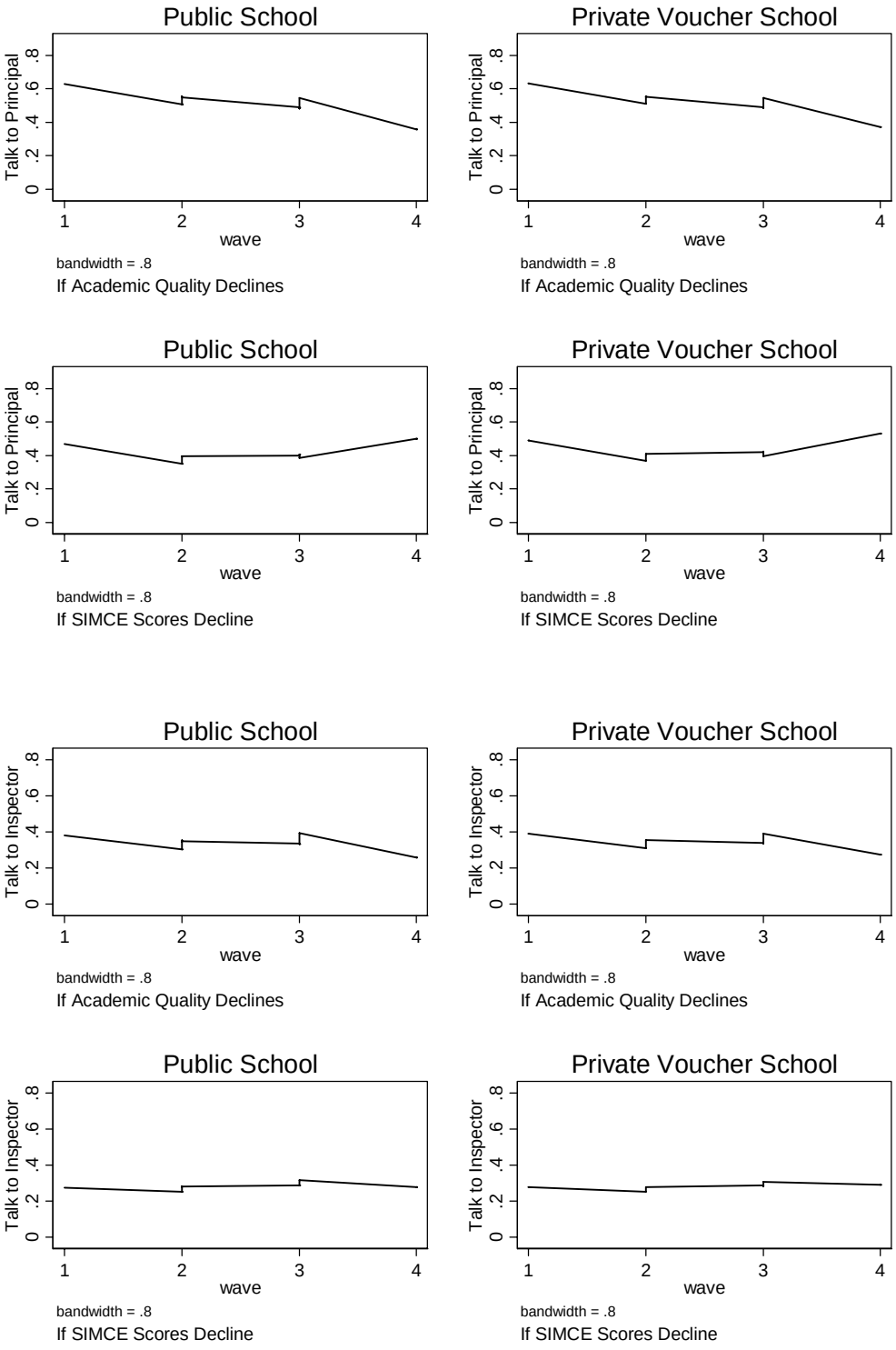
Note: Reported odds ratios are from survey weighted random intercept logit model. Coefficients are exponentiated and can be interpreted as odds ratios. Robust standard errors in parentheses. Sample size varies over model due to list-wise deletion of missing values. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.

Figure 1: Change in the Predicted Probability of "Not too Probable" or "Improbable" Responses to Parental Exit Questions over Panel Waves



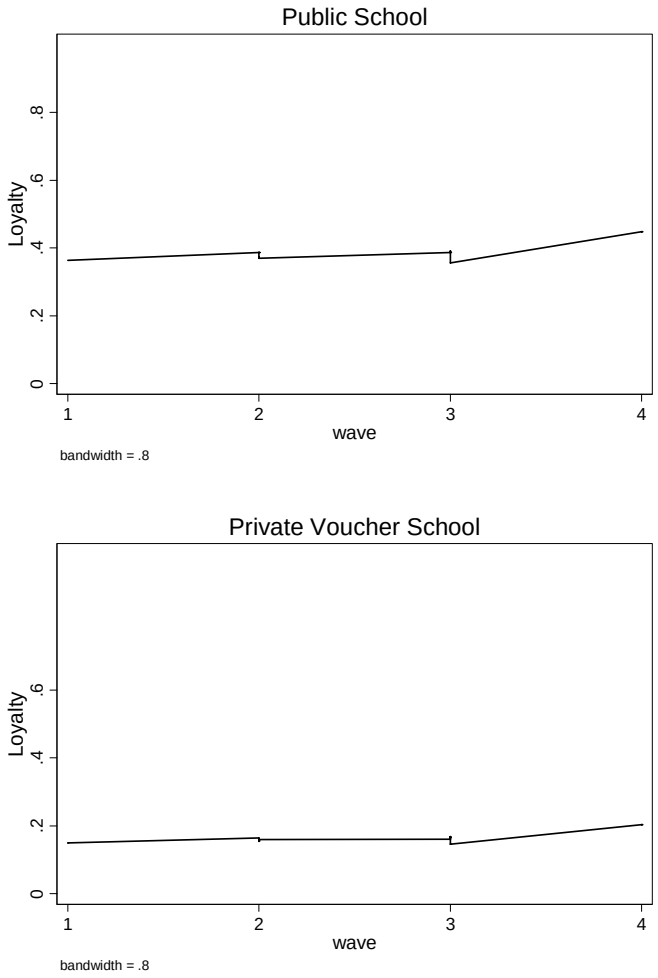
Note: Graphs are loess-smoothed plots of predicted probabilities from the models in Table 2 over panel waves.

