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Quantifying the Value Teachers Place on Non-Monetary Factors When Evaluating Job Opportunities

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Abstract: How working conditions, personal characteristics, and school factors influence teacher recruitment and retention is an oft-studied topic in the field of education finance and policy. Through decades of research, it has become increasingly clear that teachers respond to a set of monetary and non-monetary factors when making decisions in the teacher labor market. What is less clear is the relative or absolute value teachers place on factors such as salary, student demographic factors, school conditions, and other working conditions such as class size, curricular autonomy, and principal support, to name a few. This project introduces the use of a novel survey methodology, Adaptive Choice-Based Conjoint (ACBC) analysis, to quantify the relative importance of various monetary and non-monetary job factors to practicing teachers as they consider the desirability of various hypothetical schools. The use of ACBC estimates the value placed on various working condition factors by secondary teachers in Utah and how those valuations vary with personal and demographic factors. This research provide practical recommendations for administrators and policymakers that aim to make schools more desirable for teachers and demonstrates the use of ABC to answer outstanding questions in the field of teacher recruitment and retention.

Keywords: Teacher Recruitment; Teacher Retention; Teacher Working Conditions; Compensating Differentials

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Cuantificación del valor que tienen los profesores atribuidos a los más importantes no monetarios como las oportunidades de trabajo

Resumen: Como condiciones de trabajo, como características pessoais e os fatores escolares influenciam o recrutamento e a retenção de professores, é um tópico muito estudado no campo da educação financeira e política. Los resultados de la investigación pesquera, cada vez más veces que los profesores responden a un conjunto de fatores monetarios y no monetarios, no son decisivos en el mercado de trabajo del profesor. O que es menos claro es o valor relativo o absoluto que a los profesores se les atribuye un papel como el amor, los datos demográficos del estudio, las condiciones de la escuela y las condiciones del trabajo, el estilo del trabajo, la autonomía del plan de estudios y la mayoría de las personas. Este es el propósito del uso de una nueva metodología de investigación para el campo, con el objetivo de responder a las preguntas. Este es un análisis de uso basado en la elección adaptativa (ACBC) para cuantificar una importancia relativa de los papeles de los fondos monetarios y los de los profesores en el ejercicio, tal vez una vez que se considere una conveniencia de dinero. El uso de ACBC se estima o el valor se colocará dentro de los plazos de trabajo del profesorado por los profesores de apoyo en el estado de Utah y como es el caso de los cambios en la información y los datos demográficos. Esta pesquisa fornece recomendaciones prácticas para los administradores y formuladores de políticas que el visado se torna como las escuelas más importantes para los profesores y la demostración del uso de ACBC para responder a las preguntas pendientes en el campo del trabajo y la retención de los profesores.

Palavras-chave: Recrutamento de Professores; Retenção de Professores; Condições de trabalho do professor

Quantificação do valor que os professores atribuem aos fatores não monetários ao avaliar as oportunidades de trabalho

Resumo: Como as condições de trabalho, as características pessoais e os fatores escolares influenciam o recrutamento e a retenção de professores, é um tópico muito estudado no campo da educação financeira e política. Através de décadas de pesquisa, tornou-se cada vez mais claro que os professores respondem a um conjunto de fatores monetários e não monetários ao tomar decisões no mercado de trabalho do professor. O que é menos claro é o valor relativo ou absoluto que os professores atribuem a fatores como salário, fatores demográficos do estudante, condições da escola e outras condições de trabalho, como tamanho da turma, autonomia curricular e apoio principal, para citar alguns. Este projeto introduz o uso de uma nova metodologia de pesquisa para o campo, com o objetivo de responder a essas questões. Este estudo utiliza a análise do *Adaptive Choice-Based Conjoint* (ACBC) para quantificar a importância relativa de vários fatores de trabalho monetários e não monetários para os professores em exercício, uma vez que consideram a conveniência de várias escolas hipotéticas. O uso de ACBC estima o valor colocado em vários fatores de condição de trabalho por professores secundários em Utah e como essas avaliações variam com fatores pessoais e demográficos. Esta pesquisa fornece recomendações práticas para administradores e formuladores de políticas que visam tornar as escolas mais desejáveis para os professores e demonstra o uso do ACBC para responder questões pendentes no campo de recrutamento e retenção de professores.

Palavras-chave: Recrutamento de Professores; Retenção de Professores; Condições de trabalho do professor

Introduction

Teachers are regularly cited as the most important school-level factor influencing student achievement (Darling-Hammond, 2010; Ferguson, 1991; Hanushek, Kain, & Rivkin, 2004a; Rockoff, 2004; Sanders & Rivers, 1996; Sanders, Wright, & Horn, 1997). It is also well known that many teachers tend to have short careers, with five-year attrition rates cited as being as high as 50% (Ingersoll, 2001). Additionally, teacher quality and the rate of turnover of teachers is inequitably distributed, with poorer and Black and Hispanic students typically being taught by less qualified teachers who are more likely to turnover (Auguste, Kihn, & Miller, 2010; Betts, Reuben, & Danenberg, 2000; Clotfelter, Ladd, & Vigdor, 2005; Darling-Hammond, 2004, 2010; Holzman, 2012; Lankford, Loeb, & Wyckoff, 2002). This inequitable distribution of teachers may contribute to the persistent achievement gaps among students of different racial and socioeconomic backgrounds (Darling-Hammond, 2010; Lankford, et al., 2002). A conclusion of the existing research is that improving teacher recruitment and retention can act as a key lever for both improving overall educational attainment and reducing achievement gaps among students of different racial and socioeconomic backgrounds (Adamson & Darling-Hammond, 2012; Darling-Hammond, 2010; Ronfeldt, Loeb, & Wyckoff, 2013).

