WAGE DIFFERENTIALS FOR PRE-COLLEGE TEACHERS TO SOLVE SHORTAGES AND QUALITY ISSUES?

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ABSTRACT

Complaints about the quality of schools abound, but solutions are few and far between. This note presents what we believe is one comprehensive solution to most of the ills of public and private schools, namely wage differentials for teachers that reflect their respective opportunity costs of being educators. The analysis reveals graphically, and with historical data, how both teaching and non-teaching markets are distorted by salary scales and why this leads to disproportionate numbers and qualities of teaching faculty across disciplines. The end of the paper develops justifications for how and why this will improve schools.

JEL Classification: I21, I22

Key Words: wage differentials, high opportunity cost teachers, low opportunity cost teachers, Finnish schools

INTRODUCTION

The fundamental premise of this communication is that many of the basic problems inherent in secondary education could be alleviated through wage differentials for teachers. Unfortunately, there have historically been no wage differentials in most public educational institutions at the primary or secondary level and the private middle and high schools that do have wage differentials protect their structure and design with stringent confidentiality requirements. In addition, it would be virtually impossible to distinguish the wage effect from all others that fuel the perception that private schools are better than public ones (or vice-versa).

In the last few years, discussion of merit pay for teachers and differential pay based on student performance has surfaced, but not the pervasive wage differentials discussed here. Consequently, if general wage differentials are ever applied at the public, pre-college level, they will have to be developed from scratch for that segment of the educational structure. Naturally, wage differentials are not a goal, but rather a tool to achieve what is most desirable, that is a climate in which student learning is maximized. This can be accomplished when classroom teachers are the best available and the atmosphere for the development of the highest order analytical and cognitive skills is possible in each student to his/her ability to achieve.

A quote in *The Economist* (March 25-31, 2006, p. 58) reveals the simple explanation from a headmistress of a school near Helsinki, Finland for why the Finnish schools were identified as the world's best (see Alvarez, 2004 referenced in *Freakonomics* 2006 for a discussion of the Finnish superiority). She

says "[T]eachers, teachers, teachers." Finnish schools have either eliminated, or avoided instituting national curriculums, magnet schools, charter schools, national exams, streaming, or selection programs. Instead, they provide considerable support to teachers and grant teachers the freedom to operate most effectively. It appears to be working. However, maintaining quality in the classroom requires proper incentives universally.

BRIEF LITERATURE REVIEW

Up until very recently, there has been very little literature regarding the role of wage differentials in primary and secondary educational institutions. Except for a small group of journal articles in the late 1970s, there have been only a few analyses in the popular press and from think tanks regarding the standard salary structure found in most of our public and private schools today. An article by the Pacific Research Institute questioned why teacher salaries are not tied to either market demand or classroom performance. "An English teacher makes the same salary as a physics teacher. Although there is a lot of discussion about a general teacher shortage, the real scarcity is in specific fields such as math and science. Individuals with college degrees in math and science can get much higher salaries in private industry than they can get in teaching." (Izumi, 2001) A large part of the rationale for this reality is the inability of policy makers and educators to think outside the box of uniform wage rates for all teachers. This severely hampers any effective effort to address this shortage (Izumi, 2001).

Despite claims that teaching is a calling; and that teachers most value the intrinsic rewards, teachers react similarly to other workers in terms of compensation. Teachers respond to wage differentials between teaching and non-teaching jobs (Baugh and Stone, 1982). Thus, teachers' salaries represent an important policy issue that contributes to a school's ability to attract qualified staff. Baugh and Stone (2011) recently expanded this discussion in their book based on the 1982 article.

