

Patterns of Attrition Among Indiana Teachers, 1965–1987

An Executive Summary

David W. Grissmer, Sheila Nataraj Kirby

RAND

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PREFACE

This report, one in a series focusing on Indiana teachers, presents findings regarding the patterns of teacher attrition among full-time teachers in Indiana from 1965–87. The analysis was undertaken as part of a larger study of teacher supply and demand in Indiana funded by Lilly Endowment Inc. The study required and received excellent support and cooperation from the Indiana State Department of Education. The objectives of the study are to assess the current state of teacher supply and demand in Indiana, to determine and recommend policies to ensure an adequate supply of certified teachers, and to provide the Indiana State Department of Education with the capability to monitor and perform future assessments of teacher supply and demand.

The present report summarizes research on the most important component of teacher demand, namely, teacher attrition.¹ Companion reports address teacher supply and the role of the Beginning Teacher Internship Program in Indiana in retaining first-year teachers and maintaining their level of job satisfaction.² A future report will integrate the results using a pc-based model of teacher supply and demand that will address questions of possible teacher shortages.

The Indiana data provide a unique opportunity to look at teacher attrition over 23 years—probably the longest longitudinal database kept by any state. This period has been one of extreme change in the teaching profession. The 1960s saw rapid growth in the number of teachers and in real salaries to accommodate the baby boom, whereas the 1970s saw enrollments plummet and reductions in the teaching force. The 1980s saw a more stable but much older teaching force with rising salary levels. The database provides a unique window through which one can examine the effects of these turbulent changes on the level and causes of teacher attrition.

Although the results use Indiana data, the patterns of attrition and the factors that have led to a decrease in teacher attrition rates during this period are probably mirrored in many other states. The

¹D. W. Grissmer and S. N. Kirby, *Patterns of Attrition Among Indiana Teachers, 1965–1987*, RAND, R-4076-LE, 1991.

²S. N. Kirby, D. W. Grissmer, and L. Hudson, *New and Returning Teachers in Indiana: Sources of Supply*, RAND, R-4049-LE, 1991; and L. Hudson, D. W. Grissmer, and S. N. Kirby, *New and Returning Teachers in Indiana: The Role of the Beginning Teacher Internship Program*, RAND, R-4048-LE, 1991.

authors find that the factors explaining the trends in Indiana are the increased labor-force participation of women, the aging of the teaching force, the increased entrance of older women into teaching, the declining student/teacher ratio, and the increase in salaries. These trends have occurred nationwide, and although individual states may experience variations of their own, the nationwide trends probably dominate any state-specific factors. Thus, the results presented here may be useful in understanding teacher attrition trends nationwide. The results should be of interest to educators and policymakers in all states and nationally who are concerned with issues of teacher supply and demand.

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I. INTRODUCTION

Teachers have come under increasing scrutiny over the past several years as part of the continuing national debate on the quality and appropriateness of American schooling. Issues that have been raised focus on the quality of the teaching force, the adequacy of teacher compensation, the potential for teacher shortages, and the patterns and magnitude of teacher attrition. Much of the reporting on these issues paints a fairly bleak picture: a teaching force underpaid and declining in quality with high rates of attrition and looming shortages.

Part of the debate was triggered by an earlier RAND report¹ that warned of the potential for a crisis in the teaching profession unless policies to restructure it were pursued. The trends cited as contributing to a potential shortage were increasing enrollments, an aging teacher force nearing retirement, low enrollments in teacher training programs, the more attractive professional opportunities for women outside teaching, and teaching conditions that deter the best students from entering and staying in teaching. These conditions included low pay levels, poor working conditions, and little autonomy over teaching practices.

The earlier report triggered new efforts aimed at analyzing critical issues such as the supply and demand for teachers, teacher compensation, teacher attrition, and the quality of the teaching force.² One conclusion of this research was that almost no data existed at the national level³ to examine these questions and that perhaps some of them were best addressed at the state level. States often had

¹L. Darling-Hammond, *Beyond the Commission Reports: The Coming Crisis in Teaching*, RAND, R-3177-RC, July 1984.