Figure 2: Change in the Predicted Probability of 4 or 5 Responses to Parental Voice Questions over Panel Waves



Note: Graphs are loess-smoothed plots of predicted probabilities from the models in Table 2 over panel waves.

Figure 3: Change in the Predicted Probability of Loyalty over Panel Waves



Note: Graphs are loess-smoothed plots of predicted probabilities from the model in Table 3 over panel wave.

CHAPTER NINE

Conclusions

In this dissertation, I tested a series of hypotheses on parental choice, school competition, and parental accountability based on the market model of education as implemented in the Chilean universal school voucher system. Although school vouchers have been hotly debated in the US for the last few decades, application of the reform remained limited. School vouchers have been offered to families with limited resources so that they can send their child to schools in different districts. Hence, the US experience with school vouchers has been quite different compared to the universal school voucher design developed in the seminal works on school vouchers by Friedman (1962) and Chubb and Moe (1990). We still do not know what a large-scale school voucher system would look like in the US.

Unlike the US, Friedman's (1962) proposal of a market for schools took hold in Chile. It was quickly implemented by the military regime in 1980. The design of vouchers emphasized choice and efficiency instead of equality or social cohesion (Belfield and Levin 2005). School vouchers were flat, which is considered the most stratifying school voucher design (Epple and Romano 1998, 2000; Gonzales, Mizala and Romaguera 2004), and universal, i.e. vouchers can be spent in any school literally anywhere in Chile. Also, parents can add money on top of the voucher if they want to send their child to a more expensive school.

The reforms created a substantial private voucher school supply in urban areas especially in the Metropolitan Region of Santiago, where the density of the student

population attracted many entrepreneurs to set up private voucher schools. Because per student vouchers automatically follow the child to the chosen school, revenues in voucher schools depend directly on the number of students enrolled. In brief, the structure of the universal school voucher system makes the Chilean case ideal to study the assumptions behind the idea of having a market for schools as well as the effects of school vouchers on educational outcomes.

One educational outcome believed to be linked to school vouchers is improved test scores. However, improved test scores do not directly follow from the market model of education, which promises efficiency, i.e. reduced costs for the same level of educational output broadly defined. Despite the fact that improved test scores is not a central feature of the idea of having a market for schools, previous research has focused on whether the universal school voucher system delivered higher test scores.

McEwan and Carnoy (1999) show that controlling for student SES level, the private school advantage in standardized test scores diminishes. Also, Hsieh and Urquiola (2004) showed that the most immediate impact of school vouchers has been parental sorting based on socio-economic status and not higher test scores. Moreover, stagnating or marginally improving scores in international tests have been a cause of concern for Chileans since the start of standardized testing by SIMCE. Hence, the evidence has so far shown that universal school vouchers in Chile has not produced higher test scores.

In this dissertation, instead of test scores I focus on the three basic promises of the market for schools that directly follow from the idea of a market for schools -choice, competition, and accountability to parents. I use these ideas to construct empirically testable propositions on how parents and schools behave in a universal school voucher

system. School vouchers aim to expand the range of options for parents, introduce competition to the education system, and establish a market accountability system. Other educational and societal outcomes are linked to these three promises in one way of another. For example, both improved academic quality and social stratification has been linked to schools' competitive behavior and the nature of parents' choices in the literature. Hence, choice, competition, and accountability constitute the three dimensions along which school voucher proposals and their corresponding market models can be evaluated.

Moreover, I focus on those empirical propositions regarding parental choice, school competition, and accountability that could hardly be studied in limited school choice experiments and that have received less attention in the school choice literature. For instance, demographic constraints on the quality of parents' choice sets have received a lot of attention in the school choice literature. Research has shown that parents' socio-economic status and their social networks affect the information parents have about schools, and the quality of their school choice decisions. On the other hand, whether parents' choices are filtered by schools' admissions policies, a more direct constraint on parents' choices, has not received much attention. Even if we assume that parents search for and find good quality information and can correctly evaluate their options, the criteria schools use in choosing students and parents can significantly affect parental sorting into schools. When schools choose on the basis of socio-economic characteristics, this can further exacerbate the stratification of the school system. Hence, I investigated whether schools screen parents and the criteria they use in their admissions policies across school sectors.

Moreover, although school choice promises mobility, especially to parents living in poor districts, it is not clear whether parents living in geographically segregated urban environments will take the opportunity to enroll their child in schools in different neighborhoods. Township ("comuna") borders in Chile were redrawn by the military regime to create socio-economically homogenous zones. In addition to the cost of transporting a child to a different township, parents may incur additional costs associated with the school. Accordingly, I investigated parents' choice sets geographically to assess whether there are de facto school districts in a universal school voucher system.