Given the effect teachers have on student achievement, the potential for teachers to reduce the achievement gap, and the high rate of teacher attrition, a great deal of research has been conducted on teacher recruitment and retention. Unfortunately, this body of research, while substantial, falls short of answering key practical questions needed to transform research into policy. In particular, the current literature does not adequately address how teachers value different job-related factors when evaluating potential employment opportunities. This is a result of two key weaknesses in the existing literature: a limited focus on how teachers choose between competing school options and a lack of studies that aim to meaningfully quantify the relative value of different working conditions.

This study aims to address these gaps in the existing literature by allowing teachers to choose between hypothetical sets of schools using an Adaptive Choice-Based Conjoint Analysis (Johnson & Orme, 2007) survey. This method systematically varies conditions among the choices offered and estimates the value placed by individual teachers on individual job-related factors. This process allows for an answer to the question: What value, if any, do teachers place on select job-related factors? Additionally, through the collection of relevant demographic information, further investigation can determine whether valuations vary systematically across teacher contexts or backgrounds.

This study aims to advance the existing teacher recruitment and retention literature by directly measuring how teachers utilize their preferences when they evaluate potential employment opportunities. The results of this study provide relevant and easy to understand measures of relative importance of the various factors studied. This study extends the existing research into teacher preferences in a way that can be effectively utilized by administrators and policymakers. Administrators and policymakers can use the outcomes of this research to inform changes in school desirability relative to other schools and to predict teachers' responses to changes in policies by, for example, informing cost-benefit analyses related to working conditions or salary structure changes within their locus of control. Additionally, administrators can use these results to develop efficient incentives for recruiting and retaining the best teachers for their schools. By understanding how teachers value incentives, schools serving disadvantaged student populations can optimize their work environments to compensate teachers for more challenging teaching assignments. Undertaking this effort can assist administrators in retaining highly skilled teachers and potentially increasing the

achievement of their students. Moreover, this study aims to quantify the amount of money needed to properly compensate a teacher for working in what is perceived to be a more challenging environment. This outcome can guide policymakers to the determination of an appropriate compensation level for teaching in these hard-to-staff schools. As a result, this research has the potential to make a meaningful impact on student achievement in hard-to-staff schools and reduce the component of the educational achievement gap attributable to staffing inequities.

Specifically, this study addresses two key research questions. First, I identify the value placed by teachers in this sample on salary and 13 non-monetary factors both in relative terms and, for the non-monetary factors, in dollar-equivalent terms. Second, I explore the extent to which these valuations vary across the entire sample as well as with respect to teacher demographic and context factors. This study finds that while salary is the most important factor, there are meaningful values placed on non-monetary factors, allowing policymakers and administrators to manipulate the desirability of schools through levers other than salary. Additionally, this study finds that values placed on these factors vary based on respondent demographic and contextual factors, resulting in different policy recommendations for administrators operating within different contexts.

Review of the Literature

It is well accepted that the teacher is the school factor with the greatest potential influence on student achievement. This contention has been a part of the canon of educational research for so long that it is no longer challenged. Examples of prominent researchers describing this relationship include Hanushek, Kain, and Rivkin (1998), Darling-Hammond (2003), Kane and Staiger (2008), Sanders and Rivers (1996), Sanders et al. (1997), and Ferguson (1991). In addition to studies showing links between student achievement and general teacher effects, many studies show the connection between specific teacher quality characteristics and student outcomes (e.g., Ballou & Podgursky, 1997; Clotfelter, Ladd, & Vigdor, 2007; Darling-Hammond, 2000, 2009; Ferguson & Brown, 2000; Goldhaber, 2002; Wilson, Floden, & Ferrini-Mundy, 2001). Much of the debate today resides not with whether or not teachers impact student achievement, but whether or not schools can compensate for out-of-school factors associated with student performance, such as income inequality issues (Berliner, 2013). Because schools may not be positioned to directly influence their broader socio-cultural context in a transformative way, focusing on recruiting and retaining the highest-quality teaching candidates is of great importance to schools.

The existing teacher recruitment and retention literature is primarily focused on identifying factors that increase teacher retention. A key finding of this body of literature is that monetary factors impact teacher recruitment and retention. This finding is cited in reviews of the existing literature (Kelley & Finnegan, 2004; Lynch, 2012) as well as most individual studies in this field. There are some studies that have found no impact of compensation on retention (e.g., Cowen & Winters, 2013; Hancock & Scherff, 2010), but salary is generally considered to be an important factor influencing teacher recruitment and retention. In addition, a large number of non-monetary factors have been found to influence teacher recruitment and retention, such as professional development (e.g., Elfers, Plecki, & Knapp, 2006; Ingersoll & May, 2012), administrator support (e.g., Ado, 2013; Cannata, 2010), class size (e.g., Horng, 2009; Lankford et al., 2002), student demographic factors (e.g., Feng, 2010; Guarino, Brown, & Wyse, 2011), organizational fit (e.g., Cannata, 2010; Player, Youngs, Perrone, & Grogan, 2017), curricular autonomy (e.g., Bunn & Wake, 2015; Ingersoll & May, 2012), and others.