²D. M. Gilford, and E. Tenenbaum (eds.), *Precollege Science and Mathematics Teachers: Monitoring Supply, Demand and Quality*, National Academy Press, Washington, D.C., 1990; D. W. Grissmer and S. N. Kirby, *Teacher Attrition: The Uphill Climb To Staff the Nation's Schools*, RAND, R-3512-CSTP, August 1987; A. E. Wise, L. Darling-Hammond, and B. Berry, *Effective Teacher Selection: From Recruitment to Retention*, RAND, R-3462-NIE/CSTP, January 1987; G. W. Haggstrom, L. Darling-Hammond, and D. W. Grissmer, *Assessing Teacher Supply and Demand*, RAND, R-3633-ED, May 1988.

³Part of that gap has been filled by the Schools and Staffing Surveys (SASS) and the Teacher Followup Survey (TFS) sponsored by the Department of Education. See, for instance, S. A. Bobbitt, F. Faupel, and S. Burns, *Characteristics of Stayers, Movers and Leavers: Results from the Teacher Followup Survey, 1988-89*, National Center for Education Statistics, DR-SAS-88/89-1.0, June 1991.

reasonably good data with which to address questions of supply and demand, and much of the focus of recent research has been at the state level.

The present study was funded by a grant from Lilly Endowment Inc. It is one of several⁴ that use unique data from states to explore questions of teacher supply and demand, teacher attrition, and teacher quality. This study focuses on Indiana public school teachers. The data we have are unique among the states analyzed to date in that they cover 24 years (from 1964–65 through 1988–89)—the longest by far of any other databases analyzed. Teachers can be tracked year by year to determine when they enter, when they leave, and whether they return. These data, combined with measures of teaching salaries, student-teacher ratios, and historical trends in labor-force participation rates and the median income of full-time workers (which can be regarded as a proxy for the opportunity costs of teaching), can not only help shed light on the behavior of teachers in the labor force and the potential for teacher shortages but can also help inform policies aimed at improving the quality of teachers.

Although our focus is on Indiana and Indiana teachers, the study will also improve our understanding of potential national-level shortages as well. National estimates have generally been based on sparse data and simplistic models of supply and demand. These simplistic models, based on inadequate information about the sources of teacher supply and the factors important in predicting teacher attrition, predict severe shortages at both the state and national levels. State-level analysis can help determine whether the critical factors influencing changes in components of supply or demand are peculiar to states or are national trends. If the latter, then improved national models can be developed.

⁴Richard Murnane and colleagues have analyzed data from Michigan and North Carolina. See R. J. Murnane and R. J. Olsen, "The Effects of Salaries and Opportunity Costs on Length of Stay in Teaching: Evidence from North Carolina," *Journal of Human Resources*, Vol. 25, pp. 106–124, 1990; R. J. Murnane and R. J. Olsen, "Will There Be Enough Teachers?" *American Economic Review Papers and Proceedings*, Vol. 79, pp. 242–246, 1989; R. J. Murnane and R. J. Olsen, "The Effects of Salaries and Opportunity Costs on Duration in Teaching: Evidence from Michigan," *Review of Economics and Statistics*, Vol. 11, pp. 347–352, 1989; R. J. Murnane and M. Schwinden, "Race, Gender, and Opportunity: Supply and Demand for New Teachers in North Carolina, 1975–1985," *Educational Evaluation and Policy Analysts*, Vol. 11, pp. 93–108, 1989; R. J. Murnane, J. D. Singer, and J. B. Willett, "The Influences of Salaries and Opportunity Costs on Teachers' Career Choices: Evidence from North Carolina," *Harvard Educational Review*, Vol. 59, pp. 325–346, 1989; and R. J. Murnane, J. D. Singer, and J. B. Willett, "The Career Paths of Teachers: Implications for Teacher Supply and Methodological Lessons for Research," *Educational Researcher*, pp. 22–30, August/September 1988.