School competition is another promise of the school voucher system believed to be linked to better school quality. The increase in the private voucher school sector in the past few decades in Chile provides us with the school choice environment to test the assumptions on school competition. The necessary conditions for competition to improve schools are that schools compete with each other and that competition revolves around academic quality. Market segmentation along non-academic categorical dimensions could significantly reduce the competitive pressures that would otherwise pressure schools to improve themselves. In order to understand the level and nature of school competition I investigate whether schools compete with other schools and the characteristics of schools whom they see as their rivals.

Perhaps the most basic promise of market reform in education based both on Friedman (1962) and Chubb and Moe (1990) is that the logic of the market will create a better match between what parents want and what schools offer, hence more satisfied parents. In other words, if we observe satisfied parents and parents who leave their schools when they are dissatisfied then we have some indications that the system of

market accountability is working. Hence, I investigated parents' satisfaction with their schools across several school qualities and over time. Moreover, I explored parents' reactions to school failure when there are alternatives in the school choice environment.

In my empirical chapters, I focused on the comparison of school sectors based on Chubb and Moe's (1990) work on the differences between public and private schools. I explored whether the public and private voucher school sectors in Chile resemble the ideal public and private school types described by Chubb and Moe (1990). As explained in Chapter 3, the differences between these sectors in terms of their governance, finance, and regulation show that they are good approximations to the stylized account of school sectors by Chubb and Moe (1990). To the extent that they are, the results of the dissertation can be used to set reasonable expectations on school voucher outcomes in other contexts.

As is often the case with school choice research, the results of my empirical investigations on parental choice, school competition, and market accountability present a mixed picture.

Regarding parental choice, I find that schools are screening parents with respect to their demographics—that is that parents not only choose schools, but schools also choose parents. This may lead parents to exclude a portion of the universe of schools from their choice set. However, I also found that screening is more common in religiously affiliated schools compared to non-religious private voucher schools, many of which are for-profit. This is counter to the expectation that the for-profit status of most non-religious private voucher schools will give them an incentive to reduce their costs by choosing the students

who are least costly to educate. I present some evidence, however, on screening of students' behavioral problems that needs further inquiry.

Examining parents' choice sets with respect to the geographic location of their choices, I find that parents disproportionately choose schools in their own township, and only those who seem to have the ability to be mobile include schools from other townships in their choice sets. I also check to see if parents tend to flee from poor neighborhoods to schools in wealthier neighborhoods controlling for parental SES. I find no supporting evidence on the universal school vouchers' ability to give parents living in poor neighborhoods the incentive to change their students' educational environment. It seems that de facto school districts in the form of segregated urban zones significantly affect parents' choices and restricts the variety of schools they consider before enrolling their child to a school. However, these results are confined to parents of first grade students, when parents are likely to be the most reluctant to have their children travel long distances to attend school, and future research should try to isolate the effect of the students' age on the geographical clustering of parents' choices.

Regarding competition, public school principals seem to perceive significantly more competition in the environment compared to principals of schools in other sectors. If competition revolves around academics this perception may put pressure on them for academic improvement. However, descriptive analyses of school principals' choice sets show that they perceive mostly schools with higher SES status as their rivals, which may suggest that public schools fear losing students with higher SES to other schools. This may also explain why public school principals perceive more competition in the environment: they may view their schools as potential recruitment grounds for other

schools. Investigating the effect of different definitions of school choice environments also revealed an interesting result. With a smaller definition of the environment, $1km^2$, private voucher school effect on principals' perception of competition became visible. Future studies should investigate what drives private voucher schools' location decisions.

Perhaps, the least controversial result of the dissertation is private voucher school parents' satisfaction with their schools. Their satisfaction, despite decreases over time, remain higher than public school parents at any point in the panel. Although what goes into overall parental satisfaction is unclear, it is the general satisfaction with the private voucher school sector that can create a constituency around the sustenance of school voucher reform. If parents are not happy with the schools that the school voucher reform of the military regime created, then the reform would fail the most basic test of the success of market reform, market accountability.

I also tried to get traction of the meaning of private voucher school parents' high overall evaluations of their schools by looking at their satisfaction with specific features of their schools. The results suggest that private voucher schools are not significantly more satisfied with their schools' academic quality, teacher, or principal compared to public school parents. Rather, they seem to like those aspects of the school less directly related to academic quality such as extracurricular activities. The results show that private voucher schools' accountability to parents may not give schools the incentive to improve their academics, or to unleash competitive pressures on public schools based on academics. Instead, they may compete with public schools based on less-academic features of the school. For example, in Chile, physical education is not a part of the primary school curriculum. Schools offering facilities such as a swimming pool to

students and parents, or extra-curricular activities involving sports, may have a an advantage over public schools in satisfying their parents

In addition, I also find that the availability of other schools in the environment does not significantly affect whether parents would leave their schools when they are dissatisfied with their schools, seemingly a necessary condition for school vouchers to drive bad schools from the school choice environment. It seems that the single most important predictor of parents' reactions to school failure is the school sector. Public school parents are disproportionately more likely to say that they would leave their schools when academic quality drops. This may be because what attracted parents to a private voucher school is not non-academic quality in the first place. This is supported by the findings on parental satisfaction. Private voucher school parents are more satisfied with school qualities such as extra-curricular activities or values compared to public school parents but not with the academic quality, teacher, or principal.