Despite a great deal of literature that identifies factors influencing teacher recruitment and retention, it is much more challenging to find research that evaluates the relative importance of

those factors. The existing literature suffers from two primary limitations that make it challenging to understand how teachers evaluate potential schools. The first is that many studies do not attempt to rank the importance of factors and those that do generate ranks typically use methods that can be challenging to derive action from or that do not get at the nuanced choices teachers are making. For example, studies that report the percentage of participants citing a particular factor as important are useful, but do not replicate the real-world experience of choosing between a fixed number of options nor do they provide insight into how important the factors are. The second limitation is that the vast majority of studies either focus on factors influencing retention or job satisfaction in the abstract or look at survey responses associated with certain movements, rather than understanding how teachers choose between competing employment opportunities. For example, many studies utilizing the School and Staffing Survey and Teacher Follow-up Survey (such as Jackson, 2012) look for how answers on a survey are different between teachers who indicate staying in their teaching role as opposed to changing schools or exiting the profession. These studies can capture the impact of factors unrelated to teacher preferences, such as movements due to retirement and family relocations and choices to remain in an undesirable school for reasons unrelated to school quality. In these cases, it is impossible to know how conditions described on the survey contributed or not to the decisions teachers made about staying at their schools, moving between schools/district, or leaving the career. While these studies provide a great deal of information on what matters to teachers, it is more challenging to know how much these factors matter. These gaps justify the need for studies that focus on how teachers evaluate the desirability of schools and studies that result in easy-to-understand and actionable measures of factor importance and valuation. A few studies tried to fill this gap, but they suffer from their own limitations, discussed below.

There are a few studies in the literature that have attempted to quantify trade-offs that teachers are making when choosing among employment options. One is Hanushek, Kain, O'Brien, and Rivkin (2005), which uses statistics from the Texas Schools Project to attempt to estimate the amount of "Combat Pay" needed to overcome differences between schools based on non-monetary differences. The primary limitation of this approach is that it typically involves predicting movements based on regression outcomes of variables such as school demographics and average salaries, rather than observing individual teacher behavior. However, the attempt is promising because it allows for comparison of factors in a well-understood metric, that of salary dollars.

Two more promising studies are those done by Horng (2009) and Robinson (2012). Each of these studies used Adaptive Conjoint Analysis to attempt to find the relative importance of different factors when teachers made trade-offs between hypothetical schools. These studies each resulted in importance values of each factor analyzed, allowing for the direct comparison of the impact of each factor in the teacher's (hypothetical) labor market decision. Unfortunately, each of these studies is limited in its sample. Robinson (2012) only evaluated the preferences of pre-service music teachers, while Horng (2009) looked only at elementary school teachers within a single district. Additionally, while Horng noted some differences in importance scores based on demographic characteristics, there was not a robust analysis of these differences. Despite their limitations, these two studies provide useful guides for future research into the question of how much teachers value non-monetary factors and influence the design of the present study.

Study Methodology and Analytic Approach

This study makes use of an Adaptive Choice-Based Conjoint analysis. This method is an adaptive survey tool used to determine the value that individual teachers place on different school characteristics. The use of this tool adds a unique contribution to the important and well-established

field of teacher recruitment and retention. Specifically, this study allows for a better understanding of how teachers choose between competing school options and how they value different working conditions and school characteristics. This unique tool and the intuitive results it produces can advance the field of teacher recruitment and retention by delivering meaningful and actionable results to researchers, policymakers, and administrators.

Study Design

This study used an Embedded Mixed Method design (Creswell & Plano Clark, 2011) utilizing Adaptive Choice-Based Conjoint Analysis (ACBC). This is similar to the procedure used by Horng (2009) and Robinson (2012), described above. One key difference between the ACBC methodology used in this study and the Adaptive Conjoint Analysis (ACA) methodology used in the prior studies is the introduction of a forced choice between competing options, rather than a ranking of a single option (Johnson, Huber, & Bacon, 2003), which more closely mimics the choice teachers face in the labor market.

The survey instrument utilized consists of three key components: an initial demographic survey, the Adaptive Choice-Based Conjoint Analysis, and an embedded qualitative component.

Demographic survey. The initial demographic survey collected personal characteristics that may be important covariates with the preference data collected in the ACBC survey. This section was also used to screen out respondents who were not a part of the target population and to evaluate the similarity of the survey sample to the broader population of interest. The demographic questions address the most commonly cited personal and qualification/contextual factors that were found to be associated with teacher preferences or movements in the literature review. Five personal factors were included in this study: age, teaching experience, race, gender, and marital status as well as six professional characteristics: preparation pathway; highest degree earned; current subject area; and whether the current school is a middle vs. high school; is urban, suburban, or rural; and is a charter or district school.