A study conducted by Dale Ballou (2000) relative to teacher contracts in Massachusetts, found widespread agreement that teacher salaries were not sufficiently competitive to attract talented people into careers in education in the numbers that are desired. He found this especially true of teachers who possess knowledge and skills that are in high demand in private industry. Administrators that were contacted for Ballou's study frequently commented on how difficult it has become to recruit teachers in mathematics and science given the premium on their skills in today's labor market, yet the structure of teacher compensation in Massachusetts has remained resistant to market forces (Ballou, 2000). Consequently, regardless of what subject they teach, teachers are paid according to the same set of criteria: essentially how many advanced degrees or college credits they have beyond a particular degree level, and how many years of service. There is generally little in the way of merit pay, no differentials by field, no differentiation to compensate teachers for taking on jobs in particularly difficult working conditions (Ballou, 2000).

Another study completed by the National Center for Policy Analysis (1999) found, like the Finns, that the single most important factor in student learning improvement is teacher quality. Yet teacher quality is woefully missing in certain high school subject areas. There is significant evidence that teacher quality varies by class level, with the advanced classes being allocated the superior teachers (see Ingersol, 1999). The research also shows that teacher knowledge of specific subject matter, particularly at the secondary level, is a good prediction of student achievement. For example, David Monk (1994) found a strong correlation between teacher preparation in both math and physical sciences and student success in both low and high scoring students.

Within the last twenty months, two additional analyses have been published that indirectly assess wage differentials for teachers by evaluating the by-discipline earnings of those teachers that have left the profession. Chingos and West (2012) employ a unique data set of 3,500 ex-teachers from the state of Florida. The results suggest that math and science teachers who leave teaching earn respectively 15% and 11.8% more than departed English teachers in alternative employment. West (2013) sites his prior work and that of a few others to infer that compensating high demand teachers more might keep them from departing and attract other qualified teachers from alternative employment. However, to be impartial,

West also cites evidence from several sources revealing the reluctance of parents to support wage differentials as opposed to higher pay for all teachers, the potential for a perspective of lesser importance for other disciplines as a result, and issues associated with union contracts if such differentials are allowed to exist. Ultimately, parents mostly want teachers who will be qualified and effective in educating their children. Jealousy over differential pay among teachers can be mitigated by paying superior teachers for outstanding performance regardless of field the union issue can be assuaged by the potential that higher wages for some teachers may pull up the wages for all.

However, despite the objections, these studies are evidence that there is a real need to change the current salary compensation policies in the U.S. school system. Uniform wage rates for all teachers are not an effective system and they hamper any successful effort to address the shortage of qualified teachers in specific disciplines. As one education expert noted, "It's crazy to pay the same salaries to people in high-demand subjects (e.g. high school science and math) as to those in high-supply fields (e.g. middle school social studies)" (Izumi, 2001).

In the last few years, some states in the United States including Florida and Ohio have proposed legislation to permit wage differentials for specific regional areas or disciplines. While this is a step in the right direction, without universal wage differentials, those who possess teaching skills that presently work outside of the teaching profession are unlikely to be attracted into teaching; and limited differentials may skew the compensation across school districts such that the best teachers may be concentrated in just a few schools at the disadvantage of the rest.

THE ECONOMICS OF NO WAGE DIFFERENTIALS

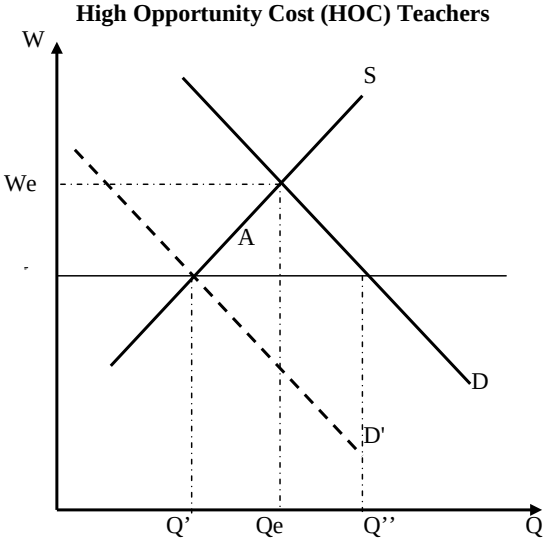
So, if wage scales are so inappropriate, why do they exist? The answer derives from two fundamental influences. The first is obvious – paying all of the teachers uniformly for the same level of experience and/or educational level is less expensive for a municipality (particularly since teacher salaries have always been very low compared to non-teacher salaries with corresponding qualifications). However, this naturally ignores the potential damage done to students who are instructed by those who perceive that they are underpaid; and thus give less than maximum effort. The second perspective is that all secondary teachers do the same thing -- teach students. However, NBA players play the same game as development league players, but their salaries differ by millions. Quarterbacks play the same game as offensive linemen, but their incomes are not remotely similar. It has always amazed the authors of this paper that those with unique skills to perform their vocations at the highest levels are virtually always compensated to do so, but those most responsible (or second most to parents) for preparing the next generation of citizens are paid woefully, and uniformly regardless of effectiveness!