Among specific questions that we address using Indiana data are:

- Are teachers leaving the profession at growing rates?
- What roles do compensation and working conditions play in retaining teachers within the profession?
- Are shortages of teachers likely?
- Are more attractive job opportunities increasing attrition rates for women teachers?
- What types of teachers stay longest in the profession?
- How do attrition rates differ by subject taught?

To fully address the issue of shortages, quantitative research into the separate components of supply and demand is needed. This research must provide credible explanations for the historical trends we see in each component of teacher supply and demand to produce good forecasts. The longer the time period for which we have historical data, the more credible the explanations for previous trends. Thus the data from Indiana become important in developing models of the individual components of teacher supply and demand and in testing an integrated model to predict teacher shortage or surplus.

II. IMPORTANCE OF MEASURING AND MONITORING TEACHER ATTRITION

Accurate measures of teacher attrition are needed to serve several important planning and policy objectives. First, attrition rates largely determine how many teachers need to be hired each year; they thus play a significant role in assessing future teacher shortages. Because of this, it is crucial to measure and predict attrition accurately. Predicting attrition is the most important and the most difficult of the components of supply and demand. Without credible predictions of attrition, teacher shortages cannot be addressed. Such predictions are difficult to make because of the rapid changes that have occurred in teacher attrition rates over time and because of the multiple and changing factors that affect teacher attrition rates. Analyses of the Indiana data allow testing of these hypotheses and enable us to paint a fairly clear picture of the future of teacher attrition rates.

Second, attrition rates—when accurately measured and interpreted—can provide good indicators of the relative adequacy of compensation levels and working conditions within the profession. Low salaries and poor working conditions lead to high attrition and point to a need for increased spending in these areas. Low attrition combined with strict entrance standards probably indicate that salaries and working conditions are competitive; however, low attrition levels could also indicate that entrance standards are low and that those attracted to teaching do not have attractive alternative opportunities.

Third, differential patterns of attrition across subjects may point to the inadequacy of a uniform system of compensation such as the one characterizing the teacher labor market. Without pay differentials to compensate those with highly marketable skills, we risk having high turnover among these teachers with perhaps a significant deterioration in the quality of teaching in these areas.

III. DEFINITIONS OF ATTRITION

There are several different ways to measure attrition, and it is critical to match the appropriate measure with the policy or planning problem.¹ In this research, we measure attrition in two ways. The traditional measure of attrition is the proportion of teachers who leave annually. We refer to this as annual attrition. However, our data show that between one-fourth to one-third of those who leave in any given year return to Indiana public schools in subsequent years. We thus define a second measure, called permanent attrition, that takes into account these returns. More precisely, annual attrition is the proportion of the teaching force in any given year that leaves during or at the end of that academic year. Permanent attrition, however, accounts for later returns by looking at all future years to see whether those leaving teachers return to teaching. If they do, they are not counted as leavers in the particular year that they left. Teachers are counted as leavers only when they do not return to teaching during the time period for which we have data.

We examine overall and disaggregated attrition rates among the total teaching force. Trends in these estimates, although useful, can be misleading if the composition of the overall teaching force changes over time. Thus in this research we focus primarily on what we refer to as cohort attrition in which we examine the attrition patterns of cohorts of newly hired, inexperienced teachers. Most attrition occurs during the first five years of teaching. It is during this critical period that individuals make career decisions to teach or to pursue other occupations. If policies to improve the quality of the teaching profession are to succeed, they must focus on keeping the best teachers during their initial years of teaching.

