

USING AN INTEGRATED ECONOMIC AND ORGANIZATIONAL APPROACH TO
UNDERSTAND NEW TEACHER MOBILITY, ATTRITION AND RETENTION

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ABSTRACT

Teacher turnover is one of the major issues that concerns policymakers and school administrators. The instability of teachers in schools has a particularly negative impact on school functions and disadvantaged students, and teacher turnover also has great impact on schools and districts' finance. This study focused on new teacher turnover since this is the group most likely to leave the teaching profession. The purpose of this study was to examine teacher mobility and attrition using an integrated model that contained both economic and institutional factors.

Data consisted of a sample of 1,259 new teachers constructed from the Teacher Follow-up Survey (2000-01) and Schools and Staffing Survey (1999-00). A principal component analysis was conducted to construct the four dimensions of school working conditions, and multinomial logistic regression was performed to examine the relationship between teacher perceived working conditions, salary satisfaction, alternative opportunity and teacher retention decisions. To address the problem that a complex sampling design might cause bias in the variance estimation and statistical tests, the current study used teacher final weights (TFSFINWT) to compensate for the unequal probability sampling, and estimated variance by using the balanced repeated replication (BRR) method (replicate weights TFRPWT1-TFRWT88) with SAS PROC SURVEYLOGISTIC procedure.

Findings from this study indicated that the construct of student behavior problems was associated with teacher mobility and attrition, but it varied in degree. It had a strong influence on teacher attrition but moderate effect on mobility. The construct of

supportive administration and principal had moderate effect on teacher mobility but no influence on teacher attrition.

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CHAPTER 1. INTRODUCTION

Teacher turnover is one of the major issues that concerns policymakers and school administrators for a number of reasons. National data indicate that teacher turnover rates in the United States are rising. Based on the Schools and Staffing Survey (SASS, 2003-04) and Teacher Follow-up Survey (TFS, 2004-05) sponsored by the National Center for Education Statistics, 8.4 percent of public school teachers left the teaching profession, 8.1 percent moved to different schools and districts (269,600 left the teaching profession, 261,100 moved to different schools in the school year 2004-05), and the attrition rate increased from 5.6% in the school year 1998-89 to 8.4% in the school year 2004-05 (Marvel, Lyter, Peltola, Strizek and Morton, 2006). International comparison studies also indicate that the attrition rate for public school teachers in the United States is relatively high among 15 countries with comparable data (Organization for Economic Co-Operation and Development [OECD], 2005). In 2002, 25 countries participated in an international review of teacher policy launched by the OECD. According to the OECD (2005) there were five countries, including United States, in which the attrition rate was above six percent in 2001. The attrition rate was less than six percent in Italy, Japan, Korea, Australia, Canada (Qb.), France, Germany, Ireland, Netherlands and Scotland.

There is concern in the United States that teacher turnover leads to a loss of highly qualified teachers and has a negative impact on disadvantaged groups of students and schools (National Commission on Teaching and America's Future [NCTAF], 2003). The organizational and industrial literature suggest that turnover might reduce group performance and cohesiveness, entail higher costs for organizations and decrease the

effectiveness of organizations (Mowday, Porter and Steers, 1982). Researchers in education in the relatively early stages of examining the impact of teacher turnover on schools and student achievement. A study by Guin (2004) examined five elementary schools in a large urban west coast school district, and suggested that the instability of teachers had a negative influence on curriculum planning/implementation and maintaining positive relationships among teachers, and high teacher turnover also had a negative impact on the school's function.

Furthermore, studies indicate that the more highly qualified teachers are more likely to leave difficult working conditions, leaving low-income, low-achieving and non-white students with higher proportion of inexperienced teachers (Lankford, Loeb and Wyckoff, 2002). Students in disadvantaged groups experience the greatest level of instability among teachers, and this diminishes their chances for a high quality education as a consequence of being taught more frequently by inexperienced teachers (NCTAF, 2003). This type of turnover exacerbates the inequalities among schools (OECD, 2005).

Teacher turnover also has great impact on education finance. Recruiting, replacing and training teachers are expensive. The Alliance for Excellent Education (2005) estimated that the cost of replacing public teachers who left the teaching profession or transferred to different schools was about \$4.9 billion every year. The estimation of annual cost could exceed \$7.3 billion a year based on a report by the NCTAF (2007). A study in Texas conducted by the Texas Center for Education Research (2000) suggested that teacher turnover cost that state more than 300 million dollars per year.

In order to develop effective strategies to retain teachers, researchers have been

trying to identify factors that affect teachers' decisions to stay, transfer, and leave schools. From an economic perspective, teachers' career decisions are the result of rational cost and benefit assessments (Shen, 1997; Murnane and Olsen, 1990). A number of studies have proposed that teachers' salaries were associated with teacher attrition (Imazeki, 2005; Murnane and Olsen, 1990; Shen, 1997; Stinebrickner, 2002). Studies have also examined the relationship between teacher turnover and student composition (Rinke, 2008; Liu and Ramsey, 2008). They suggest that student population with respect to race, socioeconomic status and achievement are related to teacher turnover (Boyd, Lankford, Loeb and Wyckoff, 2005; Hanushek, Kain and Rivkin, 2004; Scafidi, Sjoquist and Stinebrickner, 2007). Moreover, individual teacher characteristics such as gender, age, years of experience, and quality are associated with teacher turnover (Hanushek et al., 2004; Ingersoll, 2001; Krieg, 2006; Stinebrickner, 1998). Researchers have also examined the relationship between teacher perceived working conditions and teacher turnover (Ingersoll, 2001; Shen, 1997; Weiss, 1999; Loeb, Darling-Hammond and Luczak, 2005).

In the aggregate, research on teacher turnover reveals a complicated phenomenon. Individual characteristics, student composition and school working conditions all contribute to teacher turnover. This study focuses on new teacher turnover, since this is the group who are most likely to leave the teaching profession (Kirby and Grissmer, 1993; Stinebrickner, 1998).

New Teacher Retention

New teachers are more likely to leave the teaching profession in the early stages of their career (Kirby and Grissmer, 1993; Stinebrickner, 1998; Ingersoll and Smith,

2003). In a study using a national dataset in the United States, Ingersoll and Smith (2003) suggested that almost 40% of new teachers leave the field within their first five years. Lankford et al. (2002) tracked New York State teachers who were hired into their first teaching job in 1993 and found that over the next five years, 30% had transferred to different schools or districts, and another 30% of the teachers left the public schools altogether.

The initial years of teaching are crucial in determining the probability of teachers remaining in the teaching profession (Stinebrickner, 1998). Stinebrickner (1998) examined 341 teachers who were certified to teach during the period between 1975 and 1985. The author argued that the probability that a teacher would leave the teaching profession increased in the first four years, and decreased dramatically after four years. A similar trend in the initial stages of teaching was also shown in another study. Li (2009) looked at 17,935 new teachers from the state of Florida who began teaching during the school year 1997-98 and tracked them through the school year 2003-04. She found that about 25% of new teachers remained at their initial schools after six years. In another study, Kirby and Grissmer (1993) found that the median lifetime of an average beginning teacher was 3.9 years.

In the first several years of a teacher's career, there is a transition from being a student teacher to becoming a classroom teacher. Many new teachers enter teaching with intrinsic motivation. They desire to work with children (Lortie, 1975; Cockburn, 2000), and help them pursue a sense of success (Johnson and Birkeland, 2003). However, the transition into the profession can be very challenging. Teachers often face multiple tasks in daily classroom teaching. They need to develop students' intellectual ability, respond

to their emotional needs, and take care of students' moral development (Johnson and Birkeland, 2003). Furthermore, new teachers are expected to take on the same responsibilities of their more experienced colleagues (Veenman, 1984). The greatest challenges perceived by new teachers involve managing student discipline problems, motivating them, dealing with individual differences, assessing students' work, and dealing with problems of individual students (Veenman, 1984). "New teachers are often deeply unsure about whether they will be able to teach their students effectively and build productive relationship with students" (Johnson and Birkeland, 2003, p.73). Beginning teachers in difficult situations often experience failure and frustration.

Although many beginning teachers enter the profession for "idealistic reasons" (Cochran-Smith, 2004, p.391), it is not surprising that many also leave early in their career. As Cochran-Smith (2004) points out that "these reasons are not enough to sustain teachers over the long haul in today's labor market and in the face of the extraordinarily complex and multiple demands today's teachers face" (p.391). National data showed that moving to get a better teaching assignment, dissatisfaction with workplace conditions, and insufficient support from administrators were cited most frequently as factors for beginners who transferred to different schools (Luekens, Lyter and Fox, 2004).

Some districts and schools have implemented induction and mentoring programs to improve new teachers' skills and effectiveness, and ease the transition into the profession. Smith and Ingersoll (2004) also showed that teachers who experienced an induction program were less likely to leave the teaching profession or transfer to different schools. But an induction program is only one aspect of new teacher support system.

Dealing with the challenges new teachers face, one cannot overlook the overall conditions of the places where teachers work.

A number of studies have suggested that new teacher perceived working conditions have a great influence on teachers' career choices. Johnson and Birkeland (2003) collected data from 50 teachers in Massachusetts. They found that new teachers made their career decisions based largely on the extent to which they received organizational support. Many teachers left their current work environment in search of a more supportive school culture, where they could feel satisfied and successful. Based on national data, Weiss (1999) found that new teachers' perceptions of working conditions (including leadership and culture) were associated with their morale, career choice commitment, and planned retention. A study by Boyd, Grossman, Ing, Lankford and Loeb (2011) found that new teachers in New York City who had positive perceptions of their school administrators were more likely to stay at the school. Using an organizational approach, those studies help us better understanding teachers' professional lives and their career decisions.

Purpose of the Study

Given the high rate of turnover during the first five years of a teacher's career, the purpose of this study was to profile the working conditions of new teachers in public schools, and use an integrated economic and organizational approach to understand new teacher mobility, attrition and retention.

Research Questions

1. What were the characteristics of teachers who moved to different schools, left the teaching profession and stayed in the same school between the school year 1999-2000 and 2000-2001?
2. What were the perceptions of teachers about their salary and workplace?
3. How were teacher mobility and attrition related to teacher perceived salary satisfaction, alternative opportunity and working conditions (supportive principal and administration, shared decision-making, teacher autonomy and student behavior problems)?

Significance of the Study

This study used an integrated economic and organizational approach to understand new teacher mobility, attrition and retention. It extends prior studies in several ways. First, this study distinguished teacher mobility and attrition since they might be associated with different attitudes and behaviors (Imazkei, 2005). Second, it limited its study sample to beginning teachers. Studies have demonstrated a U-shaped probability of turnover with respect to teaching experience (Kirby and Grissmer, 1993; Hanushek et al., 2004; Ingersoll, 2001). A large amount of turnover occurs at the beginning of teachers' careers and in later career stages, and very little during the mid-career stage. Factors that affect beginning teachers' career decisions might be different from the ones that influence teachers in later stages of their career. For example, a study by Harris and Adams (2007) suggested that the relatively high ratio of pensions-to-

salaries in teaching partly contributes to teachers' early retirement compared with other professionals, and makes pension participation a more significant factor in turnover decisions. An integrated economic and organizational model might be a better framework to understand new teachers' career choices, although it might not be a comprehensive enough framework to study late career stage teachers' career decisions. Third, the current study used SAS PROC SURVEYLOGISTIC procedure to estimate the variance. The results were more precise compared with studies without adjusting the design effect.

Conceptual Framework

The conceptual framework used to analyze and interpret the data in this study was based primarily on McLaughlin and Yee's (1988) work that applied Kanter's (1977) theory of structural empowerment to education. It also includes an economic dimension, examining how salary and alternative opportunity cost affect beginning teacher retention. Kanter's (1977) theory of structural empowerment

Kanter's (1977) theory of structural empowerment provides a conceptual framework for understanding how the organization structures impact human behaviors in organizations. In her book, *Men and Women of the Corporation*, Kanter (1997) argues that individual behaviors and attitudes are shaped in response to the level of opportunity and the amount of power associated with the position that a person holds. Kanter (1977) states, "power is the ability to get thing done, to mobilize resources, to get and use whatever it is that a person needs for the goals he or she is attempting to meet" (p.166). Opportunity refers to career advancement and growth, increasing skills and rewards, and being challenged by the work. People who hold a position that offers higher

opportunities tend to be more committed to the organization, their job, and engaged in organizational innovation.

Kanter's (1977) theory of structural empowerment evolved from her study of work environment in a large American corporation, but is also applicable to educational environments. Based on a teacher career study in a northern California school district, McLaughlin and Yee (1988) further developed Kanter's theory in educational settings. They argued that the level of opportunity and the level of capacity (power) "vary significantly across institutional settings and play a primary role in defining an individual's career as a teacher and the satisfaction derived from it." (p.26). McLaughlin and Yee (1988) suggest that opportunity means "the chance to develop basic competence, the availability of stimulation, challenge, and feedback about performance, and the support for efforts to try new things and acquire new skills" (p.26). They argue that teachers with rich opportunities are motivated in their jobs, and are willing to try new ways to improve their performance, while teachers with low levels of opportunity become burned out. They interpreted power as capacity. One important aspect of capacity is to empower teachers to influence decision-making processes that could affect the organization's direction. Another important attribute of capacity is access to resources and have the ability to mobilize them. They suggest that teachers with higher capacity tend to have higher organizational and professional commitment, and teachers with lower capacity tend to leave schools and have lower effectiveness in the classroom.