Taken together, the results indicate a quasi educational market segmented along social class lines with parents whose educational priorities may not necessarily be academic. The findings show that the universal school voucher system in Chile may have fallen short of its market ideal in the expansiveness of parents' choices because of geographically segregated choices and because schools also choose parents, as in the case of religious voucher school parents who seemed to have been screened based on social class more compared to parents in other sectors. Also, the voucher system managed to subject public schools to enrollment threats from private voucher schools, but the nature of school competition may not be conducive to improvements in academic achievement as school authorities consider schools with higher socio-economic status parents their

rivals. However, the system seem to have produced a high level of satisfaction for most parents, and a significantly more satisfied group of private voucher school parents compared to public school parents.

Of course, not all private voucher school systems have to produce the same results. The specific context of the Chilean experience marked by its military regime and class consciousness seems to significantly affect how the design of the universal school vouchers worked in practice. The urban policy of the military regime in Chile created homogenous township and the decentralization policy in education tied the resources of these townships to the public schools they serve. However, most urban areas in developing and some developed countries with large income gaps do have highly segregated urban areas divided along racial, lingual, religious or class lines, and their resources are affected by the immediate environment in which they survive. Hence, the lessons drawn from the Chilean case on how the initial design interacts with existing social cleavages are likely to have validity in other such countries.

The results, except the higher satisfaction of private school parents, seem to show the weaknesses of the market model of education as it has played out in Chile. As has been repeatedly shown in the school choice literature, non-academic considerations and parents' social status matter in how school choice works in practice. Because these effects have been largely ignored in the market model of education, its predictions on improved educational outcomes have been overly optimistic. Moreover, unlike Chubb and Moe's emphasis on the public and private divide in education, as the differences between the religious and non-religious private voucher schools' admissions practices show, the *within* sector differences in organization and mission may significantly affect

how these schools operate and which parents choose these schools. Hence, future research should investigate intra-sectoral differences in the behavior of schools as suppliers of schooling.

The findings on parental satisfaction, however, seem to confirm the relevance of the public and private divide. The new school sector which entered the educational market after the market reform movement in education by the Chilean junta seems to have created a group of satisfied parents who are likely to remain loyal to their schools and support the continuation of the universal school voucher system. The junta's success in creating a satisfied constituency through school vouchers coincided with its relative economic success among Latin American countries. The Pinochet regime swiftly applied market reform without much political criticism. Chile's political trauma was paralleled by high economic growth rates compared to other developing countries in Latin America, the creation of a middle class, and a widening income gap in society. These developments increased the class consciousness in the population. Private voucher schools supplied the burgeoning middle class with the low-cost private school alternative they wanted.

The urban policy of the Pinochet era and its decentralization of the school system have added to the sense of exclusiveness of middle income parents living in homogenous districts most of whom send their children to the private voucher schools in the same comuna. With the introduction of the shared financing scheme in private voucher schools, their parents might have felt the private status of their schools even more. Despite the small amount of most tuition in the voucher sector, the fact that parents can pay for an otherwise publicly provided service may have added to the sense of higher social status enjoyed by most private voucher school parents. In fact, what made most middle income

parents choose private voucher schools may not have been these schools' academic superiority, but may have been their relative higher social status. Hence, privatization in education may have given the military junta a political tool to cultivate a satisfied and loyal new middle income constituency. It also may make future policy changes more difficult.

The relative high satisfaction of private voucher school parents compared to public school parents may explain why after the transition to democracy Chilean governments have kept the basic structure of the universal school voucher system of the military regime. The democratic governments of Chile made changes in regulations governing hiring and firing of teachers in the public school sector in the 1990s, but the same governments did not alter the rules of the game for private voucher schools. Despite recurring legal proposals for strict control of private voucher schools such as the recent attacks on private vouchers schools by teachers, public school students, and some politicians, the changes in the laws governing educational institutions at the K-12 level kept the for-profit status and autonomy of private voucher schools.

From the perspective of academic achievement, however, the stability of the universal school choice policy is more of a curse than a blessing. The finding that private voucher school parents' satisfaction is driven by non-academic considerations suggest that parental pressures can not be counted on to improve academic achievement. This is also reflected in the socio-economically clustered competition sets reported by school principals. If parents and schools care more about social class than academic achievement, and if they are satisfied with their schools, educational reform proposals that aim to improve academic achievement by altering the structure of the existing school

voucher system may not find a broad constituency supportive of change. If a large number of parents were unhappy with their schools it would be easier to address the problem of stagnating test scores in Chile by new educational reform movements.

In the long run, however, the democratic politics of education can also give parents and students in low income schools, which are mostly public schools, a political voice. They may demand more educational equality and create a countervailing force against private voucher school parents. The involvement of public school students in recent strikes seem to suggest that the first signs of the coalition of relatively dissatisfied students in higher grades and teachers are in place. Their demands for greater educational equality directly target the differences between the public and private school sectors. Whether this emerging coalition will be strong enough to make major changes in education policy and the context in which they can do so remain to be seen.

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APPENDICES

APPENDIX 4-1: Characteristics of Socioeconomic Groups and Distribution of Enrollment in Chile, by School Type

Socio-Economic group	Mothers' years of education	Income (pesos per month)	Family monthly expenditure on education	Enrollment and % in public schools	Enrollment and % in private voucher schools	Enrollment and % in private nonvoucher schools	Number and % of group over total enrollment
A - Low	7	100 563	10 029	22 324 **79.4%**	5 775 **20.6%**	0 **0%**	28 099 (10%)
B - Low middle	9	129 776	11 589	71 607 **81.9%**	15 788 **18.1%**	0 **0%**	87 395 (32%)
C - Middle	11	195 772	18 845	48 116 **47.6%**	52 855 **52.3%**	0 **0%**	100 993 (37%)
D - High middle	13	391 242	42 323	5 132 **13.0%**	32 140 **81.6%**	2 131 **5.4%**	39 403 (14%)
E - High	16	1 252 361	137 147	0 **0%**	1 159 **6.1%**	17 815 **93.9%**	18 974 (7%)

Source: OECD 2004

APPENDIX 4-2: The Sample Design

The population for the parent survey comprises all the parents in the greater metropolitan region of Santiago, Chile whose kids are enrolled as first year students in a primary school. The primary schools can be of any type; i.e. public, voucher, private, religious private, financed by the municipality or by the Ministry of Education of Chile. For the principal survey, the population comprises all the principals of the schools with first year classes in the greater metropolitan region of Santiago, Chile. The primary sampling unit is the school.