For these cohorts of teachers, we estimate annual and permanent attrition rates year by year. For example, for the entering cohort of inexperienced teachers in 1965–66, we estimate how many teachers leave temporarily or permanently in each succeeding year through 1988–89. We compare cohort attrition rates for each entering cohort from 1965–66 to 1985–86. We then estimate “survival” functions that allow us to measure differences in attrition trends among various groups categorized by gender, age at entry, and primary teaching assignment. Our multivariate models allow us to analyze how

¹See Grissmer and Kirby (1987) for illustrations of this point.

attrition is affected by changes in beginning teacher compensation, salary growth ratios (which attempt to control for the growth or erosion in real teacher incomes), outside wage opportunities, labor-force participation rates, and student-teacher ratios (which act as a proxy for changes in working conditions in the profession). All these measures have changed dramatically between 1965 and 1988, and the long history we have on teacher cohorts allows us to estimate the effect of these variables on teacher attrition.

IV. RESULTS

Both annual and permanent teacher attrition rates have fallen steadily over time with the exception of a period in the late 1970s characterized by involuntary reductions in staff. Annual attrition, which was at an all-time high of 15 percent in the late 1960s, now stands at less than 5 percent. The permanent attrition rate has mirrored this decline, falling from 11 percent in 1969 to an estimated 3 to 4 percent in 1987. Part of this decline can be attributed to the demographics of the teaching force. In the late 1960s and early 1970s, the teaching force, hired in response to the rapid expansion in enrollments stemming from the baby boom, was predominantly a younger force with almost 40 percent being under 30 years old. By the 1980s, this teaching force was predominantly a mid-career force, with only about 12 percent being younger than age 30. Younger teachers have much higher attrition rates (approximately 15–25 percent) than do older teachers (2–4 percent by mid-career). Thus, lower annual attrition can be partially attributed to the aging of Indiana's teaching force. This trend in shifting age distributions of teachers also has occurred nationally, and would be expected—other things equal—to lower national attrition.

However, this does not address the important question of whether *younger entering teachers* are staying longer and the related question of whether better pay and working conditions are influential in teacher attrition. Younger teachers are more sensitive to changes in salary, working conditions, or outside wage opportunities; thus their attrition patterns are key indicators of the need for improvements within the teaching profession.

Attrition (both annual and permanent) in entering cohorts of new teachers is also at its lowest level in 25 years. For the 1965–66 entering cohort, one-half had permanently left teaching in Indiana by the end of the fifth year. For the 1980–81 cohort, only about one-third had permanently left teaching in Indiana by the end of the fifth year—a reduction in cohort attrition of 33 percent. Early attrition for the 1981–82 through 1986–87 cohorts is also significantly lower, although, of course, we do not have as long a history for these cohorts. We estimate that the five-year permanent attrition rates from these later cohorts may be as low as 25 percent.

Although permanent cohort attrition rates of one-quarter to one-third during the first five years might still seem high, it is important

to place them in perspective. Much of this early attrition results from the normal turbulence associated with early family formation and spouse job changes, and is an expected pattern of high job and geographic mobility for individuals early in any career, not just teaching. Some of these teachers move from Indiana because of marriage and spouse job changes and probably return to teaching in other states; some may leave teaching because their performance does not come up to standard and their contracts are not renewed; some may choose to leave teaching because they feel an alternative career might suit them better. Much of this turbulence may be desirable or unavoidable and may reflect life-cycle patterns that are not peculiar to the teaching profession.

Teacher attrition patterns by age group in each of the 23 years follow a U-shaped curve common to other occupations and professions, and predicted by life-cycle career patterns and human capital investment theories. The U-shaped relationship between age and attrition holds true not only over a single year but in each of the 23 years. Attrition among younger teachers, those age 20–24 years, tends to be rather high compared with the average attrition for all ages. Over time, as attrition has declined, the U-shaped curve relating age to attrition has tended to move down as well, while still retaining its U shape. For young teachers between 22–24 years, attrition was 23 percent in 1965 and 13 percent in 1985 compared with average attrition for these two years of 12.4 and 5.6 percent, respectively. The attrition rate falls with age, being the lowest for teachers age 45–54 years. For these teachers, attrition is between 2 and 4 percent. Attrition, not unexpectedly, is higher (10–17 percent, depending on the year at which we are looking) for those age 55 and over, who are eligible for retirement.