Given the definitions defined by McLaughlin and Yee (1988), we can identify three major dimensions that promote teachers' opportunity and capacity in schools: shared decision-making, teacher autonomy, and supportive principal and administration.

Shared decision-making and teacher autonomy are often assumed by researchers and policy makers to be effective strategies to restructure schools to increase teachers' opportunity and capacity. Autonomy allows teachers to choose the best teaching methods and/or materials to serve students' needs based on their professional judgment and training (Firestone and Pennell, 1993; Rosenholtz and Simpson, 1990). Increasing autonomy also promotes teachers' sense of responsibility for students' learning (Firestone and Pennell, 1993). Participating in decision-making provides opportunities for teachers to express their concerns and suggestions, and teachers can better understand how the decisions have been made. Thus, it is seen to enhance teachers' sense of trust and fairness in the school, and teachers become more committed to school policies over the long term (Firestone and Pennell, 1993). To increase new teachers' capacity and opportunity, a supportive principal and administration is considered to be a central component. New teachers will have more chances to increase their competency and skills when principals provide frequent feedback, convey high expectations, and encourage innovation in classrooms.

In addition to examining the three dimensions of working conditions mentioned above, the current study also explored the effect of student discipline problems on teacher retention. Empirical studies show that new teachers are more concerned about classroom management, especially handling student behavior, when compared with experienced teachers, and they tend to have lower expectations, morale and feelings of efficacy when their teaching is interrupted by student behavior problems (Lee, Dedrick and Smith, 1991; Melnick and Meister, 2008; Weiss, 1999). Moreover, the level of student behavior

problems in classrooms and schools might lead to the dysfunction of school structures that can improve teachers' capacity and opportunities.

Economic approach

From an economic perspective, teachers' decision to leave or stay is considered to be the result of a rational cost-benefit assessment (Kirby and Grissmer, 1993; Murnane and Olsen, 1990; Shen, 1997). The central components of the economic model are the concepts of pay and perceived alternative opportunities. Studies suggest that high pay will reduce turnover (Kirby and Grissmer, 1993; Imazeki, 2005; Murnane and Olsen, 1990; Shen, 1997; Stinebrickner, 2002; Theobald, 1990). In addition to a teacher's current salary, a handful of studies have argued that alternative occupation opportunities affected teachers' career decisions. Researchers assume that a teacher will quit teaching for a better wage in an alternative occupation (Hoxby and Leigh, 2004; Rickman and Parker, 1990). Generally, teachers in science fields or teachers with higher test scores (SAT or ACT) have higher opportunity costs, and are more likely to leave the teaching position (Murnane and Olsen, 1990; Rickman and Parker, 1990). Thus, I included teachers' perceived salary satisfaction and teaching subjects (representing the alternative opportunities) in the current study.

Definitions

New teachers: beginning classroom teachers with one to five years of working experience.

Teacher mobility: refers to teachers who transfer or move to another school, but remain in the teaching profession (Ingersoll, 2001).

Teacher Attrition: refers to teachers who leave the teaching profession (Ingersoll, 2001).

Teacher turnover: refers to teachers who leave their current teaching position, including those who transfer to different schools (OECD, 2005).

Leavers: teachers in the SY1999-2000 who left the teaching profession prior to the 2000-2001 school year (Luekens et al., 2004).

Stayers: teachers in the SY1999-2000 who were still teaching in the same school in 2000-2001 as they were in the previous school year (Luekens et al., 2004).

Movers: teachers in the SY1999-2000 who were still teaching in 2000-2001, but were in a different school in the SY 2000-2001 (Luekens et al., 2004).

Limitations

The current study uses data from the TFS (2000-2001), and the SASS (1999-2000) public school teacher questionnaire and public school questionnaire. It allows the researcher to generalize the results at the national level. However, there are several limitations that need to be considered.

First, the study uses a quantitative research design and attempts to answer questions based on statistical findings. This is useful for identifying patterns and potentially significant relationships, however the results here are based on teacher movement over only a one-year period. Studies using longitudinal data might be more

appropriate and informative in determining the factors that influences new teacher turnover.

Second, the study is based on a teacher survey questionnaire sponsored by NCES in the school year 1999-2000, which is the latest data that is available for public use. However, this dataset is 12 years old, thus the findings may not precisely reflect the current situation in public schools.

Third, the survey instrument used teachers' self-reports as the measurement of school conditions. There are no other data available with which to compare the teachers' reports for confirmation or accuracy. In addition, the limited choice of survey items may affect the relative strength of the contributions of the proposed working conditions.

Last, it was not possible to make a distinction between teachers who left the schools voluntarily and those who left involuntarily.

Organization of the Paper

This research is presented in five chapters. Chapter I includes a background of the problem, the rationale for the study, the research questions, the conceptual framework, definitions, limitations, purpose and significance of the current study. Chapter 2 provides a review of the literature on teacher turnover studies. Chapter 3 outlines the research design in detail, describing the data sources, the study sample and the data analysis procedures. Chapter 4 presents the results of data analyses. Chapter 5 summaries the study and discusses the policy implications and recommendation for future studies.

CHAPTER 2. LITERATURE REVIEW

Why do teachers leave teaching profession or transfer to different schools?

Research on turnover reveals a complicated phenomenon. Economic, individual and organizational factors all contribute to teacher turnover. Generally, there are three major approaches to the study of teacher turnover. The first school of research examines the relationship between salary, opportunity cost and teacher attrition. The second approach explores the student composition and teacher characteristics that impact teacher retention. The third approach examines the working conditions that influence teacher's career decisions. The majority of studies conducted have been empirical, using state, national or national longitudinal data. Turnover, attrition, migration and retention are terms commonly used in the literature to refer to teachers' likelihood to remain or leave. Some of the studies separate migration and attrition, while others treat migration and attrition as a whole. In this review, I use Ingersoll's (2001) definitions of migration and attrition. Teacher migration refers to teachers who transfer or move to another school, but are still in the teaching profession. Teacher attrition refers to teachers who leave the teaching profession.

Research on Teacher Mobility and Attrition

Salary, opportunity cost and teacher retention

A number of studies have proposed that teachers' salaries were associated with teacher attrition, or teachers' leaving the profession, (Kirby and Grissmer, 1993; Imazeki,

2005; Murnane and Olsen, 1990; Shen, 1997; Stinebrickner, 2002; Theobald, 1990). Using national SASS and TFS data, Shen (1997) found that teachers with a Master's degree who worked over 20 years were more likely to stay if schools provided higher salaries. Murnane and Olsen (1990) studied 8,462 white teachers who began their teaching career in North Carolina public schools during the period of 1975-79. They found that salary played an important part in teachers' length of teaching. According to their findings, "a \$1000 increase (in 1987 dollars) in salary increase the probability by 15 percent that a teacher's first spell will last for at least 10 years" (Murnane and Olsen, 1990, p.118). Stinebrickner (2002) examined 442 female certified teachers in a sample constructed from the National Longitudinal Study of the High School Class of 1972, and found that teachers with higher salaries were less likely to leave the teaching profession. Similarly, Imazeki (2005) examined Wisconsin public school teachers from 1992 to 1998, and found that increasing salary levels reduced teacher attrition rates.

In addition to a teacher's current salary, a handful of studies argued that alternative occupation opportunities affected teachers' career decisions. These researchers assume that a teacher will quit teaching for a better wage in an alternative occupation (Hoxby and Leigh, 2004; Rickman and Parker, 1990). Generally, teachers in the math and science fields or teachers with higher test scores (SAT or ACT) have higher opportunity costs (Murnane and Olsen, 1990). Opportunity cost is the highest salary a teacher can earn in the job market outside of education. Murnane and Olsen (1990) suggested that teachers with higher opportunity costs would leave the teaching profession earlier. They found that chemistry and physics teachers have shorter durations in teaching compared with teachers in other fields. Stinebrickner (1998) examined 341 certified

teachers in a sample constructed from the National Longitudinal Study of the High School Class of 1972, and found that science teachers did leave significantly more quickly than other teachers. This finding is consistent with a previous work by Murnane and Olsen (1990). Rickman and Parker (1990) used the Current Population Survey (CPS) data from 1979 to 1985, and investigated the relationship between wage differential and teacher attrition. They found that the wage differential between teacher current wage and the wage that could be earned in alternative occupations was significantly related to teacher attrition. However, a study by Strunk and Robinson (2006) examined a sample of 28,885 teachers constructed from SASS (1999-00) and TFS (2000-01). They did not find that math and science teachers had a higher rate of attrition given their higher opportunity cost.

Student composition, teacher initial placement and retention

A number of studies show that less qualified teachers are more likely to be placed in schools with low-achieving, low-socioeconomic status and minority students, and the disparities in terms of teacher quality among schools have been widened due to teacher mobility and attrition (Boyd et al., 2005; Clotfelter, Ladd and Vigdor (2005); Greenberg and McCall, 1974; Lankford et al., 2002).

Teacher distribution across districts and schools is not even with respect to student race, achievement and socioeconomic status. Greenberg and McCall (1974) employed internal labor market theory to explain teacher mobility within districts. Given that salary schedules are identical for teachers with the same teaching experience and educational credentials, the nonpecuniary differences among assignments account for teacher mobility. The more experienced teachers were given the best assignments, largely on the

basis of seniority(a reward for staying), leading to greater job satisfaction, while newer teachers were assigned more difficult students and given the choice either to stay and pay their dues to earn better assignments, or to leave. Greenberg and McCall (1974) examined teacher mobility in the San Diego school district between 1970-71 and 1971-72. They found that new teachers tended to be placed in schools with a higher proportion of lower socioeconomic status students, and experienced teachers were more likely to move from schools with a higher proportion of lower socioeconomic students. Clotfelter et al. (2005) focused on the role of school administrators in initial placement of novice teachers. They suggested that school administrators were constrained by the preferences of parents and teachers, and novice teachers were more likely to be assigned to the difficult-to-educate students.

Data from New York state and North Carolina also showed that the more highly qualified teachers were not equitably distributed across districts. Lankford et al. (2002) examined public school teachers in the state of New York during the period of 1984-85 through 1999-00. The results showed that less qualified teachers taught poor, minority and low-achieving students in urban areas. In their study, teacher quality attributes were analyzed using multiple measures, and identified the following teacher characteristics at school level: (1) the percent of teachers with no prior teaching experience, (2) the percent with no more than a Bachelor's degree, (3) the percent not certified in any current assignments, (4) the percent certified in all current assignments, (4) the percent of exam takers who failed the NTE General Knowledge Exam or the NYSTCE Liberal Arts and Sciences Exam on their first attempt, (5) the percent who attended Barron's College Guide's most competitive and highly competitive schools, (6) the percent who attended

competitive, less competitive, or least-competitive schools. The disproportional distribution of more highly qualified teachers was also found in the North Carolina. Clotfelter et al. (2005) examined a rich micro-level database provided by the North Carolina Department of Public Instruction, and found that black students were more likely to face inexperienced teachers than white students. The descriptive data showed that districts with high proportions of minority students also typically have higher proportions of novice teachers.

Several other studies indicated that teachers' turnover patterns were related to student composition. Hanushek et al. (2004) examined public school teachers in Texas from 1993 to 1996. They found that student composition, including performance and ethnicity, were significantly related to teacher mobility and attrition. Student racial composition was significantly related to the probability of their leaving the public schools and switching districts. White teachers were more likely to switch schools or leave the teaching profession when they taught in schools with higher proportions of minority students. However, black teachers were less likely to switch districts or exit public schools if they taught in schools with higher proportions of minority studies. Student performance (i.e., the district average of mathematics and reading scores on state assessment exams) was also associated with teacher turnover.

Boyd et al. (2005) examined certified elementary school teachers with one to five years of experience in New York City in SY 1995-1996 through 2001-2002. They examined four teacher career decisions: (1) remaining in that school, (2) transferring to another school in the same district, (3) transferring to another district, or (4) leaving the New York City public school system. Consistent with the earlier studies, the study

showed that teacher mobility and attrition were affected by student achievement and race. They found that higher qualified teachers were more likely to transfer or quit when teaching lower-achieving students, and Caucasian or Hispanic teachers were much more likely to leave schools with a higher proportion of black students.