ACBC survey. The second component of the survey instrument is the Adaptive Choice-Based Conjoint Analysis (ACBC) (Johnson & Orme, 2007). This consists of an adaptive survey with four stages, which will be described below in the order in which they are encountered by a respondent. The survey aims to evaluate the relative importance of different factors to each respondent by determining the utility placed on different levels of those factors.

ACBC surveys require a focus on a limited number of factors, limited to 14 factors for this study. The factors investigated in this study are: (1) Salary; (2) Job Security; (3) School Grade; (4) Student SES; (5) Student Race; (6) Planning Time; (7) Class Size; (8) Curricular Autonomy; (9) Principal Support; (10) Influence over Policies; (11) Opportunities for Collaboration; (12) Professional Development and Mentoring; (13) Mission and Vision Alignment (“Organizational Fit”); and (14) Teaching Assignment. These factors chosen by the researcher to be investigated in this study were informed by the results of the literature review and a pilot study conducted in 2016. This pilot study was conducted with a larger set of potential factors commonly cited in the literature and was used to reduce the number of factors down to a more manageable size by removing those that were found to be of relatively low importance by the pilot group and to adjust levels of the factors according to participant feedback. A limitation of any ACBC study is that not all possibly relevant factors can be considered, however, the specific factors investigated in this study are ones that have strong theoretical support, strong support in the literature, and/or strong support from the pilot study. An additional limitation is that respondents may use certain conditions as proxies for others that are not measured; for example, if Student SES is inferred by respondents to be a proxy

for resources, the inclusion or exclusion of resources as a factor in the study will influence the importance of Student SES.

Build Your Own. In the first stage of the ACBC survey, respondents build their ideal school and working conditions by selecting the preferred level of each factor. For example, the survey asks a respondent to choose his/her preferred level of the factor of Job Security from the following options: “Tenure is available and likely”; “Tenure is available, but unlikely”; and “Tenure is unavailable”. A complete list of factors and the level of each factor available to respondents can be found in the Appendix. The only factor where participants do not select a preferred level is the salary factor. The factors that are obviously ordinal, including class size, student SES, student race, and school achievement, are displayed in order from lowest numeric value to highest numeric value or, in the case of School Achievement, from A to F. Levels of the other factors were fixed for all participants, but randomized when generating the survey. This decision regarding ordinality of a factor was also reflected in the settings of the survey to improve its estimates of utility by, for example, allowing a respondent to indicate that a school letter grade less than a C was unacceptable (Sawtooth Software, 2018).

Screening. Next, the survey develops a series of hypothetical schools and displays them five at a time. For each, respondents are asked whether they would consider choosing to work in one of these schools. This task is repeated a total of 10 times, so that, in aggregate, a respondent has considered 50 potential schools. Throughout, in order to refine the options presented, the respondent is permitted to select a level of a factor as a “must have” or “unacceptable”; for ordinal and continuous factors (salary), greater than and less than logic is employed. For example, a respondent may have the opportunity to say that a class size greater than 30 students is unacceptable. The survey tool uses the responses to which schools are potentially viable to generate the set of hypothetical schools to consider for this particular individual.

Choice tasks. Using the responses from the screening task described above, the survey adaptively generates sets of three hypothetical schools with combinations of desirable and undesirable factors. For each set, the survey asks the respondent to choose the most desirable of the three. Each choice task varies a subset of the factors, making any two choices in the task more similar than not. By displaying the “constants”, the task forces an individual to consider the totality of the school environments that they are considering while directing attention to the key differences. Forcing a choice mimics the reality teachers face with finite opportunities. This task is repeated up to 12 times.

Calibration stage. The final stage of the ACBC survey is a calibration stage that presents respondents with a single hypothetical school and asks how likely they would be to take a position at that hypothetical school. Respondents respond using a Likert scale with the following options: “Definitely Would”; “Probably Would”; “Might or Might Not”; “Probably Would Not”; “Definitely Would Not”. This task is repeated up to six times per survey. The survey uses this stage to refine and calibrate the utility values calculated through the prior portions of the survey.

Embedded Qualitative Strand. Throughout the screening and choice tasks process, open-ended response prompts are intermittently included that ask respondents to reflect on the reason for their decisions. The results of this qualitative data are not addressed in this paper.

Population

The population surveyed included secondary teachers in public schools within the state of Utah who were a teacher of record during the 2016-17 school year. The focus is necessarily limited to a subset of teachers due to mixed methods nature of the broader study. When choosing a subset of teachers to investigate, the secondary level was chosen because research that shows that

secondary school teachers exhibit higher degrees of attrition than elementary school teachers (Keigher, 2010), as well as the belief that secondary and elementary school teachers make up two distinct labor markets. With different preparation programs and alternative career opportunities, it is reasonable to predict that these sets of teachers would have different sets of values. In particular, the subject area expertise of secondary teachers generates different alternative career opportunities for secondary teachers that may influence responses. Additionally, the context of a middle school and high school is different from that of an elementary school and the job expectations for the teachers are often different.

Utah teachers are targeted in part because it is a convenience sample, as it is the state where the researcher is located. Utah is an under-studied state, as compared to states such as Texas and North Carolina, for example. This is likely due to its lack of large data sets available. Increasing the geographic diversity of studies investigating teacher recruitment and retention is of value to the field.