Dramatically lower attrition of women teachers during their early to mid-careers accounts for a significant portion of the overall attrition decline; we believe that this decline may be largely associated with the changed behavior of women in the labor force. Our analysis shows that the attrition decline has been much steeper for women than for men. Since women account for approximately two-thirds of all teachers, their steeper attrition rate decline is a significant factor in reducing overall attrition. For men, annual attrition declined from a peak of 10 percent to less than 5 percent. For women, the decline is from a peak of almost 17 percent to almost 5 percent. In earlier years attrition rates of men were significantly below those of women, but by the mid-1980s, the attrition rates of men and women were very similar.

Moreover, our statistical analysis supports the hypothesis that this difference is partly attributable to the changed behavior of women in the labor force. During the 1965–87 time period, the participation rate of women age 25–29 in the full-time workforce changed from 43 percent to 72 percent. This substantial increase in labor-force participation has been triggered by a number of factors: the change in society's attitude toward women working, women's increased preference to work outside the home and their stronger attachment to the labor force, later marriages, which have tended to keep women in the labor force longer, and the need for two incomes to support families. From 1965–84, the median income of men in the 25–29 age group actually fell in real terms by 8 percent. Thus, to maintain and increase family income, women needed to work.

Women teachers appear to have followed the general labor-force trend among women. They dropped out of the teaching force less often to raise children, returned more often, and stayed out for shorter periods of time. This change in attrition would most likely have occurred independent of changes in teacher salary or working conditions and is simply an effect derived from the changing labor-force participation of women. This has affected teacher attrition rates dramatically simply because of the large proportion of women in teaching. Labor-force participation of women is likely permanent, and will prevent teacher attrition rates from ever reaching the high levels encountered in the late 1960s. However, female labor-force participation rates are unlikely to grow much further, making further inroads in attrition from this factor unlikely.

Two important factors in explaining declines in attrition are the increase in beginning teacher salary levels and the relatively favorable salary growth experience of later cohorts in real terms. Average beginning teacher salary levels in Indiana declined from a peak of \$20,800 (1987 dollars) in 1970 to \$15,400 in 1982—a decline of 26 percent. Since 1982, salaries have risen and by 1987, they averaged \$17,500, a 14 percent increase. Our analysis shows that attrition rates are responsive to changes in teacher salaries. A 10 percent increase in beginning salaries would reduce annual teacher attrition by 10 percent for men and 4 percent for women.

Declining average class sizes also have contributed to declining teacher attrition levels. Our best surrogate for teacher working conditions was average class size. The average class size in Indiana has declined 24 percent from 25.8 in 1965–66 to 19.5 in 1985–86. In recent years, the state has mandated smaller class sizes in lower elementary grades. Our results show that declines in class

size will reduce attrition and suggest stronger effects for men than for women. However, we have elsewhere suggested that this gender difference may not be due so much to the relative insensitivity of women to working conditions (an inference in which we do not place much credence) as to our inability with the current data to clearly distinguish between trends in student/teacher ratios and the similar trends in women's labor-force participation.

Attrition has also declined among cohorts of new teachers because a greater proportion of new teachers are older. In 1965–66, 75 percent of new, inexperienced teachers were recently out of college and between 22–24 years of age, compared with only 40 percent in 1987–88. The proportion of entering teachers age 25–29 years has increased in this same time period from 13 to 33 percent; the over-30 age group has grown from 10 to 27 percent. We find that women teachers who enter teaching at older ages have significantly lower attrition than those who enter shortly after college. By the fifth year after entry, 43 percent of younger teachers have permanently left teaching in Indiana, whereas only 27 percent of teachers entering over 30 have left.

This 60 percent difference in cumulative attrition between the younger and older age groups of entering teachers can probably be attributed to several factors. First, these teachers are likely to have greater stability in their family lives and probably have school-age children, making it less likely that they will leave for family responsibilities. Second, spouse jobs become more stable after age 30, and relocation as a result of a spouse job change is less likely. Third, teachers entering late may be more committed to teaching, having made a decision later in life to pursue teaching. Finally, family income needs grow as children age, making working more important to meet increasing consumption.