Falch and Rønning (2007) examined 25,363 Norwegian teachers in public schools between SY 1998-99 and 2001-02. They investigated four types of teacher mobility: (1) moving to another public school in the same school district; (2) moving to another public school in another district in the same labor market region; (3) moving to another public school in another labor market region; (4) moving out of the public school sector. They concluded that student performance (average achievement as indicated by the standardized test scores at the school level) was negatively related to teachers moving to a school in another school district in the same labor market region, as well as to a school in another labor market region. Furthermore, a one unit increase in student achievement decreased the probability of moving to a school in another school district in the same labor market region, and moving to a school in another labor market region by 17% and 28% respectively.

Scafidi et al. (2007) examined 11,070 public elementary school teachers in Georgia who began their careers between SY1994-95 and 1999-00 and were under the age of 27 when they started teaching. The descriptive statistics showed that teachers were more likely to change schools if they started their teaching at schools serving higher proportions of low income, low achievement or Black students. Particularly, teachers were more likely to leave schools with higher proportion of minority students.

Based on social identity theory, Strunk and Robinson (2006) examined the SASS

(1999-00) and TFS (2000-01), and found that teachers were more likely to quit or transfer schools if the student body at their school was largely minority. However, black and Hispanic teachers were less likely to leave a school if the student's population matched their own racial or ethnic identity.

Teacher characteristics and turnover

Teachers' individual characteristics, such as gender, age, years of experience, qualifications, and ethnicity are commonly investigated in empirical studies. Studies have demonstrated a U- shaped probability of turnover with respect to teaching experience (Kirby and Grissmer, 1993; Krieg, 2006; Hanushek et al., 2004; Ingersoll, 2001). A large amount of turnover occurs at the beginning of a teacher's career and at the later career stage, with rates being much lower during the mid-career stage.

Researchers propose that attrition tends to be higher at the early career stage because new teachers have accumulated less specific capital in teaching field. They have fewer years invested and more time to pursue other careers, thus it is a more rational choice for them to leave compared with mid-career teachers (Kirby and Grissmer, 1993). Harris and Adams (2007) argued that the relatively high ratio of pensions-to-salaries in teaching partially explains why older teachers are more likely to retire earlier than other professionals.

Stinebrickner (1998) examined 341 certified teachers in a sample constructed from the National Longitudinal Study of the Class of 1972 (NLS-72), and found that teachers' probability of exiting teaching increased in the initial four years of the teaching career. Strunk and Robinson (2006) also supported that teachers with less than five years of working experience were more likely to leave their teaching job. Hanushek et al.(2004)

analyzed 378,790 Texas public school teachers during 1993-1996, and found that teachers with two years or less experience and very experienced teachers nearing retirement age were more likely to leave Texas public schools. Ingersoll (2001) also found that U shaped pattern in his analysis, but he combined attrition and migration in his study.

Studies often demonstrate contradictory results regarding gender and teacher turnover. Krieg (2006) examined 2,293 teachers in Washington public schools, and found that more highly qualified female teachers were more likely to stay in the profession. Stinebrickner's (1998) study found that male teachers tend to stay longer than female teachers. Strunk and Robinson (2006), however, found that gender effect was not significant in their model.

A study by Stinebrickner (2002) also suggested that female teachers might consider family responsibilities when making career decisions. Stinebrickner (2002) examined 422 female teachers in a sample constructed from the National Longitudinal Study of the High School Class of 1972 (NLS-72). This dataset contains individual information for approximately 14 years after the subjects graduated from high school. He found that a woman with a newborn child was eight times more likely to leave the teaching profession than a woman who did not have a newborn child.

In addition to teacher background, several studies have explored the relationship between teacher quality and retention. Many of these studies base teacher quality on teachers' performance on standardized tests, and found that teachers who scored higher on such exams were less likely to remain in teaching. Murnane and Olsen (1990) examined 5,100 white teachers in North Carolina, and found that teachers with higher

National Teacher Examination (NTE) scores were more likely to leave. Podgursky, Monroe and Watson (2004) investigated six cohorts of Missouri public school teachers who entered teaching between 1990-91 and 1995-96, and tracked them to the 1999-2000 school year. They found that both male and female teachers who had higher ACT scores and graduated from more selective colleges were more likely to exit the teaching profession. Another study by Lankford et al. (2002) followed a cohort of teachers who were hired into their first teaching job in 1993 in the New York City public schools over the next five years of their career. They found the more highly qualified teachers (based on certification exam performance and college selectivity) were more likely to leave the teaching profession.

Working conditions and retention

A number of quantitative and qualitative studies indicate that schools as workplaces have a great impact on teacher turnover. Johnson and Birkeland (2003) conducted a longitudinal study of 50 new teachers in Massachusetts. They followed these teachers for four years, conducting interviews and administering one survey to track and explore what factors cause teachers to move to new schools, stay in their current schools or leave the teaching profession in their first three years. In their study, 11 teachers left the teaching profession, 11 teachers moved to different public schools, and 28 teachers stayed in the same school where they had started teaching. The leavers experienced frustration and failure with their teaching experience, while the movers felt that they were not effective in the classroom. The authors concluded, “although the respondents’ prior career orientations, financial situation, and preparation played a role in their career decisions, their experience at the school sites was central in influencing their

decisions” (Johnson and Birkeland, 2003, p.581). Swars, Meyers, Mays and Lack (2009) used a mixed method, and investigated 134 teachers at a large, suburban elementary school. Their findings also suggested that supportive administration, quality of daily working experience and academic success all contributed to teacher retention.

Several quantitative studies have investigated the relationship between teachers’ perceptions of their working conditions and retention. Principal support, student discipline problems and teacher autonomy are all factors that appear to influence teachers’ career decisions (Byod et al., 2011; Ladd, 2011; Loeb et al., 2005; Ingersoll, 2001; Shen, 1997; Weiss, 1999).

Shen (1997) investigated 3,612 public school teachers in a sample constructed from national SASS data (1990-91) and TFS data (1991-92). Discriminant analysis was conducted to determine the difference among teachers who stayed in teaching profession, moved to other schools and left teaching. Shen (1997) found that teachers who left the profession or transferred to another school felt that they had less influence over school policies and were less understood by their administrators.

Ingersoll (2001) examined 6,733 teachers in a sample constructed from SASS data (1990-91) and TFS data (1991-92), and found that administrative support, faculty influence on policy and reducing student discipline problem all contribute to reduce teacher turnover. In this study, however, Ingersoll did not distinguish between attrition and migration, and used aggregated data that combined public and private schools.

Weiss (1999) examined first-year K-12 public and private school full-time teachers using a sample constructed from national SASS data (1987-88, 1993-94). Weiss (1999) found that teachers’ perceptions of school leadership, culture and teacher

autonomy were the strongest variables associated with first year teachers' intention to stay.

Loeb et al. (2005) conducted a survey of 1,071 California teachers in 2002. Three separate regression analyses were used to examine the effects of teacher characteristics, student composition, and school conditions on teacher turnover. The variable "school conditions" was computed from teachers' ratings of their school on eight dimensions of teaching conditions, including school facilities, the availability of textbooks and technology, the quality of profession development, parental involvement, and job satisfaction. In the first model, the dependent variable was whether teachers reported that turnover was a problem for the school. They found that the strongest predictor of turnover was teachers' ratings of school conditions. In the second model, the dependent variable was whether vacancies were hard to fill in the school. They found that large schools with poor conditions, such as bigger classrooms, noisy classrooms and lower ratings of school conditions were more likely to have difficulty filling vacancies. In the third model, the outcome was the proportion of first-year teachers in the school. The results showed that school conditions were the strongest predictors of the percentage of first-year teachers in the school. They concluded that "the working conditions add substantial predictive power to models of turnover and that, when these working conditions are added, the influence of student demographics on reported turnover and hiring problems is reduced" (p.65).

Two recent studies proposed that school administration/leadership was the dominant factor among teacher perceived work contexts that significantly predicted teachers' movement. Boyd et al. (2011) used a multinomial logistic regression to

examine the relationship between the six aspects of teachers' perceived working condition and new teachers' career decisions in New York City. They found that teachers' perceptions of the school administration has the greatest influence on teacher mobility and attrition, and other factors (teacher influence, staff relations, students, facilities and safety) were not significantly related to teacher retention. Using 2006 North Carolina statewide data, Ladd (2011) examined the influence of teachers' perceived professional development opportunities, school resources and facilities, expanded roles and school leadership on teachers' planned/actual departure from schools. The findings suggested that the school leadership was the dominant factor that influenced teachers either plan to leave or actually to leave the school.

Summary of the Literature Review

Most studies of teacher turnover are empirical and use quantitative methodology. Thus, understanding how researchers defined the concepts, datasets and research designs is important when interpreting the results.

Turnover, attrition, migration and retention are commonly used in educational literature related to teacher mobility. Some studies separate migration and attrition, while others treat migration and attrition as a whole. Ingersoll (2001) has noted that migration leads to the same effect on schools as attrition. Several studies using national data sets chose to combine migration and attrition (Ingersoll, 2001, Strunk and Robinson, 2006). However, attrition and migration might be associated with different attitudes and behaviors (Imazkei, 2005). Thus it is necessary to distinguish migration and attrition in turnover studies.

Three types of datasets are commonly used by researchers: national, regional or statewide, and national longitudinal. Regional data often can't track teachers who move to other states, but continue to teach, thus overstating the teacher attrition rate (Macdonald, 1999; Murnane and Olsen, 1990, Stinebrickner, 1998). Longitudinal data tracks individuals over years, but turns out a very small sample size when it limits its scope to teachers. National data have the advantages of sample size and the ability to distinguish among teacher status, however, they (SASS and TFS) can only track teachers during one-year period.

Researchers have explored a wide range of economic factors that influence teachers' career decisions. From an economic perspective, teachers' decisions to leave appear to be the result of rational cost and benefit assessments (Kirby and Grissmer, 1993; Shen, 1997; Murnane and Olsen, 1989). The early studies that focused on economic factors were based on the assumption that teachers would quit teaching if a better wage were available in an alternative occupation (Hoxby and Leigh, 2004; Rickman and Parker, 1990). The salary and wage differential between the teacher's current wage and the wage that could be earned in the alternative occupation have been examined in many studies (Imazeki, 2005; Murnane and Olsen, 1990; Rickman and Parker, 1990; Shen, 1997; Stinebrickner, 2002). Economic models are insufficient to explain teachers' decisions to leave because most of empirical studies have explored only broad measures of school conditions. As Hanushek et al. (2004) have argued that previous analyses on the relationship between teacher salary or the alternative opportunity cost and teacher retention failed to take working conditions into sufficient consideration in their study models.

Empirical studies also suggested that students' characteristics had significant impact on teacher mobility. Teachers are more likely to move away from schools that have a high proportion of low-income, low-achieving and minority students (Boyd et al., 2005; Hanushek et al., 2004; Scafidi et al., 2007). However, these studies did not investigate school contexts relative to the student composition. Schools serving higher minority students might also have difficult working conditions, such as poor leadership, serious student behavior problems, and higher student dropout rates. Those studies might not be able to examine the specific effects of various working conditions on teachers' career decisions due to data limited by too few sources to make definitive conclusions.

In recent years, researchers have paid more attention to the influence of working conditions on teacher retention. Several studies indicated that teachers' perceived working conditions had an effect on their career decisions (Boyd et al., 2011; Ingersoll, 2001; Ladd, 2011; Shen, 1997; Weiss, 1999). However, there is no common agreement on what aspects of teachers' perceived working conditions are significant predictors of teachers' retention. Weiss (1999) found that teachers' perceptions of school leadership, culture and teacher autonomy were associated with first year teachers' intentions to stay. School administration was the only significant factor that influenced new teachers' career decision in a study by Boyd et al. (2011). The differences among sample selections, statistical models, the measurement of teacher career status and teachers' perceived work contexts might be possible explanations for this phenomenon. Further, only a few previous studies using SASS data have considered incorporating complex sampling design into the statistical models. This might result in misleading conclusions if studies fail to apply the proper sampling weight design in statistical models.

CHAPTER 3. METHODOLOGY

The purpose of this study was to profile the working conditions of new teachers in public schools, and use an integrated economic and organizational approach to understand new teacher mobility, attrition and retention. The data set was constructed from TFS (2000-2001), and linked with the SASS (1999-2000) public school teacher questionnaire and public school questionnaire. A preliminary analysis was conducted to explore whether the sample size was sufficient to support the proposed analysis, and whether the underlying constructs of teacher survey items related to teacher perceived working conditions. This chapter describes the data sources, research questions, subjects, the instrument and the statistical analysis methods used in the study.

Research Questions

1. What were the characteristics of teachers who moved to different schools, left the teaching profession and stayed in the same school between the school year 1999-2000 and 2000-2001?
2. What were the perceptions of teachers about their salary and workplace?
3. How were teacher migration and attrition related to teacher perceived salary satisfaction, alternative opportunity and working conditions (supportive principal and administration, shared decision-making, teacher autonomy and student behavior problems)?