In addition, universities are generally perceived to be more effective than secondary schools. Not surprisingly, universities attract the most qualified individuals to teach these advance students across disciplines, in large part due to definitive wage differentials for faculty. Like professional athletes and university professors, teachers that have different skills, and more importantly, different opportunity costs, need to be paid commensurately to maintain quality among the larger opportunity cost group.

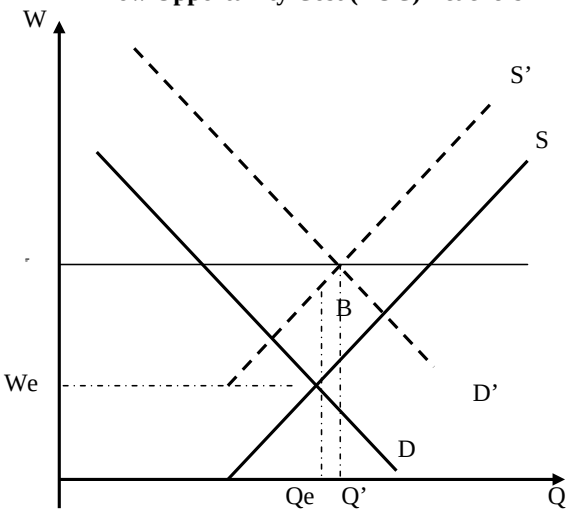
To clarify the inefficiency of the status quo, consider the graphs below. The lack of wage differentials generates temporary disequilibrium in the teaching markets (graphs 1 and 2) due to the wage controls. However, the wage limits do not influence markets for high opportunity cost (HOC) teachers (graph 1) the same way they do for low opportunity cost fields (graph 2). For those teachers in fields like math and science where there are clear shortages (graph 1), the starting wage serves as a temporary price ceiling causing an excess demand for teachers in that market (Q''-Q'). Since administrators must fill those classrooms as best they can, they may use a small number of workers from the high opportunity cost, non-teaching markets willing to accept teaching wages (not likely to be the best of the workers from graph 3). But, most likely, and more frequently, these positions will be filled by low opportunity cost teachers employed to teach out of their field. However, the achievement of equilibrium in the HOC teaching markets at the constrained wage comes most from reductions in the demand for math and science

teachers (movement to Q' and $\overline{W}$). All of these effects combined cause decreases in the supply of LOC faculty in teaching markets; raising wages in graph 2, increased supply in graph 3, and creating declining wages for these latter workers. Conversely, in the market for low opportunity cost teachers (graph 2, the Arts, English, etc.), the salary scale serves as a price floor that creates a surplus at the prevailing wage. Generating equilibrium in this market means the hiring of too many Art and English teachers (move from D to D' in Graph 2 at Q'), falling supply in graph 4, and higher wages for non-teaching, low opportunity cost workers. The absence of wage differentials generates negative welfare effects (areas A-D) due to the misallocation of resources between both teaching markets and both non-teaching markets and leads to lower quantity and quality in teaching markets that are in under supply (HOC). The dynamics between the markets exacerbate the differentials between teaching and non-teaching wages and encourage (necessitate) hiring out of field. Many teachers' unions argue that the fundamental problem is that all teacher salaries are too low in general, but the reality is that while some teacher salaries are too low, many are simply too high to avoid distorting both teaching and non-teaching markets. It is no wonder that teachers exhibit so much discontent, particularly in high opportunity cost fields, which ends up generating low quality teaching for their students.