Older entering teachers should continue to be a good source of teacher supply because the 30–45 year old age group will be the fastest growing part of the population as the baby boom ages. Thus, this factor should continue to exert a downward push on attrition rates in the foreseeable future.

Dramatic differences in permanent cohort attrition exist among teaching specialties; secondary school teachers, especially science teachers, have higher attrition rates than elementary teachers. Physics and chemistry teachers have the highest level of cohort attrition among teachers, followed by biology teachers. This effect remains after controlling for gender and age at entry. After five years of teaching, permanent attrition for elementary teachers is 36 percent, whereas it is 57 percent for physics and

chemistry teachers, and 51 percent for biology teachers. The corresponding rates for other types of teachers are 47 percent for English teachers and 41 percent for mathematics teachers.

Higher outside wage opportunities are an important explanation for these patterns. However, it may be only a partial explanation for the higher attrition rates of science teachers with respect to mathematics teachers. Mathematics teachers appear to have equivalent outside wages, but have much lower attrition than science teachers. Another contributing factor for science teachers, but not mathematics teachers, might be the quality of laboratory facilities and equipment, budgets for science supplies, the workload associated with laboratory classes, and the difficulty of handling students in a laboratory environment.¹ Another plausible explanation² is that high-paying jobs in business and industry may be available only to those mathematics teachers who teach advanced mathematics courses and not to the majority of teachers teaching algebra, geometry, and remedial math.

A way to summarize the teaching longevity of various types of teachers is to estimate the time in years required until one-half of entering teacher cohorts have left teaching in Indiana permanently. Table 1 summarizes this for various types of teachers. For physics and chemistry teachers, one-half have permanently left before four years of teaching. Among elementary teachers, the median length of service is 11 years, when we consider permanent attrition. Older teachers stay much longer: Their median survival time is 16 years compared with a little over seven years for those age 20–24 years.

It is not a coincidence that experienced teachers with skills in high demand and with the highest wages in the private sector (science) are the hardest to keep. One goal of our education system is to train students in those skills demanded by the private sector and to prepare students for high-paying and productive jobs. And yet, because of the high rate of attrition among teachers of these subjects, we have been experiencing the greatest difficulty in meeting this goal. This problem may at least partly be attributed to the fact that teacher pay scales are not differentiated to pay more to teachers with higher outside salary opportunities. To maintain equity among teachers,

¹I. R. Weiss and S. E. Boyd, *Where Are They Now: A Follow-Up Study of the 1985–86 Science and Mathematics Teaching Force*, Horizon Research, Inc., Chapel Hill, North Carolina, 1990. This study shows that math and science teachers give somewhat different responses when asked about their main dissatisfaction with teaching. Science teachers rate quality of equipment and facilities and “no time for hands on” instruction as being important dissatisfactions with teaching.

²See Murnane et al. (1988), op. cit.

teacher unions have worked to maintain uniform pay scales, with the inevitable result of higher turnover and probable lower quality of teachers in those specialties for which the private sector pays higher salaries.

Table 1

MEDIAN SURVIVAL TIME IN YEARS FOR SELECTED GROUPS

Selected Group of Teachers	Annual Attrition	Permanent Attrition
Overall	3.9	8.2
Male	5.5	9.7
Female	3.5	7.6
Age 20–24 years	3.6	7.4
Age 25–29 years	3.9	6.9
Age 30+ years	11.9	15.9
Nondepartmentalized elementary	4.2	10.9
Special education	3.8	8.4
English	3.0	6.3
Mathematics	4.1	6.9
Physics/chemistry	2.6	3.8
Biology	3.5	4.5
Other science	3.5	6.5
Other departmentalized	3.9	6.9

Differentiation in teacher salaries to reflect this difference in outside opportunities and relative demand for skills has often been suggested as a means of retaining such teachers.³ Under such a system, for example, science teachers and other teachers in shortage specialties would receive higher salaries than other teachers with similar years of experience. This could be accomplished by simply starting them higher on the salary scale or having a separate salary scale or additional fixed annual payments. Some school districts have initiated these practices, and the American Federation of Teachers has endorsed the idea of starting teachers in shortage areas higher on the salary scale.⁴ This would allow more choice in hiring teachers and perhaps result in better teachers staying longer in teaching. However, the perceived unfairness of such a system and the possible schisms it might create in the teaching force may prove to be too high a cost for these gains.