Data Sources

I drew data from the public SASS (1999-00) and the TFS (2000-01) sponsored by the National Center for Education Statistics (NCES). SASS is the largest, most extensive survey of K-12 districts, schools, teachers, and administrators in the United States today (Tourkin et al., 2004). The SASS (1999-00) contained five survey components: the School District Questionnaire, the School Principal Questionnaire, the School Questionnaire, The School Teacher Questionnaire, and the School Library Media Center Questionnaire. It covered four types of schools including public, private, charter, and Bureau of Indian Affairs (BIA) schools. The TFS (2000-01) was administrated one year after the SASS (1999-00) to sub-sample of teachers who completed SASS, and was designed to provide additional information concerning teacher mobility, attrition and retention. It consisted of all teachers who left teaching within a year after completing SASS. All teachers with less than three years of teaching experience who moved to different schools also were included. Experienced teachers who moved to different schools and teachers who stayed in the same schools were sampled at certain proportions (Luekens et al., 2004).

Population and Subjects

Sample design and weights

According to Tourkin et al. (2004), the SASS (1999-00) used “a stratified probability sample design” (p.8). In the first stage of sampling, schools were placed into subgroups, and once the schools were selected, the districts associated with these schools

were generally included in the sample as well. At the second stage, teacher samples were selected from within each sampled school (Tourkin et al., 2004).

The public school sampling frame was based on the 1997-1998 Common Core Data (CDD) school file, which is considered the most complete public school data in the United States. The public schools were stratified into three types of schools at the first level: (a) Native American schools; (b) schools in Delaware, Nevada, and West Virginia; (c) all other schools. Then, the three types of schools were stratified by states and districts. Finally, schools were selected according to school levels (elementary, secondary, and combined schools).

The National Center for Education Statistics (NCES) created the teacher-sampling frame based on the information provided by the sampled schools, which contained teachers' general information such as ethnicity, teaching status, new or experienced teachers, teaching assignment, and grade level. In each school, teachers were stratified into the following subgroups: (a) Asian or Pacific Islander (API); (b) American Indian or Alaska Native (AIAN); (c) taught classes designed for students with limited English proficiency; (d) new and experienced teachers. Teachers were selected by stratum in each school with equal probability. The number of teachers in selected schools ranged from one to 20 per school (Tourkin et al., 2004).

Unlike simple random sampling, a complex survey design, such as stratified sampling, involves some problems. It creates the unequal selection probability. Some groups might have been oversampled for study purposes. For example, schools with 19.5% or more Native American students were oversampled in order to improve the estimation of teachers in Native American schools in SASS (1999-2000) (Tourkin, et al., 2004).

Sample weights were developed to adjust the differential representation of sample participants. The final teacher weights in TFS (2000-01) were computed based on the SASS (1999-00) teacher final weights that were the inverse of the selection probability modified by the school sampling adjustment factor, the teacher sampling adjustment factor, the school non-interview adjustment factor, the teacher-within-school non-interview adjustment factor, the frame ratio adjustment factor, and the teacher adjustment factor (Luekens, et al., 2004).

Further, in the two stages of the stratified sample of SASS (1999-2000), schools were chosen at the first stage, and then teachers were selected within these schools. Teachers who were naturally clustered in the same school generally had more similarity. The sampling variance on measures tended to be underestimated on the assumption of simple random design (Tourkin et al., 2004). Considering the effect of stratification and clustering, the estimation of variance would be very complicated (Lee and Forthofer, 2006). There are several variance estimation methods for complex survey design including replicated sampling, balanced repeated replication (BRR), jackknife-repeated replication (JRR), the bootstrap method, and the Taylor series method (Lee and Forthofer, 2006). The bootstrap method was implemented in SASS (1999-00) to estimate the sampling variance. Each SASS data file and TFS contained a set of 88 replicate weights designed to produce the variance estimates (Tourkin et al., 2004).

Designed-based and model-based approaches can be used to address the design effect when analyzing complex surveys (Hahs-Vaughn, 2006, Lee and Forthofer, 2006; Thomas and Heck, 2001). The current study contains 1,257 teachers nested in 1,157 schools. A model-based approach, such as hierarchical linear modeling, might not be

appropriate for this study. Thus, a single level model was applied in the current study. To address the problem that a complex sampling design might cause bias in the variance estimation and statistical tests (Lee and Forthofer, 2006), the current study used SAS PROC SURVEYREG and PROC SURVEYLOGISTIC procedures to estimate variance.

Population and study sample

The target population for this study was teachers who taught students in any of grades K-12 in traditional public schools in the school year 1999-00. The TFS (2000-01) included 2,149 former teachers, and 3,639 current teachers. Of these, 4,156 participants were public school teachers and the rest taught in private schools. Three types of teacher employment status (leaver, mover, and stayer) were defined in the TFS (2000-01).

The current study focuses on full time public school teachers with one to five years of teaching experience. The data for this study were primarily extracted from 1,372 public school full time new teachers from TFS (2000-2001), and linked with SASS (1999-2000) public school teacher questionnaire and public school questionnaire. However, not all teachers could be matched to public school data. Thus, 1,259 teachers remained in the study. The weighted total number of respondents was N=595,994. Of these respondents, 72% were female and 12% were minorities. With respect to teacher status, 7.9% were leavers, 12.6% were movers and 79.6% were stayers. A description of the current study sample is presented in Table 3.1.

Table 3.1. Description of Studying Sample (Weighted sample size n=595,994)

	Variables	Percentage of Total
Outcome variable	STATUS	
Stayer		79.57%
Mover		12.58%
Leaver		7.85%
Teacher characteristics		
Gender	T0356	
Female		71.54%
Male		28.46%
Race	T0357	
American Indian		1.09%
Asian or Pacific Islander		2.10%
African American		8.66%
White		88.14%
Education		
No degree		0.58%
Bachelor degree	T0070	77.38%
Master degree	T0080	22.04%
Teaching assignment	T102	
Science teachers		8.51%
Non science teachers		91.49%
School year teacher income	T0347	
Less than \$ 25,001		20.86%
\$25,001 to \$ 30,000		35.49%
\$30,001 to \$ 35,000		28.80%
\$35,001 to \$45,000		13.55%
\$ 45,001 or more		1.30%
Teaching level	TEALEV2	
Elementary		54.12%
Secondary		45.88%
Teaching experience		
1 year		23.48%
2 years		21.82%
3 years		18.86%
4 years		18.31%
5 years		17.52%
School characteristics		
Percentage of student eligible for free or reduced price lunch	S0284	
Less than 5%		8.31%
5% to 19%		22.73%
20% to 49%		34.62%
50% or more		34.34%
Percentage of minority students	MINENR	
Less than 5%		20.80%
5% to 19%		22.53%
20% to 49%		23.22%
50% or more		33.45%

Instrumentation

Instrument

The current study uses Public School Teacher Questionnaire (1999-00). This questionnaire contained 71 questions regarding teachers' general information, certification and training information, professional development, class organization, resources and assessment of students, working conditions, decision-making, and general employment information.

Validity and reliability

Validity is an important key to effective research. Cohen, Manion and Morrison (2000) state that "quantitative data validity might be improved through careful sampling, appropriate instrumentation and appropriate statistical treatment of the data" (p.105). NCES has revised survey contents at each cycle of its administration in order to improve the quality of the surveys since SASS was initiated in 1987. The fourth administration of SASS (1999-2000) was carefully prepared and conducted. Following up on the format of the 1993-1994 teacher questionnaires, cognitive interviews were conducted to identify the existing problems on the Teacher Listing Form (TLF). Two field tests were conducted to identify the existing problems with the questionnaires. In the spring of 1998, the first revised teachers' questionnaires were mailed to approximately 550 public school teachers to conduct the field test. Then the second version was mailed to 571 public school teachers to test in fall of 1998. The final completed questionnaires were evaluated using the following three methodologies: professional review of questionnaires, behavior coding, and cognitive interviews (Tourkin et al., 2004). In this way, the Public School Teacher Questionnaire is updated to improve consistency and accuracy.

Data collection

The United States Census Bureau coordinated the data collection for both the SASS and TFS. The SASS (1999-2000) was administered between September 1999 and June 2000. The first School Teacher Questionnaire was mailed to sampled teachers at their schools between December 1999 and March 2000. A second copy of questionnaire was sent to those who had not responded within six weeks after the first questionnaire was mailed. Follow up phone calls and field interviews were arranged for teachers who had not responded after the second questionnaire mailing. There were 59,797 public school teachers selected in the sample, and 44,713 teachers completed the interview. The unweighted response rate of public school teachers was 81.2%, and the weighted response rate was 83.1% (Tourkin et al., 2004).

The TFS was designed as a follow-up to the SASS. In September 2000, all the sampled schools were asked by the Census Bureau to provide information on the employment status of SASS teacher respondents.

The TFS survey consists of two questionnaires, one for current teachers and one for former teachers. The first questionnaire was sent to all the leavers and sampled movers and stayers in January 2001, and followed by reminder postcards. The second questionnaire was sent to sampled teachers who did not return the first questionnaire. Finally phone calls were arranged to contact those who did not respond the second questionnaire.

The 2000-2001 TFS surveyed approximately 7,687 teachers who completed the 1999-2000 SASS teacher survey. The unweighted response rate of current and former public school teachers were 87.9% and 90.9% respectively. The weighted response rate

of current and former public school teacher were 90.1% and 90.5% respectively (Luekens, et al., 2004).

Measures and Variables

Teacher mobility and attrition

The dependent variable for this study was teacher employment status. Teacher employment status was defined as three groups in the TFS (2000-2001). A teacher was defined as a mover if he or she moved to a different school between school years 1999-00 and 2000-01. A teacher was defined as a leaver if he or she left the teaching profession between school years 1999-00 and 2000-01. A teacher was defined as a stayer if he/she remained in the same school between school years 1999-00 and 2000-01.

Although Ingersoll (2001) didn't distinguish between mobility and attrition in his study, claiming that both had the same outcome effect on schools, Imazeki (2005) suggested that attrition and mobility might be associated with different attitudes and behaviors. Thus, in order to explore these relationships, the current study distinguished mobility and attrition. The reference group is teachers who remained in the same school between school years 1999-00 and 2000-01.

Organizational and economic factors

Four dimensions of school conditions were examined in this study: supportive principal and administration, teacher autonomy, shared decision-making, and student behavior problems. In addition, two economic factors were also examined: teacher perceived salary satisfaction and alternative job opportunity. They are defined as follows:

Supportive principal and administration. The primary job of the principal is to create a working environment in which teachers can achieve success with students

(Basom and Frase, 2004). First-year teachers are more likely to be committed to the teaching profession when principals communicate effectively with teachers, back up teachers when they need it, and provide necessary resources for teachers (Weiss, 1999). The index of supportive principal and administration measures the extent to which the principal supported and communicated with teachers and recognized the staff's performance. Teachers were asked to what extent they agreed with the following statements such as "the principal lets staff members know what is expected of them"; "the school administration's behavior toward the staff is supportive and encouraging"; "my principal enforces school rules for student conducts and backs me up when I need it"; "the principal talks with me frequently about my instructional practices"; "the principal knows what kinds of school he/she wants and has communicated it to the staff"; "In this school, staff members are recognized for a job well done". Responses were measured on four-point scale from "strongly agree" to "strongly disagree". The scores were reversed in the analysis.

Shared decision-making. Participating in decision-making provides the opportunities for teachers to express their concerns and suggestions, and teachers can better understand how the decisions have been made. Thus, it can enhance teachers' sense of trust and fairness in the school, and teachers become more committed to school policies over the long term (Firestone and Pennell, 1993). Empowering teachers can increase their organizational commitment (Kushman, 1992; Somech and Bogler, 2000), and is also positively associated with teachers' professional commitment (Somech and Bogler, 2000). A few studies have proposed that teacher participation in decision-making was associated with teacher retention (Ingersoll, 2001; Johnson and Birkeland, 2003;

Shen, 1997; Weiss, 1999). The index of shared decision-making measures the extent to which teachers participate in decision-making about school policy. Teachers were asked to evaluate how much influence they had on school policies in the following areas: (1) determining the content of in-service professional development programs, (2) evaluating teachers, (3) hiring new full-time teachers, (4) setting discipline policy, (5) deciding how the school budget will be spent, (6) setting performance standards for students of this school, and (7) establishing curriculum. Response options for each item use a five-point scale ranging from “no influence” to “a great deal of influence”.

Teacher autonomy. In their development of work design theory, Hackman and Oldham (1980) defined autonomy as “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” (p.79). Autonomy allows teachers to choose the best teaching method or materials to serve students’ needs based on their professional judgment and training (Firestone and Pennell, 1993; Rosenholtz and Simpson, 1990). Empirical studies have shown that teacher autonomy contributed to increased teacher organizational commitment (Rosenholtz and Simpson, 1990), and professional commitment (Somech and Bogler, 2002). Furthermore, increasing autonomy also promotes teachers’ sense of responsibility of students’ learning (Firestone and Pennell, 1993). The index of teacher autonomy measures the extent to which teachers have control over classroom policy. The survey items cover a wide range of classroom dimensions, including selecting textbooks and other instruction materials, selecting content, topics, and skills to be taught, selecting teaching techniques, evaluating and grading students, disciplining students, and determining the amount of homework to

be assigned. Respondents were asked about the degree of control about six aspects of classroom on a five-point scale ranged from “no control” to “complete control”.