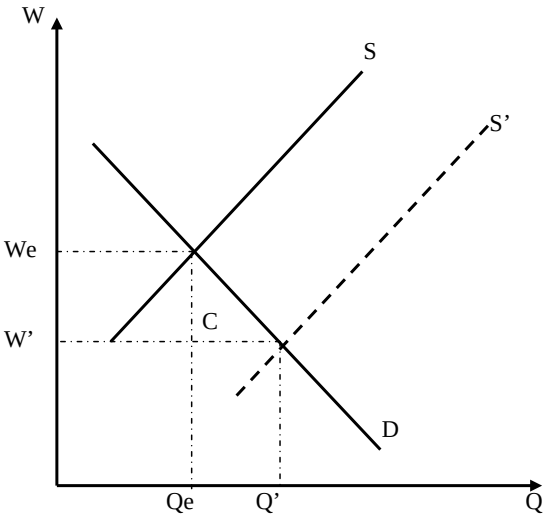
Graph 1
High Opportunity Cost (HOC) Teachers



Graph 2
Low Opportunity Cost (LOC) Teachers



Graph 3
HOC Non-Teachers



Graph 4
LOC Non-Teachers

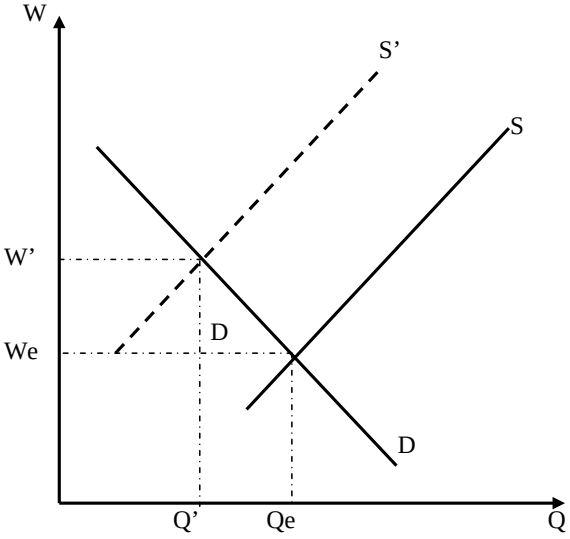


Table 1: Percentages of Public Secondary Teachers by Discipline, Various Years, 1961-2011

Fields/Years	1961	1966	1971	1976	1981	1988	1991	1991 *	1994	1994 *	2008	2008 *
The Arts	3.9	6.7	7.5	5.4	**7.9**	6.7	5.7		4.6		7.49	4.3
English	19.0	18.1	20.4	19.9	**24.8**	16.4	14.2	10.9	14.6	11.1	15.9	7.8
Foreign Languages	4.1	6.4	4.8	4.2	2.7	4.8	5.5		5.8		**5.9**	1.5
Health and Physical Education	8.2	6.9	**8.3**	7.9	6.5	5.3	5.1		4.9		6.7	2.2
Mathematics	11.4	13.9	14.4	**18.2**	15.6	13.2	12.9	8.8	14.1	9.7	13.4	4.8
Sciences	11.7	10.8	10.6	**13.1**	11.7	10.7	10.9	9.0	10.4	6.6	11.6	4.1
Social Studies	12.9	**15.3**	14.0	12.4	10.9	11.0	10.7	8.9	11.2	7.1	11.4	4.4
Special Education	0.3	0.4	1.1	3.0	2.1	8.1	8.8		**19.8**		10.2	4.7
Other	**28.5**	21.5	18.9	15.9	17.8	24.0	26.1		14.6		17.4	12.5
TOTALS	**100%**	**100%**	**100%**	**100%**	**100%**	**100 %**	**100 %**		**100 %**		**100 %**	