The sample is stratified based on school sector and socio-economic status. Within each stratum respondents are chosen in two stages. The first stage corresponds to the choice of the primary schools in each stratum and the second stage corresponds to choosing the parents in each primary school chosen in the first stage. For the principal survey, however, sampling stop at the first. The probability of selection of each school is proportional to its size defined by the total number of students enrolled in the first year of the school. The selection of parents within each school is rather simple: equal probability of selection for each parent within a given school.

The sample is stratified along two dimensions: the type of primary school, i.e. its sector, and the socio-economic status of the school. The former is rather straight-forward. In Chile, there are five categories of schools according to Ministry of Education, Chile: schools run by municipal corporations, municipal public schools, schools run by private corporations, other private schools, and voucher schools.

Regarding the socio-economic status of the schools, the information provided by the Chilean Ministry of Education was used. The ministry provides two types of information: the socio-economic classification of the school and the vulnerability index. The ministry classifies the schools according to their socio-economic status and publishes this information regularly. One should, however, take a closer look at how the ministry does the classification. The ministry conducts a questionnaire on every parent whose kid takes the school-level achievement test known as SIMCE. Hence, their measure is an approximation of the real average of a given school's parents. In order to see the compatibility of their measures, the correlation between the Ministry classification and the school scores in the index of vulnerability (as published by the ministry of education) was checked. Despite the high correlation between the two, almost 40 % of the schools did not supply information necessary to construct the index either because they have not responded to the ministry questionnaire designed to construct the index or because they did not have first year classes at the time. As a result, the SES classification of schools was used for stratification.

The sample size in each stratum is proportional to the total number of the first year school children in each stratum. Within each school there are eight parents for the parent survey. The choice is discussed in detail below.

In order to construct a base for the population the Chilean Ministry of Education's statistics for the number of school establishments that have at least first-year classes starting from the year 2005 was used. The corresponding number is 1764. Out of these, 144 did not report socio-economic status because they have not administered the SIMCE examination. These are excluded from the study. Out of the remaining schools, 17 of them did not have students in the first year; hence, they are excluded bearing in mind that the study investigates the school choice decision of first-grade urban parents. Since the urban

areas of the metropolitan region excludes Alhué, Curacaví, Buin, El Monte, Isla de Maipú, Maria Pinto, Melipilla, Paine, Peñaflor, San José de Maipú, San Pedro and Til-Til of Santiago (with a total of 160 schools) and 60 other schools are classified as "rural" by the Ministry of Education. As a result there are 1378 schools, which have first year classes, with 92,678 students. This will constitute the population from which the sample will be drawn.

In the first stage, the schools are stratified along the two dimensions of school type (sector) and the school SES. The total of 1378 schools and 92,678 students are stratified as follows:

SES (socio-economic group): 1=low, 2=middle-low 3= middle 4=Middle-High 5=High.

School Type (ST-sector): 1=Municipal Corporation (Public) 2=Municipal Public 3=Voucher 4=Private 5=Private Corporation.

Please note that there are no schools in the strata ST2/SES5, ST4/SES1, ST5/SES1, STS5/SES2, STS5/SES3, STS5/SES4.

Strata Number	Strata	Number of Students	Number of Schools	Schools in the stratum: 68* (the number of first year students in the stratum/ the sum of all first year students in all strata
1	**ST1/SES1**	**575**	**12**	**.42**
2	ST1/SES2	7882	104	5.78
3	ST1/SES3	5909	72	4.34
4	**ST1/SES4**	**1667**	**16**	**1.22**
5	**ST1/SES5**	**72**	**2**	**.05**
6	**ST2/SES1**	**170**	**4**	**.124**
7	ST2/SES2	10434	153	7.66
8	ST2/SES3	6347	83	4.66
9	**ST2/SES4**	**682**	**8**	**.5**
10	**ST3/SES1**	**513**	**13**	**.38**
11	ST3/SES2	6387	117	4.69
12	ST3/SES3	28100	351	20.62
13	ST3/SES4	11901	186	8.73
14	**ST3/SES5**	**217**	**4**	**.16**
15	**ST4/SES2**	**126**	**3**	**.09**
16	**ST4/SES3**	**419**	**8**	**.31**

17	**ST4/SES4**	**1541**	**55**	**1.13**
18	ST5/SES5	9736	187	7.14
Total		92678	1378	

In the first stage, approximately 5 % of the population which amounts to 68 schools was chosen (4.93% of the population 1378*4.93 %=~68 schools), which gives us the principal survey sample. In the second stage, eight students (hence parents) were chosen. The size of the sample for each stratum is proportional to the size of the stratum in the population defined by the number of students in ach stratum- however, in the case of small strata; a minimum 2 schools are allocated. That way, the standard errors can be corrected.