Student behavior problems. When compared with experienced teachers, beginning teachers are less experienced and more concerned about classroom management, especially handling student behavior (Melnick and Meister, 2008). New teachers tend to have lower expectations, morale (Weiss, 1999) and low feelings of self-efficacy (Lee et al., 1991) when their teaching is interrupted by student behavior problems. The index of student behavior problems contains 12 items. Teachers were asked to evaluate various students' behavior problems in schools. The problems include: (1) student tardiness, absenteeism, class cutting and dropping out; (2) physical conflict among students; (3) student use of alcohol, drug abuse, robbery and pregnancy; (4) student disrespect for teachers. Each of these items is rated on a four-point scale from “serious problem” to “not a problem”. The scores were reversed in data analysis.

Teacher salary satisfaction and alternative opportunity. Studies have also suggested that teacher's compensation and the alternative occupational opportunity were associated with their career decisions. Generally, teachers in science fields have more alternative opportunities outside of the educational system. I included a dummy variable for the teaching subject. The variable takes value 1 if the teacher taught science and was coded as 0 for non-science teachers. Teachers' compensation was measured by teachers' self-evaluation on salary satisfaction. Teachers were asked to what extent they were satisfied with their salary. Response options range from “strongly agree” to “strongly disagree”. The scores on salary satisfaction were reversed in the analysis.

School characteristics

School characteristics include student composition, location and size. Student composition, particularly students' race and socioeconomic status, were associated with teacher turnover (Boyd et al., 2005; Clotfelter et al., 2005; Greenberg and McCall, 1974; Lankford et al., 2002). Two variables were included in the study representing the student composition in schools: the percentage of students eligible for free or reduced price lunch at school level and the percentage of minority students at school level. Schools with more than 20% of students eligible for free or reduced price lunch were coded as 1, other schools were coded as 0 (a reference group). Schools with more than 50% of minority students were coded as 1, and other schools were coded as 0.

Individual teacher characteristics

As the literature suggests, individual characteristics such as gender, education, race, and teaching level all contribute to teacher turnover. It is important to include these variables in the statistical model. Gender is treated as a dummy variable, which is coded as 1 if the teacher is a female. Teacher's race was identified in four groups in the SASS (1999-00) public school teacher questionnaire. I combined three groups (American Indian, Asian or Pacific Islander, Black) as one category coded as 1, and the White teachers were treated as a reference group coded as 0.

This study also explored whether the effect of perceived working conditions on teacher mobility and attrition differ according to different groups of teachers. I included a dummy variable: teacher grade level (elementary teachers vs. secondary teachers). In addition, education level (having master degree vs. not having master degree) was also included.

Data Analysis

The data analysis was done in two stages. In the first stage, a principal component analysis was performed to construct the four dimensions of school organization proposed by the current study, and four factor scores were computed based on the standardized scoring coefficients. In the second stage, the Analysis of Variance and multinomial logistic regression were conducted to answer the research questions.

Principal Components Analysis

The data were constructed from TFS (2000-01), and linked with SASS (1999-2000) public school teacher survey questionnaire and public school questionnaire. The public school teacher survey questionnaire contained approximately 44 items related to teachers' perceptions of school policy influences, classroom instructional policies, and principal leadership and student behavior problems. Principal component analysis was used as a variable reduction procedure to develop four constructs that could be labeled as "teacher autonomy," "shared decision-making," "supportive principal and administration" and "student behavior problems". Factor scores of the four constructs were used in the multinomial logistic regression model to answer the research questions.

The Analysis of Variance and Multinomial logistic regression

PROC SURVEYREG procedure was conducted to assess teachers' salary satisfaction and perceived workplace conditions among leavers, movers and stayers.

Multinomial logistic regression was implemented to examine the relationship between the proposed predictors and beginning teacher career decisions. Logistic regression can model the relationship between a categorical outcome and a set of continuous and categorical variables. Unlike OLS regression, logistic regression

transfers the dependent variable into a logit variable and applies maximum likelihood estimation. The chi square difference test was conducted to choose the appropriate model among a given model and any nested models, and the Wald Statistics was used to test the significance of individual independent variables. A binary logistic regression is used to predict a dichotomous variable from a set of explanatory variables. Multinomial logistic regression is used to handle the dependent variable with more than two categories.

The purpose of the current study was to examine the effect of both economic and organizational factors on new teachers' career choices. The dependent variable (teacher employment status) was a multinomial outcome involved three categories: leaver, mover or stayer. In the current study, the stayers were treated as a reference group. Two generalized logits are defined as:

$$\log it(\theta_1) = \log\left(\frac{\pi_1}{\pi_3}\right)$$

$$\log it(\theta_2) = \log\left(\frac{\pi_2}{\pi_3}\right)$$

Where π_1 = probability of moving to another school

π_2 = probability of leaving teaching

π_3 = probability of staying at the same school

The multinomial logistic model is defined as

$$\logit(\theta_j) = \alpha_j + \beta_{1j}X_1 + \beta_{2j}X_2 + \dots + \beta_{kj}X_k$$

Where $j = 1, 2$ indicating the two logits and

α_j = constant and

β_{kj} is the regression coefficient and there are k independent variables (x).

The value of the regression coefficient determines the direction of the relationship between the independent variables and the logit variable. If the logistic regression coefficient is positive, the odds ratio will be greater than 1, which means that the probability of being in the reference group decreases as the independent variable increases. If the logistic regression coefficient is negative, the odds ratio will be less than 1, which means that the probability of being in the reference group increases as the value of independent variable increases.

In this study, two different sets of regression parameters were generated based on the same set of independent variables, and interactions among the predictors were examined through the products of relevant predictors.

CHAPTER 4. RESULTS

The chapter describes the analytical procedures used to answer the research questions. Principal components analysis addressed the measurement of proposed four aspects of teacher perceived school contexts. Descriptive statistics provided a profile of new teachers, and Analysis of Variance was used to compare teachers' perceptions of workplace and salary satisfaction. Multinomial logistic regression was implemented to investigate factors that influenced new teacher attrition, mobility and retention.

Principal Components Analysis

Principal component analysis was implemented to construct the dimensions of teacher perceived working conditions. Based on the survey content analysis and prior studies, 44 survey items were identified related to working conditions. Initial Principal Component Analysis (PCA) with promax rotation was performed on the 44 survey items. Survey items that loaded on more than one component were dropped, and items with factor loading ($< .50$) were excluded. Any components that accounted for at least 5 % of the total variance were retained. The final PCA generated four components explained 52% of the total variance.

The first component (student behavior problems) was measured by 13 items, and the factor loadings for each item ranged from .60 to .80. The second component (supportive principal and administration) was measured by six items, and the factor loadings for each item ranged from .71 to .82. The third component (shared decision-making) comprised seven items, and the factor loadings for each item ranged from .60

to .73. The fourth component (teacher autonomy) was measured by five items, and the minimum factor loading for one of the five items was 0.57. That was considered acceptable. Each factor score was computed based on the standardized scoring coefficients, and had a mean of zero and a standard deviation of one. Table 4.1 provides descriptive statistics for the individual survey items.

Table 4.1. Principal Component Analysis Results for Working Conditions

Factors	Items	Factor Loading
Supportive principal and administration	Agree-The principal lets staff members know what is expected of them.	0.81
	Agree-The school administration's behavior toward the staff is supportive and encouraging.	0.79
	Agree-My principal enforces school rules for student conduct and backs me up when I need it.	0.76
	Agree-The principal talks with me frequently about my instructional practices.	0.71
	Agree-The principal knows what kind of school he/she wants and has communicated it to the staff	0.82
	Agree-In this school, staff member are recognized for a job well done.	0.75
Shared decision-making	Influence-Setting performance standards for students of this school	0.70
	Influence-Establishing curriculum	0.66
	Influence-Determining the content of in-service professional development programs	0.69
	Influence-Evaluating teachers	0.73
	Influence-Hiring new full-time teachers	0.67
	Influence-Setting discipline policy	0.67
	Influence-Deciding how the school budget will be spent	0.60
Teacher autonomy	Control-Selecting textbooks and other instructional materials	0.57
	Control-Selecting content, topics, and skills to be taught	0.70
	Control-Selecting teaching techniques	0.75
	Control-Evaluating and grading students	0.73
	Control-Determining the amount of homework to be assigned	0.64
Student behavior problems	Agree-The amount of student tardiness and class cutting in this school interferes with my teaching.	0.60
	Problem-Student tardiness	0.69
	Problem-Student absenteeism	0.73
	Problem-Students cutting class	0.80
	Problem-Physical conflicts among students	0.60
	Problem-Robbery or theft	0.64
	Problem-Vandalism of school property	0.71
	Problem-Student pregnancy	0.70
	Problem-Student drug abuse	0.74
	Problem-Student possession of weapons	0.68
	Problem-Student disrespect for teachers	0.69
	Problem-Students dropping out	0.75
	Problem-Student apathy	0.70

Correlations among teacher perceived workplace conditions are presented in

Table 4.2. The highest correlation is for the variable of supportive principal and

administration and shared decision-making ($r = .35$), suggesting that the intercorrelations among the four factors were moderate. Supportive principal and administration was also positively related to teacher autonomy ($r = .12$), but was negatively associated with student behavior problems with coefficient of $-.27$, suggesting that resolving student discipline problems might require support from principals. The factor of student behavior problems was associated with shared decision-making with coefficients of $-.16$. There was little association between student behavior problems and teacher autonomy ($r = -.01$). The correlation between shared decision-making and teacher autonomy was weak with a coefficient of $.21$.

Table 4.2. Intercorrelations among variables

	Student behavior problems	Supportive principal and administration	Shared decision-making	Teacher autonomy
Student behavior problems	1.00			
Supportive principal and administration	-0.27	1.00		
Shared decision-making	-0.16	0.35	1.00	
Teacher autonomy	-0.01	0.12	0.21	1.00

A Profile of New Teachers

The majority of the new teachers were female (71.5%), white (88.1%), and had at least a bachelor's degree (77.4%). Approximately 56% of the teachers earned less than \$30,000 annually, 43% of the teachers had yearly income between \$30,000 and \$45,000, and only 1.3% earned more than \$45,000 yearly.

Studies have shown that the teacher attrition rate demonstrates a U shaped pattern (Kirby and Grissmer, 1993; Hanushek et al., 2004; Ingersoll, 2001). The descriptive findings from SASS (1999-2000) and TFS (2000-2001) also suggest the same pattern.

As shown in Table 4.3, teachers with one to five years of working experience had the highest mobility rate (12.58%), and the mobility rate decreased as teachers' teaching experience increased. Teachers who had more than 20 years working experience only had about a three percent mobility rate. Approximately eight percent of new teachers left the profession, while about nine percent of teachers in the last stage of their career choose to leave teaching.

Table 4.3. Teacher turnover rate (within one year) by career stages

	Weighted N	Leaver	Mover	Stayer
Early years in teaching (1-5 years)	595,994	7.85%	12.58%	79.57%
Second stage (6-10 years)	425,671	6.46%	8.67%	84.87%
Third stage (11-20 years)	613,270	5.08%	6.07%	88.85%
Last stage (over 20 years)	745,508	9.01%	3.26%	87.73%

Note. *This analysis was based on a dataset constructed from SASS (1999- 2000) and TFS (2000-2001), including 3,280 public school full time teachers.

Table 4.4 shows various characteristics of teacher mobility and attrition. The attrition rate for male teachers was 10.49% within one year, and the number was much lower for female teachers, but female teachers had higher mobility rates compared with male teachers (13.6% vs. 10.02%). Approximately 12% of the teachers who earned less than \$25,000 yearly left the teaching profession within one year. In contrast, only about three percent of the teachers who made more than \$45,000 yearly left the teaching profession. ELS, special education and vocational teachers had much higher mobility and attrition rates compared with math and science teachers. Approximately 29 % of the ELS teachers moved or left within one year, and about 26% of the vocational teachers moved or left within one year. Nearly nine percent of math and science teachers left teaching and 11% of them transferred to different schools.