The population includes teachers in certified areas, including special education, but excludes paraprofessionals, teachers' aides, media specialists, and similar positions. This population, as of the 2015-2016 school year, consisted of 14,941 individuals. Due to the use of Bayesian analysis (described below), a power analysis is not appropriate for the primary means of analysis. However, Sawtooth Software, the makers of the adaptive survey software, recommend using samples on the order of approximately 1,000 respondents at a minimum for studies of this type, with all subgroups at a minimum level of 200 individuals (Orme, 2010).

Participant Recruitment

Participants were recruited using publicly available email addresses from school websites of secondary schools in the state of Utah¹. An attempt was made to only collect email addresses of those in the target population, excluding non-instructional staff and teachers of elementary classes. All email addresses were collected during the fall of the 2016-17 school year (October to January). In total, 14,425 email addresses were collected. There were a minority of schools that did not have emails publicly available or did not have complete and active websites, causing them to be excluded from the set of possible participants. Participants were invited to participate in the survey over the course of a five-week period beginning in late April 2017. Of 14,425 emails collected, 629 were returned as invalid, leaving 13,769 possible respondents. Reminder emails were sent approximately every week, with participants having the option of unsubscribing from reminder emails. In total, participants were contacted up to four times over the course of the 5-week period. Participants were invited to participate in a drawing for one of three \$50 e-gift cards.

Survey Respondents

The survey was successfully distributed to 13,769 possible participants and received 2,228 complete responses for a response rate of 16.1%; those that did not complete the survey were dropped from the sample. The median response time was approximately 37 minutes, indicating that the respondents took the survey seriously, although at that length, survey fatigue must be considered a possible limitation. Of the 2,228 respondents, 16 were identified as being not a part of the target audience and were excluded. For example, some individuals who indicated their subject area as "elementary" or "guidance counselor" were removed from the study results before conducting any analyses. This results in a final sample of 2,212 individuals, which makes up approximately 14.8% of the target population. Complete demographic information was received from 2,167 individuals, allowing for an analysis of key demographic differences in the importance of different factors.

¹ IRB approval was solicited and received from the author's institution at the time of the research.

Unfortunately, other key demographics were not sampled in enough abundance to meaningfully analyze, such as teacher race.

In order to understand how the study sample compares with the target population, a summary of the demographic information of the 2,212 participants is shown in Table 1. While the state of Utah does not publish teacher demographics, salary and teaching context (charter vs. district) are available. Approximately 11.7% of secondary teachers in the state of Utah teach in charter schools, indicating that this sample over-weighted with charter school teachers at 16.2%. The average salary among all teachers in Utah in the 2016-17 school year was approximately \$47,000 (Utah State Office of Education, 2017). If the respondents are averaged according to the center of the \$5,000 salary range they chose as their current salary, the average salary in this sample was \$48,184, approximately 2.5% higher than the average salary in the state.

Table 1
Demographic breakdown of study sample (N=2167)

Demographic	Response	Percentage in sample
Gender	Male	34%
	Female	66%
Type of School	District	83.2%
	Charter	16.2%
	Other	0.6%
Level	Middle School	47.6%
	High School	52.4%
Race	American Indian or Alaska Native	1.1%
	Asian	1.1%
	Black or African American	0.5%
	Native Hawaiian or Other Pacific Islander	0.6%
	White	97.6%
Ethnicity	Hispanic or Latino	2.4%
	Not Hispanic or Latino	97.6%
Age	Median	42
Years' Experience	Median	10
Highest Education	Associates	0.3%
	Bachelor's Degree	45.7%
	Masters	49.5%
	PhD/EdD	1.6%
	Other Graduate	0.5%
	Other	2.4%
Salary	Less than \$30,000	3.6%
	\$30,000-\$34,999	10.0%
	\$35,000-\$39,999	16.0%
	\$40,000-\$44,999	16.4%
	\$45,000-\$49,999	12.0%
	\$50,000-\$54,999	12.6%
	\$55,000-\$59,999	10.5%
	\$60,000-\$64,999	9.7%
	\$65,000-\$69,999	4.6%
	\$70,000-\$74,999	2.5%
	\$75,000-\$79,999	1.0%
	\$80,000-\$84,999	0.5%
	\$85,000 or more	0.6%

Table 1 cont.

Demographic breakdown of study sample (N=2167)

Demographic	Response	Percentage in sample
Married	Yes	77.2%
	No	22.8%
Location	Urban	19.7%
	Suburban	57.9%
	Rural	22.4%
Subject Area	English	17.1%
	Social Science	10.5%
	Mathematics	16.7%
	Science	13.9%
	PE/Health	0.4%
	Fine Arts	0.8%
	CTE	10.6%
	Special Education	9.5%
	Other	9.3%

Analyses

The ACBC tool generates individual parameter estimates of utility values for each level of each factor for every individual who completes the survey. This utility value is a unit-less measure, where positive utility values indicate added value and where the range between the best and the worst-rated level of a given factor indicates the relative importance of that factor. Assuming that value is fungible, a dollar value for each “utility point” can be calculated based on the utility estimates of different levels of salary. Consequently, that the utility value of money is constant across salary ranges is an assumption worthy of future investigation. Making this assumption allows for the calculation of the monetary value placed by every respondent on each level of the different factors.