*Values in green were estimated from alternative sources
*Net of Out-of- Field Faculty

SOME SUPPORTING DATA

One of the fundamental realities of the graphical exposition above is that the lack of wage differentials in secondary schools should generate circumstances whereby there are too few HOC teachers in public schools and too many LOC teachers. An assessment of historical data verifies this outcome, although inferring such is complicated by educational trends and changes in relative wages. Table 1 provides data on percentages of secondary public school teachers in eight core disciplines (The Arts, English, Foreign Languages, Health and Physical Education, Mathematics, Science, Social Studies, and Special Education) individually for various years from 1961 through 2011. To make the totals add to 100%, the table also includes a category for all other disciplines designated as "Other."

Those data in the columns in regular black ink are derived from respectively, the National Education Association *Status of the American Public School Teacher* for 1961, 1966, 1971, 1976, and 1981. The remainders were developed from several of the *National Center for Education Statistics (NCES), Schools and Staffing Surveys* for 1987-88, 1990-91, 1993-94, and 2007-08. The three columns in red were derived from an April 1996 *Issue Brief* from the (NCES), Ingersoll (1999), and Feistritzer 2011.

Perusal of these data reveals a downward trend in the percentage of teachers in all of the traditional major categories due primarily to the sizable increase in the numbers of teachers who provide instruction in special education. The peak percentages by discipline arose in different years (bolded in Table 1) however all of the disciplines except special education and foreign languages occurred before 1982. Not surprisingly, as high schools have diversified their course offerings, the general trend would be expected to move away from the dominant fields of English, Math, Social Studies, and Science.

However, what is most significant for this paper results from the red columns that reflect the percentages of teachers with majors or minors in the primary field that they teach who populate public school classrooms. As is obvious, far fewer teachers with majors or minors in their teaching discipline

(or a closely related discipline, e.g., physics or computer science for math teachers, physical science for chemistry teachers) are actually teaching those subjects in our secondary schools. The unavoidable conclusion is that certified teachers from unrelated disciplines are being instilled in classrooms (e.g., physical education trained individuals teaching math, history trained teachers instructing in science). But likely in larger quantities, teachers are being recruited from outside education departments to teach a variety of courses. Since the data reported in these papers associated with the red columns include math majors teaching math, English teachers teaching language arts, etc., the implication is that non-education and non-discipline related college graduates are becoming secondary teachers in fields for which they are not qualified. In fact, programs like Teach for America and the ACE program out of Notre Dame are expressly designed to facilitate this process. According to the 2007-08 data (the most recent survey available), only one quarter of the foreign language teachers populating our classrooms would traditionally be considered qualified. Only slightly better are health and physical education teachers (2.2% relative to 6.7% for 2007-08). Now consider the 2007-08 data for the traditional dominant disciplines. While 57.4% of the teachers of Art and 49.1% of English teachers are qualified, only 38.5% of Social Studies teachers are deemed training competent, with Mathematics and Science bringing up the rear at 35.8% and 35.3% respectively. Comparing these outcomes to those for 1990-91 and 1993-94 reveals that while the trend towards fewer qualified teachers is downward for all four disciplines, the rate of decline is more sizable for math and science (i.e., the HOC fields considered in the graphs.)