Table 4.4. Distribution of Leavers, Movers and Stayers for Selected Teacher Characteristics

	All	Leavers	Movers	Stayers
Gender				
Female	71.54%	6.80%	13.60%	79.60%
Male	28.46%	10.49%	10.02%	79.49%
Teaching level				
Elementary	54.12%	7.92%	12.76%	79.32%
Secondary	45.88%	7.77%	12.37%	79.87%
Race				
American Indian	1.09%	9.27%	16.25%	74.48%
Asian	2.10%	1.71%	20.98%	77.31%
Black	8.66%	4.40%	12.81%	82.79%
White	88.14%	8.32%	12.31%	79.37%
Salary				
Less than \$25001	20.86%	12.45%	10.42%	77.13%
\$25001-\$30000	35.49%	7.91%	16.49%	75.59%
\$30001-\$35000	28.80%	6.53%	10.87%	82.60%
\$35001-\$45000	13.55%	3.84%	8.80%	87.37%
\$45001 or more	1.30%	3.35%	17.64%	79.01%
Degree				
No Degree	0.58%	6.51%	7.58%	85.91%
Bachelor	77.38%	7.97%	12.54%	79.49%
Master	22.04%	7.47%	12.85%	79.67%
Subject Area				
ELS Education	1.66%	13.05%	15.76%	71.19%
English	8.87%	5.66%	11.08%	83.26%
Foreign Languages	2.62%	8.63%	12.30%	79.07%
General Elementary	36.54%	8.16%	12.74%	79.10%
Math and Science	16.99%	8.90%	10.76%	80.34%
Social Science	5.88%	6.32%	6.19%	87.49%
Special Education	10.84%	7.05%	17.24%	75.71%
Vocational Education	3.25%	11.74%	14.58%	73.68%
Others	13.35%	6.70%	13.65%	79.66%

Notes.

* Weighted N = 595,994

** This analysis was based on a dataset constructed from SASS (1999-2000) and TFS (2000-2001), including 1,259 public school full time teachers with one to five years of working experiences.

As indicated in Table 4.5, new teachers' mobility rates (16%) and attrition rates (9%) were higher in schools with 50% or more students eligible for free or reduced price lunch. Teachers who worked at schools in large or mid-size central cities had a higher turnover rate (24%) when compared with those who taught in suburban and rural schools.

Table 4.5. Distribution of Leavers, Movers and Stayers for Selected School Characteristics

	All	Leavers	Movers	Stayers
Urbanicity of School				
Large or mid-size central city	25.06%	10.73%	13.56%	76.72%
Urban fringe of large or mid-size city	51.10%	6.62%	13.17%	80.21%
Small town/Rural	23.84%	7.46%	10.30%	82.24%
Percentage of student eligible for free/reduced price lunch				
Less than 5%	8.31%	5.47%	8.72%	85.81%
5%-19%	22.73%	8.35%	13.86%	77.79%
20%-49%	34.62%	6.77%	9.61%	83.62%
50% or more	34.34%	9.18%	15.67%	75.15%
Percentage of Minority Students				
Less than 5%	20.80%	6.49%	12.76%	80.74%
5%-19%	22.53%	6.90%	11.72%	81.38%
20%-49%	23.22%	10.83%	12.00%	77.17%
50% or more	33.45%	7.27%	13.44%	79.29%

Notes.

* Weighted N= 595,994

** This analysis was based on a dataset constructed from SASS (1999-2000) and TFS (2000-2001), including 1,259 public full time teachers with one to five years of working experiences.

In summary, the descriptive findings from SASS (1999-2000) and TFS (2000-2001) indicate that new teachers have higher overall attrition and mobility rates. Males had a relatively higher attrition rate, while females had a comparatively higher mobility rate. There was no clear pattern showing that the new teachers' turnover consistently increased as the proportions of students eligible for free or reduced price lunch and minority students increased.

New Teacher Assessment on Salary Satisfaction and Workplace

This section examined whether the three groups of teachers evaluated workplace and salary satisfaction differently. The present analysis applied teacher weight (TFSFINWT) to compensate for the unequal probability sampling, and estimated the variance by using the balanced repeated replication (BRR) method (replicate weights TFRPWT1 – TFRPWT88) with SAS PROC SURVEYREG procedure. Two dummy variables were created. The first one, denoted by D1, equals 1 for movers, and equals 0

otherwise. The second one, denoted D2, equals 1 for leavers, and equals 0 otherwise. The stayers were treated as the reference group. The intercept reflects the mean of the reference group on the measure. The coefficient of D1 represents the difference between the mean of the movers and that of stayers on the measure, and the coefficient of D2 reflects the mean difference between the leavers and stayers on the measure. Five regression procedures were conducted to examine three groups of teachers' perceptions on the constructs of student behavior problems, supportive principal and administration, shared decision-making, teacher autonomy and salary satisfaction.

In the Analysis of Variance Table, the overall F-test provides a test of $H_0: \beta_1 = 0$ and $\beta_2 = 0$ versus the alternative hypothesis (H_a) that at least one of β_1 and β_2 does not equal zero. If the null hypothesis was rejected, follow-up regression results are reported in Table 4.6 for leavers and movers (versus the reference group of stayers). First, the results suggested that teacher perceived salary satisfaction ($M = 2.17$, $SD = 1$) was significantly different among the three groups of teachers, ($F [2, 88] = 3.18$, $p < 0.05$). Teachers' salary satisfaction was measured on a 4-point scale from 1 (strongly disagree) to 4 (strongly agree), and the average teachers' salary satisfaction was 2.17. As shown in Table 4.6, stayers expressed higher salary satisfaction compared with leavers, ($t = -2.04$, $p < 0.05$). The mean score for stayers was higher than that of leavers ($M = 2.21$ vs. $M = 1.99$). There was no significant difference between stayers and movers with regard to salary satisfaction ($t = -1.97$, $p > 0.05$).

Second, the three groups of teachers rated the scale of student behavior problems ($M = -0.21$, $SD = 1$) significantly differently, ($F [2, 88] = 4.63$, $p < 0.05$). As shown in Table 4.6, movers ($M = -0.07$) reported greater concerns regarding student behavior

problems compared with stayers ($M = -0.26$), ($t = 2.67, p < 0.01$). The mean score of leavers was significantly higher than that of stayers ($M = 0.02$ vs. $M = -0.26$), ($t = 2.37, p < 0.05$).

Third, there was a significant difference regarding teachers' perceptions of supportive principal and administration ($M = 0.07, SD = 1$) among stayers, movers and leavers, ($F [2, 88] = 4.39, p < 0.05$). The mean score of stayers was higher than that of movers ($M = 0.12$ vs. $M = -0.22$), ($t = -2.94, p < 0.01$). No significant difference was found between stayers and leavers with regard to the supportive principal and administration ($t = -0.50, p > 0.05$).

Fourth, the three groups of teachers showed no significant difference on the perceptions of shared decision-making ($M = -0.01, SD = 1$), ($F [2, 88] = 2.44, p > 0.05$), and teacher autonomy ($M = -0.06, SD = 1$), ($F [2, 88] = 0.77, p > 0.05$). The follow-up regression results are therefore not reported in Table 4.6.

Table 4.6. Regression results of teachers' assessment on working conditions and salary satisfaction

Dependent variable : student behavior problems				
Parameter	Estimate	SE	t	p
Intercept	-0.258	0.046	-5.600	<0.0001
Mover	0.190	0.071	2.670	0.009**
Leaver	0.274	0.116	2.370	0.020*
Dependent variable : supportive principal and administration				
Parameter	Estimate	SE	t	p
Intercept	0.116	0.055	2.110	0.038
Mover	-0.334	0.113	-2.940	0.004**
Leaver	-0.087	0.174	-0.500	0.618
Dependent variable: salary satisfaction				
Parameter	Estimate	SE	t	p
Intercept	2.206	0.055	40.130	<0.0001
Mover	-0.178	0.091	-1.970	0.053
Leaver	-0.219	0.107	-2.040	0.044*

Note. Estimates using proc surveyreg procedure to adjust the SE. * $p < 0.05$, ** $p < 0.01$.

Factors Influencing Teacher Mobility, Attrition and Retention

Multinomial logistic regression was used to examine the relationship between teacher retention decisions and teachers' perceived working conditions, salary satisfaction and the alternative opportunity cost. The SAS PROC SURVEYLOGISTIC procedure was used, taking into account the survey design variables (teacher final weight: TFSFINWT and replicate weights: TFRPWT1 – TFRPWT88).

In the current study, the outcome variable was teacher employment status that categorized teachers into three groups: mover, leaver and stayer. The stayers were treated as the reference group. Teacher mobility reflects the probability that a teacher moved to a different school as comparing with staying at the same school, while attrition reflects the likelihood that a teacher left teaching as comparing with staying at the same school.

The effect coding was used in SAS PROC SURVEYLOGISTIC procedure. The categorical variables were coded as 1 versus -1 (see Appendix B). The odds ratio for a categorical variable in the current study was calculated using the following formula: $e^{2\beta}$.

Several models were tested. Model 1 that contained only teacher characteristics and school characteristics served as a baseline in the model selection process. The result of the likelihood ratio test suggested that model 1 was a significant improvement over the intercept-only model. Adding economic factors (model 2) significantly improve the model fit (Wald's $\chi^2 = 29.49$, $df = 18$, $p < 0.05$). In the final model, the four dimensions of working conditions were added, and the interaction between teaching level (elementary teachers vs. secondary teachers) and teacher perceived working conditions was also tested. Though the interaction between the factor of student behavior problems

and teaching level was not significant regarding teacher mobility (Wald's $\chi^2 = 3.75$, $p = 0.053$), there was a trend toward significance. Thus, it was kept in the final model and the others were dropped. Using a chi-square difference test, the integrated model (final model) showed a significant improvement over model 2 ($\Delta\chi^2 = 14928.49$, $df = 10$, $p < 0.01$).

Model 1

The first model considered the five teacher characteristics (gender, race, teaching level, teaching experience and education level) and two school characteristics (percentage of students eligible for free or reduced price lunch and percentage of minority students). The results indicated that the base model against a constant only model was statistically significant (Likelihood ratio test $\chi^2 = 8905.84$, $df = 14$, $p < 0.01$).

Table 4.7. Multinomial Logistic Regression Analysis of Teacher Mobility and Attrition (Model 1)

Predictors	β	SE	Wald's χ^2	p	Odds Ratio
Mobility					
Intercept	-1.736	0.220	62.396	<0.0001	
Teacher characteristics					
Female	0.157	0.107	2.178	0.140	1.369
Non-white	0.044	0.151	0.086	0.770	1.092
Secondary teacher	0.014	0.095	0.022	0.882	1.029
Master degree	0.030	0.115	0.069	0.793	1.062
Teaching experience	-0.038	0.076	0.250	0.617	0.963
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	-0.033	0.123	0.072	0.789	0.936
Percentage of minority students (>=50%)	0.049	0.115	0.182	0.670	1.103
Attrition					
Intercept	-2.003	0.392	26.099	<0.0001	
Teacher characteristics					
Female	-0.266	0.151	3.100	0.078	0.587
Non-white	-0.349	0.201	2.993	0.084	0.498
Secondary teacher	-0.061	0.125	0.237	0.627	0.886
Master degree	0.050	0.140	0.129	0.720	1.106
Teaching experience	-0.205	0.080	6.531	0.011*	0.815
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	0.113	0.155	0.528	0.468	1.253
Percentage of minority students (>=50%)	-0.070	0.151	0.212	0.645	0.870
Test			χ^2	df	p
Overall model evaluation					
Likelihood ratio test			8905.839	14.000	<.0001
Score			8579.982	14.000	<.0001
Wald			18.872	14.000	0.170
-2 Log L	756797.130				

Note. * $p < 0.05$

Model 2

Model 2 included two factors related to economics: teacher perceived salary satisfaction and teaching subject (science teachers vs. non-science teachers), which significantly improved the model fit (Wald's $\chi^2 = 29.49$, $df = 18$, $p < 0.05$). Teacher perceived salary satisfaction exhibited a significant influence on teacher retention decisions. The odds ratio of 0.71 indicates that a one standard deviation increase in a teacher's perceived salary satisfaction decreased the odds of leaving teaching by 29

percent. In other words, new teachers were more likely to stay if they were satisfied with their salary. However, the effect of salary satisfaction was not significant related to teacher mobility (Wald's $\chi^2 = 3.60, p > 0.05$).

Science teachers have higher opportunity costs since they can earn better salaries in the job market outside of education compared with teachers in other fields. The findings of this study showed, however, that science teachers were no more likely to move to another school (Wald's $\chi^2 = 0.72, p > 0.05$) or leave teaching (Wald's $\chi^2 = 0.01, p > 0.05$) as compared with other content areas teachers.