The software utilizes Hierarchical Bayesian (HB) analysis to estimate the mean utility value of each level of a factor both for individuals and across the entire sample (Sawtooth Software, 2016, 2018). To do this, the software estimates part worths that represent the value placed on a particular level of each factor for each individual as well as an estimate of a single coefficient for a linear salary function. These estimates are generated using a HB model. At the higher level, an assumption is made that individual part worths and the salary coefficient are best fit to a multivariate normal distribution. At the lower level, the probability of choosing a particular alternative given an individual’s part worths and salary coefficient are fit to a multinomial logit model (Sawtooth Software, 2016). The Metropolis Hastings algorithm is used to update priors and was run for 10,000 iterations after a burn-in of 10,000 iterations. The use of HB provides a conclusion that has significantly more value to a policymaker or an administrator than the conclusions derived using frequentist statistics by making parameter estimates. Additionally, the HB analysis has the practical benefit of “borrowing” information from other individuals to improve individual utility estimates (Orme, 2000). The HB analysis allows for parameter estimates of relative value, relative importance, and, using the calculation described above, dollar value. Simple and multiple regression were used to determine relationships among individual utility values and covariates from the demographic survey.

Importance of Salary and Non-Monetary Factors

This study supports the findings in the existing literature that, while salary matters, other factors matter as well. Figure 1 shows the utility value placed on each level of non-monetary factors

investigated in this study. Because all factors have levels with differential utility, it is clear that these non-monetary factors are influencing the choices made by respondents. It is clear from Figure 1 that salary has a large impact on respondents' choices due to the high utility difference between the two different options displayed. The factor with the next most extreme difference in utility between its least and most desirable factor is teaching assignment, although the utility value difference is less than half that that is seen with salary.

Relative Importance of Monetary and Non-Monetary Job Factors

A measure of importance was calculated for each individual participant for each factor. This importance value is a measure of the difference in utility value between the most and least desirable level of a particular factor. The importance value is positive and linear; a factor with an importance level of 4.0 is interpreted as being twice as important as a factor with an importance level of 2.0. Table 2 shows the average importance value across the full sample of 2,212 respondents of each factor investigated. Those factors with a different Importance Rank had average importances that were statistically significantly different from the prior most highly ranked factor (one-tailed *t*-test; $\alpha=0.05$). These results indicate that while salary is by far the most important factor, there is value placed on the non-monetary factors as well, with job assignment and class size being most important. The most important non-monetary factor, assignment, was approximately three times as important as the least important factor and all non-monetary factors were less than half the importance of salary. The least important factors were those related to student demographics, with student race and SES being identified as the two least important factors. School achievement, on the other hand, is tied (with curricular autonomy) for the third most-important non-monetary factor, despite the fact that it is often perceived to be related to student demographic factors. This is discussed further below.

Table 2
Mean and standard deviation of importance measures for each of the 14 investigated factors

Importance Rank	Factor	Mean Importance	Standard Deviation of Importance Values
1	Salary	19.53	11.78
2	Assignment	9.56	5.28
3	Class Size	8.83	5.02
4	Curricular Autonomy	7.86	4.31
4	School Achievement	7.83	4.38
6	Principal Support	7.41	3.69
7	Organizational Fit	6.59	3.25
8	Professional Development and Mentoring	5.69	2.39
8	Planning Time	5.62	3.09
10	Opportunities for Collaboration	4.93	2.52
11	Influence over Policies	4.48	2.40
11	Job Security	4.39	3.23
13	Student SES	3.89	1.79
14	Student Race	3.40	1.56

Another way of understanding importance in this study is how many individuals had a given factor as the factor with the greatest importance. Table 3 displays the number of individuals for whom each factor was the most important. Nearly 60% of respondents had salary as the factor with the highest level of performance, with each of the other factors determined to be the most important by less than 13% of the study participants. Half of the factors were found to be the most important to less than 1% of study participants. Despite these factors rarely, if ever, being found to be the most important factor, they do have non-zero importance values, indicating that teachers in this study are using these factors to make decisions. This result indicates that studies that focus on only the most important factors for teachers are likely to miss many relevant factors that are still weighed by teachers.

Table 3

Frequency of each factor being the factor with the highest importance for an individual

Factor	Respondents for whom it is the most important factor	Percentage of sample for whom it is the most important factor
Salary	1288	58.2%
Assignment	286	12.9%
Class Size	207	9.4%
Curricular Autonomy	138	6.2%
School Achievement	114	5.2%
Principal Support	89	4.0%
Organizational Fit	44	2.0%
Planning Time	18	0.8%
Job Security	14	0.6%
Opportunities for Collaboration	6	0.3%
Professional Development	4	0.2%
Influence over Policies	4	0.2%
Student SES	0	0.0%
Student Race	0	0.0%

Monetary Value Placed on Non-Monetary Factors

In addition to generating the relative importance of each factor, utility values can be used to estimate a monetary value placed on the change between any two levels of a factor. These values represent an estimate of the amount of money it would take to compensate a teacher for moving from a more desirable to a less desirable level of a factor, or vice versa. Estimates of these values were derived for each individual by comparing the utility value difference between levels of a single factor with the utility value assigned to differences in salary. The values were then shifted so that the most commonly preferred level of each factor was associated with a monetary value of \$0 for each individual and then a median value for the sample was found. Table 4 provides select results of this analysis.