According to the design, one can use a simple formula for determining the sample number of schools in each stratum:

n(schools in the stratum X)=68*(the number of first-year students in the stratum X/ the summation of the number of first-year students in all strata)

This first approximation, however, should be adjusted for the fact that there are minimum two schools for each stratum. The bold rows in Table 1 refer to the cases which do not meet the requirement of minimum two schools. These additional samples are taken from the remaining strata proportional to their size. As a result small strata are over-represented in the sample. The following points summarize the process:

- 8 students are chosen from each school. Each stratum has minimum 2 schools. The total number of schools is 68. The sampling fraction= (68*8)/92,678=.0044 – i.e. 4 children out of every 1,000.
- For the sample design to be PPS we need (8*2)/.004=2,727 students per stratum. Table1 shows that most strata are too small to meet the criterion. Strata number 1, 4, 5, 6 9, 10, 14, 15, 16, and 17 do not meet the criterion. The sampling scheme is disproportionate stratification.
- Given that the 10 strata will have 2 schools each (in total 10*2=20), the remaining 68-20=48 schools will be redistributed proportional to the sizes of the remaining strata number 2,3,7,8,11,12,13, 18. The total number of students in those strata is 86,696.Please refer to Table 2.

The final sample of schools whose principals were interviewed is as follows:

Strata Number	**Strata**	**Number of Students**	**Number of Schools Chosen for the Sample**	**Differential Probabilities of Selection for Pupils in Each Stratum=(8*the number of schools in the stratum)/the number of students in the stratum**

1	ST1/SES1	575	2	0.02087
2	ST1/SES2	7882	4 (4.36)	0.003045
3	ST1/SES3	5909	3 (3.27)	0.003046
4	ST1/SES4	1667	2	0.007199
5	ST1/SES5	72	2	0.166667
6	ST2/SES1	170	2	0.070588
7	ST2/SES2	10434	6 (5.77)	0.00345
8	ST2/SES3	6347	3 (3.51)	0.002836
9	ST2/SES4	682	2	0.017595
10	ST3/SES1	513	2	0.023392
11	ST3/SES2	6387	4 (3.54)	0.003758
12	ST3/SES3	28100	**16 (15.56)**	0.003416
13	ST3/SES4	11901	7 (6.59)	0.003529
14	ST3/SES5	217	2	0.0553
15	ST4/SES2	126	2	0.095238
16	ST4/SES3	419	2	0.02864
17	ST4/SES4	1541	2	0.007787
18	ST5/SES5	9736	**5 (5.39)**	0.003081

Finally, within each stratum the following procedure is applied:

1. A table with the number of school is constructed, its student size and the accumulated student size as three columns.
2. A number distributed between 1 and the total student body in the stratum is chosen at random.
3. You should choose the school which corresponds to the number in the accumulated student size column.

After doing the selection in the first stage where the schools should be identified (hence, the principals are chosen) one can turn to the selection of parents. In each school 8 parents are randomly drawn by picking a number between 1 and the number of the school's first-year students. 544 students were chosen (68*8=544).

APPENDIX 6-1: Predicting the School SES Chosen by the Parent.

Years of Education	-0.410
	(0.101)**
Years In Comuna	0.090
	(0.056)
Female Respondent	1.298
	(2.326)
Church Attendance	0.006
	(0.012)
Monthly Income	-0.006
	(0.001)**
Number of Contacts	0.149
	(0.299)
Number of Private Voucher Schools	
in the Comuna	-0.724
	(0.338)*
Number of Private Non-Voucher Schools	
in the Comuna	-4.150
	(0.746)**
Constant	37.380
	(3.464)**
Observations	521
R-squared	0.30

Note: Reported coefficients are OLS regression of index of vulnerability on the row variables. Robust standard errors in parentheses. Because the residuals of the model are used in the regressions reported in Table 5, survey design has not been taken into account in the regression. Asterisks denote: * significant at 5% level; ** significant at 1% level.

APPENDIX 6 – 2: 2SLS Regression Results: Controlling for Selectivity Based on School SES, Parents with Students in Private Voucher Schools Appear More Satisfied in the First Year.

	School	Teacher	Principal	Infrastructure	Academics	Values	Discipline	ExActiv.
Index of Vulnerability	0.032	0.014	0.007	0.011	0.017	0.003	0.019	-0.003
	(0.012)**	(0.012)	(0.010)	(0.016)	(0.010)	(0.006)	(0.013)	(0.013)
Private Voucher	0.909	0.579	0.194	1.026	0.620	0.416	0.951	0.142
	(0.212)**	(0.227)*	(0.224)	(0.303)**	(0.198)**	(0.125)**	(0.268)**	(0.266)
Private Non-Voucher	1.133	0.639	0.258	0.570	0.747	0.229	1.226	0.027
	(0.376)**	(0.366)	(0.368)	(0.523)	(0.347)*	(0.215)	(0.412)**	(0.479)
Religious Affiliation	0.301	-0.077	0.460	0.575	0.165	0.152	0.095	0.467
	(0.125)*	(0.116)	(0.168)**	(0.155)**	(0.114)	(0.068)*	(0.147)	(0.183)*
Years of Schooling	0.002	0.002	-0.000	0.006	-0.001	0.002	0.002	-0.002
	(0.006)	(0.005)	(0.005)	(0.008)	(0.007)	(0.004)	(0.007)	(0.008)
Years In Comuna	-0.004	-0.001	0.003	-0.002	0.001	-0.000	0.002	0.003
	(0.004)	(0.003)	(0.004)	(0.006)	(0.004)	(0.003)	(0.005)	(0.005)
Female Respondent	0.247	0.389	0.109	0.266	0.098	0.081	0.419	0.173
	(0.184)	(0.163)*	(0.154)	(0.222)	(0.159)	(0.075)	(0.269)	(0.244)
Church Attendance	-0.001	-0.000	-0.001	0.001	-0.001	0.000	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)**	(0.001)
Monthly Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)*	(0.000)	(0.000)
Number of Contacts	0.022	0.009	0.036	0.028	-0.008	-0.003	0.016	0.024
	(0.016)	(0.020)	(0.017)*	(0.029)	(0.016)	(0.011)	(0.022)	(0.024)
Constant	4.464	5.326	5.436	4.015	3.547	4.175	2.546	3.700
	(0.452)**	(0.431)**	(0.422)**	(0.578)**	(0.401)**	(0.227)**	(0.526)**	(0.490)**
Observations	497	513	473	514	517	515	519	483
R-squared	0.01	0.00	0.09	0.21	0.00	0.11	0.05	0.07