Table 4.8. Multinomial Logistic Regression Analysis of Teacher Mobility and Attrition (Model 2)

Predictors	β	SE	Wald's χ^2	<i>p</i>	Odds Ratio
Mobility					
Intercept	-1.388	0.346	16.127	<0.0001	
Teacher characteristics					
Female	0.154	0.108	2.035	0.154	1.360
Non-white	-0.008	0.156	0.003	0.958	0.984
Secondary teacher	0.048	0.104	0.214	0.644	1.100
Master degree	0.031	0.116	0.070	0.792	1.063
Teaching experience	-0.060	0.077	0.600	0.439	0.942
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	-0.053	0.122	0.185	0.667	0.900
Percentage of minority students (>=50%)	0.035	0.120	0.085	0.771	1.072
Economic related factors					
Science teacher	-0.139	0.164	0.721	0.396	0.757
Salary satisfaction	-0.205	0.108	3.593	0.058	0.815
Attrition					
Intercept	-1.278	0.549	5.414	0.02	
Teacher characteristics					
Female	-0.274	0.154	3.161	0.075	0.578
Non-white	-0.442	0.209	4.452	0.035*	0.413
Secondary teacher	-0.044	0.127	0.120	0.729	0.916
Master degree	0.062	0.139	0.202	0.654	1.133
Teaching experience	-0.238	0.084	8.124	0.004**	0.788
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	0.084	0.155	0.292	0.589	1.183
Percentage of minority students (>=50%)	-0.087	0.155	0.317	0.573	0.840
Economic related factors					
Science teacher	-0.016	0.206	0.006	0.937	0.968
Salary satisfaction	-0.337	0.130	6.722	0.001**	0.714
Test			χ^2	df	p
Overall model evaluation					
Likelihood ratio test			14947.849	18.000	<.0001
Score			14611.796	18.000	<.0001
Wald			29.491	18.000	0.043
-2 Log L	750755.120				

Note. *p<.05 **p<.01

Model 3 (final model)

The third model examined the four teachers' perceived working conditions: student behavior problems, supportive principal and administration, shared decision-making, and teacher autonomy. The interaction between the teaching level (elementary

teachers vs. secondary teachers) and the four dimensions of working conditions were also tested. The final model was significantly improved compared to the model 2 ($\Delta \chi^2 = 14928.49$, $df=10$, $p < 0.01$).

The findings suggest that the construct of teacher perceived student behavior problems had a significant effect on teacher mobility (Wald's $\chi^2 = 4.7$, $p < 0.05$) and attrition (Wald's $\chi^2 = 6.39$, $p < 0.05$). A one standard deviation increase in a teacher's perception of student behavior problems increased his/her odds of moving to another school by 28 percent. The influence of student behavior problems on teacher attrition was substantial. A one standard deviation increase in a teacher's assessment of student behavior problem increased his/her odds of leaving teaching by 57 percent.

The interaction between student behavior problems and teaching levels (secondary teachers vs. elementary teachers) was not significant at the alpha level of 0.05, however, it was close to significant (Wald's $\chi^2 = 3.75$, $p = 0.053$). For secondary school teachers, the odds ratio was 1.045 for a one standard deviation increase in the construct of student behavior problems; for elementary school teachers, the odds ratio was 1.578 for a one standard deviation increase in the factor of student behavior problems. In other words, the effect of student behavior problems for elementary teachers was 1.51 times the effect of student behavior problems for secondary teachers regarding teacher mobility. Though the interaction was not significant in the current study, it will be worth examining whether the effect of student behavior problems differs between elementary and secondary school teachers in the future studies.

The construct of supportive principal and administration was also a significant predictor of new teacher mobility (Wald's $\chi^2 = 3.99$, $p < 0.05$), but had no effect on

attrition (Wald's $\chi^2 = 0.003$, $p > 0.05$). The odds ratio of 0.77 indicated that a one standard deviation increase in a teacher's assessment of principal support decreased his/her odds of moving to another school by 23 percent.

The results showed that teacher autonomy had no effect on either mobility (Wald's $\chi^2 = 0.39$, $p > 0.05$) or attrition (Wald's $\chi^2 = 0.98$, $p > 0.05$), and the factor of shared decision-making had no influence on mobility (Wald's $\chi^2 = 0.57$, $p > 0.05$) and attrition (Wald's $\chi^2 = 0.001$, $p > 0.05$).

The odds ratio of salary satisfaction changes from 0.71 (model 2) to 0.73 in the final model, suggesting that teacher perceived salary satisfaction maintained a significant effect on teacher retention decisions even when the four dimensions of working conditions were added in the model. A one standard deviation increase in a teacher perceived salary satisfaction decreased his/her odds of leaving the profession by 27 percent.

In addition to the effects of teacher perceived working conditions and two economic related factors on teacher retention decisions, the findings also showed that teaching experience was a significant predictor of teacher attrition (Wald's $\chi^2 = 8.12$, $p < 0.01$). The first year teachers were more likely to leave the teaching profession. Every one year increase in teaching experience decreased the odds of leaving by 23 percent.

In summary, the findings of this study indicated that the factor of student behavior problems was associated with teacher mobility and attrition, but it varied in degree. It had a strong influence on teacher attrition but moderate effect on mobility. The supportive administration and principal factor showed moderate effect on teaching

mobility, but had no influence on teacher attrition. The study did not find that teacher autonomy and shared decision-making influenced teacher mobility or attrition.

Science teachers were no more likely to leave the teaching profession as compared with other content area teachers, given their higher opportunity costs. As expected, new teachers were more likely to stay in the teaching profession if they were satisfied with their salary. However, salary satisfaction was not associated with teacher mobility. Also, the findings did not suggest that teachers were more likely to leave or move from schools with high proportions of students eligible for free or reduced price lunch and minority students. Given that in the current study the two variables were categorical dummy variables, these findings might need to be further examined. As for the teacher characteristics, only teaching experience had a significant effect on teacher attrition but no influence on mobility.

Table 4.9. Multinomial Logistic Regression Analysis of Teacher Mobility and Attrition

Predictors	β	SE	Wald's χ^2	p	Odds Ratio
Mobility					
Intercept	-1.288	0.361	12.700	0.0004**	
Demographic variables					
Female	0.151	0.111	1.851	0.174	1.353
Non-white	0.051	0.164	0.099	0.753	1.108
Secondary teacher	-0.120	0.120	0.990	0.320	0.786
Master degree	0.087	0.122	0.506	0.477	1.190
Teaching experience	-0.090	0.084	1.162	0.281	0.914
Economic related factors					
Science teacher	-0.128	0.165	0.603	0.438	0.775
Salary satisfaction	-0.128	0.115	1.241	0.265	0.880
Institutional characteristics					
Working conditions					
Student behavior problems	0.250	0.115	4.701	0.030*	1.284
Supportive administration and principal	-0.260	0.130	3.995	0.046*	0.771
Shared decision-making	-0.092	0.122	0.568	0.451	0.912
Teacher autonomy	0.065	0.105	0.391	0.532	1.068
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	-0.093	0.130	0.540	0.460	0.831
Percentage of minority students (>=50%)	-0.047	0.126	0.137	0.712	0.911
Interaction					
Student behavior problems*secondary	-0.206	0.106	3.748	0.053	0.660

Table 4.9. (continued)

Predictors	β	SE	Wald's χ^2	p	Odds Ratio
Attrition					
Intercept	-1.071	0.619	2.997	0.083	
Demographic variables					
Female	-0.262	0.159	2.733	0.098	0.592
Non-white	-0.371	0.215	2.993	0.084	0.476
Secondary teacher	-0.300	0.184	2.663	0.103	0.549
Master degree	0.122	0.153	0.637	0.425	1.277
Teaching experience	-0.266	0.093	8.121	0.004**	0.767
Economic related factors					
Science teacher	-0.007	0.208	0.001	0.973	0.986
Salary satisfaction	-0.322	0.138	5.426	0.020*	0.725
Institutional characteristics					
Working conditions					
Student behavior problems	0.449	0.178	6.385	0.012*	1.567
Supportive administration and principal	-0.011	0.211	0.003	0.957	0.989
Shared decision-making	-0.004	0.111	0.001	0.971	0.996
Teacher autonomy	0.128	0.129	0.985	0.321	1.137
School characteristics					
Percentage of students eligible for free or reduced price lunch (>20%)	0.051	0.157	0.107	0.744	1.108
Percentage of minority students (>=50%)	-0.196	0.156	1.577	0.209	0.676
Interaction					
Student behavior problems*secondary	-0.118	0.147	0.642	0.423	0.790
Test			χ^2	df	p
Overall model evaluation					
Likelihood ratio test			29876.34	28.00	<.0001
Score			30365.19	28.00	<.0001
Wald			54.47	28.00	0.00
-2 Log L	735826.630				

Note.

The categorical variables were coded using effect coding in PROC SURVEYLOGISTIC. The odds ratios were computed using $\exp(\beta)$ for numerical variables, and they were computed using $\exp(2\beta)$ for categorical variables. The odds ratio of interaction reflects the ratio of two odds ratios (secondary school teachers vs. elementary school teachers).

* $p < 0.05$, ** $p < 0.01$.

CHAPTER 5. DISSCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This chapter summaries the current study, discusses the implications of these findings, presents recommendations for future studies.

Summary of Study

This study focused on full time public school teachers with one to five years of teaching experience. The data were drawn from SASS (1999-2000) and TFS (2000-2001) including 1,259 teachers (weighted N = 595,994). The current study distinguished teacher mobility and attrition since they might be associated with different attitudes and behaviors (Imazkei, 2005). The dependent variable was a multinomial outcome involving three categories: leaver, mover or stayer. Multinomial logistic regression was conducted to examine the relationship between proposed predictors and teacher retention. In this study, stayers were treated as the reference group. Two logistic regression equations were generated based on the same set of predictors. The first one contrasted movers versus stayers, and the second one contrasted leavers versus stayers.

SASS implemented a two stage stratified sampling design. Schools were chosen first and teacher samples were selected from within each sampled school (Tourkin et al., 2004). To address the problem that a complex sampling design might cause bias in the variance estimation and statistical tests (Lee and Forthofer, 2006), the current study used teacher final weights (TFSEFINWT) to compensate for the unequal probability sampling, and estimated variance by using the balanced repeated replication (BRR) method (replicate weights TFRPWT1-TFRWT88) with SAS PROC SURVEYLOGISTIC procedure.

The purpose of this study was to examine teacher mobility and attrition using an integrated model that contained both economic and institutional factors. The integrated model contained two economic-related factors (teachers' salary satisfaction and teaching subject) and four dimensions of working conditions (student behavior problems, shared decision-making, teacher autonomy and supportive principal and administration). Teacher characteristics (gender, race, advanced degree, teaching level and teaching experience) and school characteristics (the proportion of students eligible for free or reduced price lunch and the proportion of minority students) were also included in the statistical model.

Two logistic regression equations were generated based on all the predictors. In addition, the interaction between teacher characteristics and teacher perceived working conditions was also tested. Results suggested that an integrated model containing both economic and organizational factors offers a better understanding of teacher retention. The findings were presented as they related to economic approach and organizational perspective.

Discussion

The impact of salary and alternative job opportunity

Salary and perceived alternative opportunities are the central concepts of applying an economic model to understand teachers' career decisions. As expected, new teachers were more likely to stay in the teaching profession if they were satisfied with their salary. It was consistent with the previous studies (Kirby and Grissmer, 1993; Imazeki, 2005; Murnane and Olsen, 1990; Shen, 1997; Stinebrickner, 2002; Theobald, 1990). The odds ratio of 0.73 suggests that a one standard deviation increases in a teacher's salary

satisfaction decreased the odds of teacher attrition by 27 percent. The results of the Analysis of Variance also indicated that new teachers who left the profession expressed higher salary dissatisfaction compared with teachers who remained at the same school. In the current study, new teachers perceived salary satisfaction was not associated with teacher mobility.

The finding that science teachers were no more likely to leave the profession as compared with other content area teachers contradicted findings in some prior studies (Murnane and Olsen, 1990; Rickman and Parker, 1990; Stinebrickner, 1998), but it was consistent with the study by Strunk and Robinson (2006) using the same national dataset.

The impact of working conditions

The education literature proposes a wide range of dimensions of school organizations, particularly in the areas of leadership, teacher autonomy and empowerment, which are associated with teacher job satisfaction, commitment and retention. Of the four dimensions of teacher perceived working conditions examined in the study, and only the factors of student behavior problems and supportive principal and administration were associated with new teacher retention. The assumption that empowering teachers was associated with teacher retention was not supported in this study, and the study did not find that teacher autonomy and shared decision-making had effects on teacher attrition and mobility. One possible explanation for the finding is that new teachers are still in a “survival” mode and therefore concentrate on issues pertaining directly to their classrooms: preparing lessons, instruction, and classroom management, and they probably are not ready to play a large role beyond the classrooms and teaching in schools.

Student behavior problems. This study highlights the influence of student behavior problems on new teacher mobility and attrition. New teachers who either moved to another school or left the profession reported greater concern about students' behavior problems compared with teachers who remained at the same school. New teachers were more likely to leave or move to another school when facing serious student behavior problems in schools. The odds ratio of 1.28 suggests that a one standard deviation increase in a teacher's perception of student behavior problems increased the odds of teacher mobility by 28 percent. The effect of student behavior problems on new teacher attrition is substantial. A one standard deviation increase in a teacher assessment of student behavior problems increased the odds of teachers' leaving by 57 percent.

Supportive principal and administration. Supportive principal and administration was another significant factor that was associated with teacher mobility. A one standard deviation increase in a teacher's assessment of the supportive principal and administration decreased the odds of transferring by approximately 23 percent. The results of the Analysis of Variance also showed that new teachers who remained at the same school expressed higher positive perceptions of principal support compared with teachers who moved to another school. This finding was consistent with other studies (Boyd et al., 2011; Ingersoll, 2001; Ladd, 2011; Shen, 1997; Weiss, 1999; Loeb, Darling-Hammond and Luczak, 2005). However, this construct had no impact on new teacher attrition.