Table 4
Median monetary value estimated for a change in level of select factors

Level	Preferred Level of Same Factor	Difference in value from preferred level to given level of a factor
Tenure is unavailable	Tenure is available and likely	\$3,919
Tenure is available, but unlikely	Tenure is available and likely	\$3,177
Teaching outside content area	Teaching in content area	\$12,608
Teaching in closely-related content area	Teaching in content area	\$5,902
15 students per class	25 students per class	\$561
20 students per class	25 students per class	\$250
30 students per class	25 students per class	\$2,281
35 students per class	25 students per class	\$5,717
>35 students per class	25 students per class	\$9,896
45 minutes of daily planning time	90 minutes of daily planning time	\$1,630
45 minutes of planning time every other day	90 minutes of daily planning time	\$6,227
No department or grade-level meetings dedicated to collaboration	Regular opportunities to collaborate with peers in grade-level and department meetings	\$5,551
Teachers all teach a common scripted curriculum purchased by the district	Teachers plan a common curriculum in grade-level teams	\$8,082
School does not have an obvious or meaningful mission statement	Strong agreement with school's mission statement	\$4,551
Disagreement with school's mission statement	Strong agreement with school's mission statement	\$8,448
80-100% students in poverty	20-40% students in poverty	\$3,822
"B" School Rating	"A" School Rating	\$259
"C" School Rating	"A" School Rating	\$2,505
"D" School Rating	"A" School Rating	\$6,291
"F" School Rating	"A" School Rating	\$9,307

In Table 4, the preferred level is the level with the highest average utility value among all respondents. For example, serving in a school that had 20-40% of its students in poverty is preferable to serving in a school where less than 20% of the students are in poverty. Also, classes of 25 students were preferable to classes of 15 or 20 students. The salary drag represents the salary amount equivalent to the decrease in utility of moving from the preferred level of a factor to the level under consideration. Alternatively, it can be thought of as the equivalent salary premium for changing from a given level to the preferred level. Within a given factor, the difference between the salary drag for two different levels of a factor is equal to the salary drag or premium of moving between those two factors. For example, decreasing from 20 students per class to 15 is equivalent to a salary drag of \$311 (\$561-\$250). These values represent the amount of salary needed to make a median teacher indifferent as to a change from one condition to another.

As would be expected from the result that assignment was the most important non-monetary factor, the difference between teaching in content area and teaching out of content area is equivalent to a change in salary of \$12,608, the highest value in the table. Similarly, the high

importance of curricular autonomy is reflected in the high salary drag associated with teaching a scripted curriculum; compared to the preferred condition of developing curriculum in grade-level teams, being forced to teach a scripted curriculum is equivalent to a loss of \$8,082 in salary. These salary drags can also be thought of as a salary premium for shifting to a preferred level of a factor. For example, providing regular opportunities for collaboration is equivalent to increasing salaries by \$5,551, and having a mission statement teachers agree with is worth \$4,551 over having no mission statement. However, adding a mission statement that teachers disagree with is equivalent to a salary drag of \$3,889; this is calculated as the difference between the drag associated with no mission statement and with a mission statement the respondent disagrees with.

Looking at multiple levels within the same factor is revealing. Class size is a particularly interesting example. While 25 students is the preferred level, the salary drag associated with increasing class sizes gets increasingly severe as the class size is increased beyond 30 students. Moving from 25 to 30 students is equivalent to a salary drag of \$2,281 but adding 5 more to move from 30 to 35 is equivalent to a salary drag of \$3,436 and any increases beyond that are equivalent to a salary drag of \$4,179. Similarly, while going from an “A”-rated school to a “B”-rated school only represents a salary drag of \$259, going from an “A”- to a “D”- or “F”-rated school represent a salary drag of \$6,291 and \$9,307, respectively. Two other examples of cases where shifts between different levels of a factor are particularly informative are for the job security and planning time factors. Having tenure be available and likely is worth \$3,919 over having it be unavailable; however, having it available, but unlikely to be received is only worth \$742 over not having it at all. With planning time, doubling planning time from 45 minutes per day to 90 minutes per day is only equivalent to a salary premium of \$1,630, but decreasing it to 45 minutes every other day from 45 minutes every day is equivalent to a drag of \$4,593. The fact that the importance of a factor depends on what possible levels of that factor are under consideration is an important finding and demonstrates the importance of investigating the details of the conditions teachers cite as influencing their labor market decisions.

The values Table 4 compare favorably to the limited existing literature, lending support to the validity of these results. Hanushek, Kain, and Rivkin (2004b) found a salary incentive of 9-43% needed to incentivize moving from a suburban school to a high-minority, low-performing urban school. Boyd, Lankford, Loeb, and Wyckoff (2003) found average incentives of \$10,000 to \$16,000 needed to equalize the desirability of suburban and urban schools in New York metropolitan areas. Holding student race constant, moving from an A-rated school with 20-40% low-income students to an F-rated school with 80-100% low-income students would be equivalent to a salary loss of \$13,129 or 28% of an average teacher’s salary according to the results of this study. This indicates that the results described above are in line with those found in prior studies and lends support to the valuations of other factors that are estimated for the first time in this study.