³Differential pay for different skills, specialties, and work quality is the norm in almost all professions in our society.

⁴Murnane and Olsen, *op. cit.*

V. CONCLUSIONS

Explaining the pattern of teacher attrition levels from 1965–87 requires that attrition decisions be placed in the context of:

- The career and life-cycle patterns of individuals;
- Normal labor-force behavior in other professions;
- Changing patterns of participation by women in the labor force and the changing age structure of the labor force;
- Compensation and working conditions characterizing the profession.

Higher attrition rates and job mobility early in a career are a normal part of labor-force behavior for all occupations and professions. Individuals choose occupations and jobs with limited experience and information and often decide to change occupations, once more experience is gained. Likewise, employers hire individuals with limited information about their performance, and often terminate employment or encourage marginal individuals to seek other jobs once more information on performance is available. Job mobility, attrition, and occupational turbulence are also more frequent at younger ages because of marriage and subsequent relocation, family responsibilities for young children, or returns to schools to seek more education.

Individuals settle more permanently into jobs and occupations in their early thirties, and attrition rates and occupational mobility decline markedly. Family income needs increase and the costs associated with a change in occupation also increase because of the wage premium that accompanies experience. Location-specific human capital in terms of homes, friends, preferred teaching assignments and schools, professional relationships, and promotion opportunities all combine to reduce attrition drastically during the mid-career (age 35–55 years). The lack of portability of teacher pensions also make interstate job movement costly.

Against this background of life-cycle attrition patterns, teacher attrition trends have been greatly affected by the changing pattern of women's participation in the labor force. Women teachers have followed the general trend among women of strongly increasing full-time participation in the labor force. The usual pattern women tended to follow in the 1960s and early 1970s was that of employment until marriage, then dropping out for child-rearing, and partial return to the labor force when children grew older. These trends

have drastically changed in the 1980s. Women drop out of the labor force less frequently when they marry or during early child-rearing years, return earlier if they leave, and remain more or less permanently when they return. Overall attrition in the teaching profession has been affected more than that of other occupations because two-thirds of all teachers are women. Our analysis shows that reductions in the attrition of women teachers followed similar trends among college-educated women in labor-force participation trends. This trend has accounted for a significant part of the reduction in teacher attrition.

Another demographic trend that has also contributed to reducing teacher attrition is that a greater proportion of entering teachers are older, and older entering teachers have much lower attrition rates than those entering after college. This trend is partly due to the large demographic bulge in the 30–45 age group, which should continue to produce large numbers of later-entering women teachers.

Finally, our analysis shows that teacher compensation and working conditions significantly affect attrition. Further research can help produce better and more robust measures of these effects and can identify the types of teachers most affected by changes in pay and working conditions.

The outlook for future trends in teacher attrition is mixed. In the shorter term—the next 10 years—teacher attrition rates should remain low by historical standards, provided pay levels are maintained in real terms. The other factors that have strongly influenced attrition rates in the downward direction should continue to do so. These include the presence of a predominantly mid- to late-career teaching force, strong labor-force participation for women, increased proportions of newly entering, older teachers, and declining class sizes. In the longer term, teacher attrition rates will be gradually pushed up as the large group of mid- to late-career teachers moves toward retirement, and more younger teachers are hired as replacements. However, since the average age of the current teaching force is just over 40, and retirement usually occurs between 60 and 65, this effect should be at least 10 to 20 years in the future. However, enhanced early retirement benefits could produce earlier effects, and these need to be studied carefully.

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