The construct of supportive principal and administration in the current study reflects the following three aspects of supportive principal and administration: (1) new teachers feel more supported when a principal is willing to back them up when it comes

to student discipline problems; (2) new teachers feel more supported when a principal provides recognition for teachers' efforts, and instructional feedback; (3) new teachers value a principal who expresses clear expectations for teachers and shares his or her vision of the school's goals with teachers.

Due to the limitations related to the teacher survey, the study was unable to determine the particular characteristics of supportive principal and administration that new teachers value and appreciate. The education literature suggests that effective principals often display a wide range of skills and are able to fit them into the particular school contexts (Parkay, Currie and Rhodes, 1992). For example, beginning teachers seem to value principals who provide direction but at the same time do not stifle them, and recognize their professional judgment but are willing to help when they need it (Brown and Wynn, 2007). New teachers feel more supported when principals directly interact with them by visiting their classrooms regularly, providing regular feedback on their pedagogical approaches, helping them develop content knowledge and classroom management strategies, and facilitating mentorship assistance (Wood, 2005). Johnson and Birkeland (2003) report that new teachers often request a transfer from schools because their principals were aloof or failed to display concern for them. Principals also play a major role in allocating time for teachers to meet, and facilitating interaction among teachers for job-embedded professional development (Wahlstrom and Louis, 2008). Further analytic studies are needed to better define the particular items within the construct of supportive principal and administration.

In summary, findings from this study indicated that the effects of working conditions on teacher mobility and attrition were not consistent. The factor of supportive

administration and principal had only moderate impact on teacher mobility, but had no influence on teacher attrition, and the factor of student behavior problems was associated with both new teacher mobility and attrition.

The impact of teacher characteristics and the student composition

In accordance with prior studies, this study showed that first year teachers were at the highest risk of leaving the profession, and new teachers who gained more experience were less likely to leave the profession. However, teaching experience had no influence on mobility. Also, it is worth noting that some organizational features, such as student composition, were not associated with teacher career decisions in the current study. That is, the findings did not suggest that teachers were more likely to leave or move from schools with high proportions of students eligible for free or reduced price lunch and minority students. This finding is limited, however, because the two variables used were categorized as dummy variables. Future studies might yield more information if the variables are continuous or numerical.

Implications

The current study suggests that both intrinsic and extrinsic sources of rewards are associated with new teacher retention. Policy makers, districts and school administrators need to pay more attention to increasing teachers' salary satisfaction, establishing supportive school environments, improving new teachers' classroom management skills and assigning new teachers to classes that are appropriate for their skill levels as novices.

High teacher salaries decrease new teacher attrition. Teachers' salaries might not be able to attract college graduates to enter the teaching profession, but it certainly is a factor associated with new teachers' career decisions to stay. The finding from this study

is consistent with the literature (Imazeki, 2005; Murnane and Olsen, 1990; Shen, 1997; Stinebrickner, 2002). However, this study does not provide information on *how* financial incentives retain new teachers. Some economists have demonstrated that across the board salary increases could increase the employment duration (Murnane et al., 1990; Stinebrickner, 2001). Teachers are also sensitive to the wage differences among districts (Imazeki, 2005). Further investigation is needed to understand how much higher salaries and what types of pay structures could be more effective to retain new teachers.

School districts need to participate more actively in principal selection, preparation and professional development in order to recruit and develop effective school leaders. It is not surprising that new teachers are less likely to leave their schools when they have more positive perceptions about the principals and administrators. Principals play a major role in creating positive working conditions that promote teachers' professional growth and success. Without adequate professional support, many new teachers leave the teaching profession or transfer to different schools in search of more supportive leadership (Johnson and Birkeland, 2003). It is very challenging to create policies to promote supportive working conditions for new teachers. However, school districts can work in partnership with universities to identify the individuals with potential leadership, host meaningful internship experiences, and provide advice on program content and delivery (Lashway, 2003). They can also play a key role in providing ongoing professional development to increase the levels of effectiveness of school administrators (Normore, 2004). Parkay et al. (1992) suggest that principals pass through five stages of principal career: survival, control, stability, educational leadership, and profession actualization, and principals only are able to display higher levels of

leadership in the last two stages. School districts need to provide integrated and articulated induction programs and mentoring programs to support and guide new principals' professional development. The continuing professional renewal of experienced principals is a process of lifelong learning. These learning opportunities might include portfolio development, professional action planning, and opportunities to become coaches (Chapman, 2005).

Findings from this study suggested that the construct of teacher perceived student behavior problems was a major concern for new teachers who left the profession, and was the most significant predictor of new teacher attrition and mobility. A study by Ingersoll and Smith (2003) also indicated that student behavior management competence significantly influence the persistence of new teachers. A major implication of this study is that new teachers are more concerned about classroom management skills, and they are more likely to leave the profession or move to different schools when they can't handle students' behavior problems in classrooms. However, many pre-service teachers and new teachers may not be well enough prepared in the area of classroom management because of the limited time in their preparation programs. Classroom management training in teacher preparation programs is perceived too theoretical and disconnected from the "the real world of classroom" (Siebert, 2005, p.385), and teachers, especially secondary teachers, reported being less able and ready to manage student behavior problems (Baker, 2005). Thus, the findings of this study suggest that teacher preparation and professional development must provide new teachers with the skills to handle effectively the disruptive behavior of students.

In addition to inadequate teacher preparation and professional development, new teachers are more vulnerable because they are more likely to be placed in the toughest schools, often with the most challenging students, and they simply do not have the skills and experience to handle the problems. It usually takes several years for new teachers to become very competent in organizing classroom and managing the behavior of their students (Ritter and Hancock, 2007). Mentoring and induction programs are effective ways to reduce new teacher attrition (Smith and Ingersoll, 2004), but the impact may depend on how the programs are structured, and what is provided for new teachers. Colleges of Education, districts and schools need to consider the classroom management skills training as the priority of supportive services for new teachers. They also need to make a concerted effort involving the larger community beyond the school itself to promote and sustain a culture of positive student behavior.

Providing appropriate assignments is essential in new teacher retention. There is little question that most teachers prefer to work in schools with fewer disadvantaged students, and disadvantaged students have more behavior problems compared with their peers. Seniority-based teacher transfer and reassignment policies encourage more highly qualified and experienced teachers to move out of schools with higher proportions of economically disadvantaged students and let those vacancies be filled with less experienced teachers (Cohen-Vogel and Osborne-Lampkin, 2007). In addition, principals are more often constrained by the pressure from experienced teachers and parents, thus more experienced teachers are “rewarded” with better assignments. The findings of this study suggest that if district leaders and principals intend to keep and develop new teachers, their efforts should focus on giving them more balanced assignments. District

and school leaders need to change their practices of teachers' assignment, and match more highly qualified teachers with the most needy students and give the new teachers the opportunity to grow instead of letting them burn out and leave the profession.

Recommendations for Future Research

This study is one of several studies that use large-scale data to examine the effects of teacher perceived working conditions on teacher career decisions. Findings from the study support the significance of some factors suggested in the literature, but failed to support some other expected conclusions, such as the influence of teacher autonomy and shared decision-making on new teacher retention. The disparities between findings of this study and those of previous research raise questions about why studies on teacher retention reflect conflicting or inconclusive results. This may be due to several possible reasons related to research design regarding study samples, statistical methods and measurement of constructs of teacher perceived working conditions.

First, it may be caused by the varied samples used in teacher turnover studies. Some studies only address beginning teachers' retention; while other research does not differentiate between novice teachers and experienced teachers. It appears that factors prominent for experienced teachers' career decisions might not be associated with new teacher retention. From a teacher career-stage standpoint, teachers have different preferences and concerns. A study by Huberman (1993) suggested that a teacher experiences three phases of "professional life cycle", and each of these phases is characterized by different challenges. The early years in teaching have been described as a stage of survival, frustration and challenges (Huberman, 1993). Beginning teachers are

more concerned about student discipline problems. As new teachers gain more experience, achieve competence in the subject matter, and become more comfortable handling students' behavior problems, they might value more professional development opportunities, autonomy and participating the decision-making. A study by Harris and Adams (2007) also suggested that the relatively high ratio of pensions-to-salaries in teaching partly contribute to teachers' early retirement compared with other professionals, and makes pension participation a more significant factor in turnover decisions. A career stage approach to the study of teacher retention could advance our understanding of teacher career decisions. Additional research that examines teacher retention within these career phases might yield better information to use to sustain and develop better teachers.

The second source of variance may derive from the conception and measurement of the independent variables (teacher perceived working conditions). Defining and measuring working conditions in terms of dimensions relevant to teacher's retention are important in comparing findings across studies. Teacher working conditions is a broad concept, and there is not a conclusive definition of it in the literature. Most of the existing empirical studies have used what were available in secondary datasets, and constructed the major components of working conditions based on the statistical methods. Thus, what appears as the same construct in various studies might differ based on the components used to create the construct.

Third, the differences in statistical methods might be worth further examination. For instance, most national data sets implement a complex sampling design. The statistical analysis could inflate type 1 errors if the design effect is ignored in the analysis. This analysis, using the replicate weights to estimate the standard errors, produced fewer

significant predictors compared with the same analysis without considering adjusted the design effect. Thus, it is crucial for researchers to report the statistical methods they used in their studies in detail, so the findings from different studies may be more accurately compared.

In addition to research design considerations, future qualitative studies conducted at the school/district level would be useful to gain in-depth understanding of particular working conditions and its relationship with teacher retention. Quantitative studies using large teacher survey data describe general patterns of teacher retention. However, the problems of teacher retention vary by districts/schools, and require locally appropriate solutions (Allen, 2005).

The construct of student behavior problems was a key finding in this study, but there is little in the existing literature to explain the exact nature of the problem, or what might be done to alleviate it. One area for future studies is to investigate beginning teachers' perceptions of their programs to get deep understanding of how the teaching preparation programs prepare new teachers in area of classroom management. The relationship between the role of a principal leadership in creating a positive school culture that impact behaviors of students and new teacher retention should be another focus of future studies. Finally, a study of identifying what would be the major factors contributing to new teachers' perceptions of disruptive student behaviors need to be done.

In summary, this study highlights the influences of teacher perceived student behavior problems and supportive principal and administration on new teacher retention. From a policy perspective, the importance of working conditions on teacher retention indicates that policies aimed at improving school environment, particularly in the areas of

student behavior management and principal leadership, may be effective at retaining new teachers. Providing new teachers with effective means to handle student behavior problems is particularly important in the context that disruptive student behavior is associated with the students' socioeconomic status (Kellam, Ling, Merisca, Brown and Ialongo, 1998), as is high instability among teachers in schools with high proportion of low-income and minority students. However, the study did not provide enough information on how to improve new teachers' competence on managing student behavior problems, and more importantly it did not examine the relationship between teacher retention and teacher effectiveness. Further studies are necessary to investigate what is the currently occurring in teacher preparation in the area of classroom management, and its relationship with new teacher retention and teacher effectiveness.

Appendix A. Descriptive Statistics

Variable	Mean	SD
Gender	0.72	0.45
Race	0.12	0.32
Teaching level	0.46	0.50
Master's degree	0.22	0.41
Teaching experience	2.85	1.42
Salary satisfaction	2.17	1.00
Science teachers	0.09	0.28
Percentage of students eligible for free or reduced price lunch (> 20%)	0.69	0.46
Percentage of minority students (>=50%)	0.33	0.47
Student behavior problems	-0.21	1.00
Supportive principal and administration	0.07	1.00
Shared decision making	-0.01	1.00
Teacher autonomy	-0.06	1.00

Appendix B. Variable Coding

Variable	Variable Coding (Multinomial logistic regression, SAS)
Dependent Variable	
Teacher status	1=mover, 2=leaver, 3=stayer.
Independent Variables	
Gender	Coded 1 for female and 1 for male.
Race	Coded 1 for non-Whites and -1 for Whites.
Teaching level	Coded 1 for secondary teachers and -1 for elementary teachers.
Master's degree	Coded 1 for having a Master's degree and -1 for not having a Master's degree.
Teaching experience	Continuous variable
Percentage of students eligible for free or reduced price lunch	Coded 1 for percentage of student eligible for free or reduced lunch $\geq 20\%$ and -1 for percentage of student eligible for free or reduced prince lunch $< 20\%$
Percentage of minority students	Coded 1 for percentage of minority students $\geq 50\%$ and -1 for percentage of minority students $< 50\%$.
Science teachers	Coded 1 for science teachers and -1 for non-science teachers.
Salary satisfaction	1=strongly disagree, 4=strongly agree
Student behavior problems	1=not a problem, 4=serious problem
Supportive principal and administration	1=strongly disagree, 4=strongly agree
Shared decision-making	1=no influence 4=a great deal of influence
Teacher autonomy	1=not control 4=complete control

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