The bottom line is that training of secondary teachers is less prevalent than before the 1990s. Although consideration of this dilemma dates back to what Conant called the "dirty little secret" in his 1963 landmark book, modern era scholastic institutions are putting fewer educationally qualified teachers in secondary classrooms. A naïve viewpoint on this reality cites declining state revenues allocated to education. However, ask a teacher or student from the early part of the twentieth century about their compensation for teaching prior to the 1950s; it was virtually universally below the income of other disciplines with the same level of education. The modern problem is that unlike prior to the mid-1970s, predominantly the women who were best educated had few opportunities outside of teaching to earn a level of income commensurate with their education. Today that is not the case, so to bring these women (and men) back to secondary schools will take more globally consistent compensation of teachers, commensurate with alternative employment options given their level of training and experience. Otherwise, just like a snowball rolling down a hill, the decline in educational quality will gain speed and pick up larger numbers of ill prepared young people.

HOW WILL THIS SOLVE THE PROBLEM?

Wage differentials that bring equilibrium to both categories of teaching markets independently will help bring the appropriate number of teachers by discipline to teaching within field. The need to cover math classes with PE teachers will diminish because the market will adjust to attract math teachers for these jobs. Further, the expectation of market salaries that are discipline specific will attract more students to major in math and science and presumably fewer to major in history and English, when these salaries lag behind. This is not to imply that history majors will shift to math, but that more math-oriented college students will end up teaching math instead of populating board rooms, and alternative non-academic pursuits.

However, the benefits go further. With more math oriented individuals who are drawn to teaching because of their aptitude for instruction in school classrooms, more students will likely be enlightened to the joys of learning math, leading to more math teachers in subsequent generations at all levels (including the primary level where the present hatred and ill preparation begins). Presently, our system is stuck in a downward spiral of inferior teaching begetting poor student preparation, generating even worse teachers, etc.

It is common sense that students motivated in their classrooms learn better. Attracting better teachers can only help this development process move students in the right direction, which should promote better discipline while promoting better learning. Parents show greater respect for teachers who

motivate and improve their children. Consequently, parental support for schools and the teachers will expand and perhaps even return to the levels before the 1970s. Better teachers mean fewer problems for administrators permitting more efficient allocations of scarce resources.

However, it is also important to infer that other changes need to be made for teaching to become an attractive profession for those best qualified to teach. School administrators need to adjust their perspectives regarding who the best teachers are from evaluating education coursework to evaluating field-specific backgrounds. Command of language, mathematics, and other general knowledge need exist in all teachers regardless of level or discipline if the overall ranks of instructional skills are to improve. Both men and women of superior ability and training need to replace the caretakers that populate too many classrooms if we are to improve the reputation of schools, and thus, the future viewpoint of children and parents relative to the value of education. Like in Finland, once teachers are attracted to the classroom, they will only remain if they are given the freedom to conduct their classes in the manner they deem most effective. Already, the seeds of the decline in the Finnish system exist because they too lack wage differentials by discipline. Falling relative pay issues are draining their best from the classrooms as their population ages (http://www.oecd.org/dataoecd/43/15/5328720.pdf). In the United States and elsewhere, once the right people are in these classrooms, it will be more appropriate to provide the freedom for the teachers to excel. Naturally, time will be required for better teachers to inspire students and parents to value education so that negative peer pressure, poor home environments for educational excellence, and class size issues can be overcome. However, there is no denying that under-qualified teachers (both in teaching methodology and in their discipline) who cannot motivate their charges and those students' parents, will not succeed in improving our schools.

CONCLUSIONS

This paper recommends interjecting wage differentials into the process for setting salaries for secondary teachers. High school administrators who wish to recruit effective and well qualified teachers to their classrooms will only be able to do so if those individuals can be attracted away from private industry and other government employment. Teachers are consumers like everyone else, and as employees they want to be paid commensurate with their abilities and at or beyond their opportunity costs. The present salary scale procedure used in most schools fails to generate this outcome. United States public and private schools would benefit dramatically from more efficient and more equitable payment methodologies. If Finnish schools are the best in the world because they promote fair compensation and freedom, then the United States educational bureaucracy should learn from the best and adopt a viable procedure to achieve teacher improvement -- wage differentials. Ultimately, this realization is nothing more than applying basic microeconomics.

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