Note: Reported coefficients are from independent two stage least squares regression of each dependent (column) variable on the row variables. Robust standard errors in parentheses. Sample size varies over model due to listwise deletion of missing values. Asterisks denote: * significant at 5% level; ** significant at 1% level.

APPENDIX 7-1: GEE Regression Results with the Modeling Assumption that Panel Attrition is Nonignorable.

	School	Teacher	Principal	Infrastructure	Academic Quality	Values	Discipline	Extracurricular Activities
D1	1.876 (1.223)	0.221 (0.282)	0.812 (0.878)	1.124 (0.702)	1.447 (1.081)	-1.019 (0.879)	0.074 (0.676)	-1.175 (0.747)
D2	-1.341*** (0.348)	-0.502 (0.374)	-0.635 (0.434)	-1.023*** (0.364)	-0.289 (0.404)	-1.056** (0.451)	-0.349 (0.376)	-1.127*** (0.403)
D3	-0.722** (0.295)	-0.507* (0.292)	-0.232 (0.377)	-0.189 (0.298)	-0.143 (0.317)	0.073 (0.376)	-0.059 (0.305)	-0.557* (0.300)
Panel wave	0.764** (0.341)	0.464 (0.390)	-0.177 (0.336)	0.684** (0.282)	-0.191 (0.318)	-0.620* (0.374)	-0.612** (0.313)	-0.2205 0.3459
Panel wave^2	- 0.151** (0.065)	-0.105 (0.077)	-0.073 (0.065)	-0.117** (0.055)	0.021 (0.062)	0.110 (0.073)	0.089 (0.062)	0.025 (0.067)
End of school year	-0.344*** (0.084)	-0.072 (0.113)	-0.175 (0.080)	-0.129* (0.068)	-0.221** (0.099)	-0.292*** (0.113)	-0.094 (0.092)	-0.110 (0.095)
Private voucher school	1.816*** (0.550)	0.652 (0.605)	0.460 (0.517)	1.709*** 0.471	0.021 (0.545)	1.438** (0.703)	0.360 (0.540)	1.199** (0.599)
Private voucher school*panel wave	-1.019** (0.477)	-0.499 (0.548)	-0.148 (0.454)	-1.020** (0.400)	0.445 (0.458)	-0.558 (0.583)	0.026 (0.467)	-0.402 (0.496)
Private voucher school*panel wave^2	0.174* (0.092)	0.090 (0.108)	0.064 (0.089)	0.179** (0.078)	-0.068 (0.089)	0.118 (0.112)	0.004 (0.091)	0.056 (0.095)
Private nonvoucher school	1.1005 0.6927	0.638 (0.794)	-0.360 (0.621)	0.128 (0.539)	-0.024 (0.648)	-1.258 (0.839)	-0.228 (0.649)	0.341 (0.642)
Private nonvoucher school*panel wave	-1.2283** 0.5896	-0.670 (0.718)	0.243 (0.531)	-0.278 (0.409)	-0.376 (0.553)	1.184 (0.737)	-0.184 (0.550)	-0.345 (0.543)
Private	0.243**	0.110	-0.014	0.018	0.123	-0.201	0.065	0.065

nonvoucher school*panel wave^2	(0.114)	(0.141)	(0.104)	(0.082)	(0.108)	(0.140)	(0.104)	(0.106)
Low middle income school	0.168 (0.276)	0.227 (0.189)	0.145 (0.306)	0.526* (0.281)	0.032 (0.287)	-0.418* (0.303)	-0.019 (0.246)	0.259 (0.288)
Middle income school	0.407 (0.266)	0.077 (0.176)	-0.049 (0.294)	0.541** (0.267)	-0.013 (0.290)	-0.131 (0.303)	0.424* (0.237)	-0.056 (0.284)
High middle income school	0.593** (0.281)	0.448** (0.193)	0.060 (0.309)	1.255*** (0.290)	0.590* (0.315)	0.197 (0.333)	0.717*** (0.272)	0.255 (0.309)
High income school	0.697* (0.378)	0.444* (0.246)	-0.032 (0.307)	0.809** (0.412)	1.054*** (0.400)	0.751* (0.455)	0.393 (0.350)	-0.067 (0.374)
Years of Schooling	-0.025** (0.011)	-0.021*** (0.006)	-0.018* (0.011)	-0.024** (0.011)	-0.023*** (0.006)	-0.010 (0.010)	-0.018* (0.010)	-0.007 (0.011)
School has religious affiliation	0.467*** (0.128)	0.336 (0.106)	0.473*** (0.130)	0.832*** (0.131)	0.420*** (0.146)	0.882*** (0.147)	0.411*** (0.130)	0.548*** (0.136)
Years in comuna	0.003 (0.006)	0.008* (0.004)	0.004 (0.006)	0.009 (0.006)	0.005 (0.006)	-0.003 (0.007)	0.003 (0.005)	0.003 (0.006)
Female respondent	-0.165 (0.244)	-0.072 (0.173)	-0.308* (0.249)	-0.053) (0.247)	-0.166 (0.243)	-0.104 (0.304)	-0.313 (0.244)	-0.132 (0.232)
Church Attendance	0.002 (0.002)	0.000 (0.001)	0.001 (0.002)	0.002 (0.002)	0.003* 0.002	0.001 (0.002)	0.001 (0.001)	0.002* (0.001)
Monthly income	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 0.000	0.0001 (0.000)	0.000 (0.000)
Panel wave*D	-0.163 (0.590)	-0.490 (0.577)	-0.495 (0.705)	-0.449 (0.568)	-1.019* (0.596)	-1.051* (0.599)	-0.291 (0.584)	-0.085 (0.578)
Panel wave^{2*}D	-0.035 (0.132)	0.058 (0.136)	0.088 (0.163)	0.103 (0.131)	0.233* (0.138)	0.162 (0.135)	0.096 (0.135)	0.021 (0.138)
End of school year*D	-0.001 (0.225)	0.130 (0.266)	0.384 (0.212)	0.103 (0.201)	0.053 (0.226)	-0.064 (0.260)	-0.012 (0.231)	-0.098 (0.220)
Private voucher school*D	-1.015 (0.987)	-0.676 (1.041)	0.206 (1.111)	0.625 (1.007)	0.182 (1.020)	-0.638 (1.424)	-0.012 (0.939)	-0.591 (1.105)
Private voucher	0.791	0.802	-0.093	-0.012	0.249	1.003	0.419	0.240

school*panel wave*D	(0.971)	(1.048)	(1.145)	(0.990)	(1.006)	(1.289)	(0.938)	(1.070)
Private voucher school*panel wave^{2*}D	-0.109 (0.215)	-0.146 (0.230)	0.028 (0.261)	0.014 (0.226)	-0.074 (0.225)	-0.212 (0.270)	-0.122 (0.213)	-0.033 (0.241)
Private nonvoucher school*D	-1.9364 1.2548	1.230 (1.711)	0.205 (1.308)	-0.061 (1.113)	0.870 (1.543)	7.161** (3.232)	0.7267 1.1616	-1.266 (1.227)
Private nonvoucher school*panel wave*D	3.275** (1.470)	-0.621 (1.798)	0.721 (1.343)	0.929 (1.126)	1.080 (1.473)	-3.702 (2.768)	1.2594 1.0953	2.399* (1.306)
Private nonvoucher school*panel wave^{2}*D	-0.688** (0.274)	0.304) (0.419	-0.211 (0.309)	-0.194 (0.265)	-0.354 (0.327)	0.477 (0.565)	-0.4288* 0.2412	-0.566* (0.306)
Low middle income school*D	-0.021 (0.505)	0.394 (0.423)	0.019 (0.586)	0.154 (0.516)	0.901** (0.458)	1.217** (0.526)	-0.123 (0.474)	-0.566 0.448
Middle income school*D	0.480 (0.545)	0.683 (0.457)	0.936 (0.656)	0.663 (0.566)	1.602*** (0.499)	1.073* (0.600)	0.291 (0.519)	0.246 (0.527)
High middle income school*D	0.644 (0.632)	0.490 (0.525)	1.274* (0.720)	-0.019 (0.657)	1.739*** (0.652)	1.790 ** (0.741)	0.770 (0.622)	0.863 (0.604)
High income school*D	-0.471 (0.770)	0.490 (0.525)	1.723* (0.975)	-0.019 (0.880)	0.728 (0.834)	1.761 (1.197)	1.387 (0.886)	0.439 (0.705)
Parental Education*D	-0.037 (0.039)	0.022 (0.037)	-0.059 (0.049)	0.013) (0.043)	-0.075** (0.039)	-0.041 (0.048)	-0.047 (0.035)	-0.093** (0.039)
School has religious affiliation*D	-0.051 (0.267)	-0.416* (0.249)	-0.059 (0.284)	0.114 (0.268)	-0.029 (0.286)	-0.372 (0.308)	-0.532** (0.251)	0.647** (0.263)
Years in comuna*D	- 0.005 (0.011)	-0.026*** (0.009)	-0.009 (0.012)	-0.015 (0.011)	-0.004 (0.012)	0.009 (0.013)	-0.004 (0.010)	0.012 (0.010)

Female respondent*D	1.041)*** (0.391)	0.686** (0.330)	0.787** (0.401)	0.288 (0.426)	0.304 (0.416)	0.835** (0.426)	0.532 (0.383)	0.882** (0.395)
Church attendance *D	-0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	-0.002 (0.002)	-0.002 (0.003)	-0.000 (0.002)	0.001 (0.002)	-0.0035** (0.002)
Parental monthly income*D	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001** (0.000)	0.000 (0.000)
Sample Size	1,810	1,842	1,685	1,837	1,839	1,843	1,842	1,767
Log Likelihood	-2,043.8	1,905.7	-2,084.9	-2,563.5	-1,779.7	-1,385.9	-2,215.8	-2,058.9

Note: Reported coefficients are from independent GEE regression of each dependent (column) variable on the row variables. Robust standard errors are given below the GEE coefficients. Sample size varies over model due to list-wise deletion of missing values. Asterisks denote: * significant at 10% level; ** significant at 5% level; *** significant at 1%level.