Variation in Results

As would be expected, there is substantial variation in the importance individual teachers place on each of the factors investigated. Table 2 displays the standard deviation of the importances for the set of teachers surveyed. As can be seen in this table, the values of greatest average importance also saw the largest variation in importance values. For example, salary was both the most important factor and the factor with the greatest variation in importance values. The results in Table 2 also show that some factors have particularly high or low variation relative to their average importance. While there is a definite trend between average importance and variation, the variation in importance of the factor of job security is very high relative to its average importance, while the

variation within professional development and mentoring and, to a lesser extent, principal support, is relatively low.

In addition to investigating variance across the sample, examining the correlations between individual importance values is revealing. Table 5 shows a correlation table between importance values for the 2,212 participants. From the table, it is striking the extent to which a high importance on salary has a negative association with all other factors, particularly those related to school supports such as collaboration, professional development, and principal support. This would seem to indicate that there are sets of individuals who are more and less responsive to non-monetary factors as a whole. It is also notable that importances for student race and SES and school achievement are highly correlated.

Demographic Correlations

For all demographic analyses, a few modifications were made to the data set for ease of analysis and to obey recommendations regarding sample sizes. In order to meet the minimum subset size of 200 recommended by Sawtooth (Orme, 2010), no analyses by race or ethnicity were possible. Additionally, some categories needed to be condensed, such as turning different levels of educational achievement into a dichotomous graduate school vs. no graduate school variable. Additionally, there was a reduction in the number of subject areas analyzed, with less frequently cited categories condensed to an “other” representing non-core, non-special education teachers. Those teachers citing many subjects that crossed into multiple of the reduced categories were excluded as there were not enough “multiple subject areas” respondents to constitute a new category.

The current salary demographic question was also modified to ease the interpretation of results. The salary categories were reduced by condensing less than \$30,000 and \$30,000-\$34,999 to less than \$35,000 and upper levels of salary into a greater than \$65,000 bin. Separately, the salary measure was converted to a continuous measure. This modification allows for more intuitive interpretation of results seen than treating salary as a categorical as it was collected. The conversion from categorical to continuous variable was accomplished by assigning each member of a salary range bin an approximate salary at the center of the bin (ex. All respondents who reported a salary of \$40,000-\$44,999 were assigned a salary of \$42,500). On the extremes, all less than 30,000 respondents were assigned a salary of \$27,500 and those over \$85,000 were assigned a salary of \$87,500. Finally, preparation pathway, such as whether a teacher received a Bachelor’s degree in education or was in an alternative route to licensure program, was not analyzed due to confusion over the options provided that was communicated by a number of respondents in their open-ended responses or in emails to the researcher.

Demographic analyses were only conducted on those with complete demographic responses. This reduced the sample to 2,166 individuals. This more-limited sample is only utilized for the results in this particular section.

Table 6 displays the results of running simple regressions ($\alpha=0.05$) of the demographic characteristics on the utility value of each factor. It should be noted that some of the demographic factors were highly correlated. In particular, age and experience ($r=0.74$), age and current salary ($r=0.55$), and experience and current salary ($r=0.70$). Unsurprisingly, age and experience are also correlated with educational attainment, with those with graduate degrees being on average years older with 6.4 more years’ experience and making on average nearly \$12,000 more per year.

Table 6
Statistically significant ($p < 0.05$) relationships between teacher demographics and factor importance values as determined by simple regression

Demographic Factor	Comparison Group	Salary	Tenure	Assignment	Class Size	Planning Time	Collaboration	Professional Development	Principal Support	Autonomy	Org. Fit	Influence Over Policy	Student Race	Student SES	School Grade
Subject (Math Reference Group)	English			-.34***	-.21***					.57***		.16*			
	Science			-.15*	-.15*		-.23*		-.17*	.27***					
	Social Science	.22**		-.28***	-.37***		-.29***		-.16*	.31***		.18*			
	Other		.13*		-.33***		-.31***			.20**		.15*			.19***
MS (vs HS)	Special Ed		.20*	-.45***	.47***	-.21*		.18*		-.18*			-.22*		
		-.12**		-.10*	.13**	-.24***	.15***	.10*	.13**		.10*				.15***
District (vs Charter)	Rural	.28**	.46***		.51***			.13*	.14*	-.13*			.15*		
	Urban		.17*		.20***								-.18**		-.27***
Years' Experience		.21***	.12***	-.07***	-.14***	-.05*	-.13***	-.10***	-.07**	-.09***	-.17***			.26***	
		.47***	.10*	-.10*	-.21***	-.11**	-.23***	-.23***	-.17***	-.10*	-.26***	-.10*			-.11*
Graduate Degree (vs. Non)		.14***	.09***	-.10***	-.05*	-.09***	-.10***	-.06**		-.08***	-.09***		.05*		
		.55***		-.17***	-.13**		-.33***	-.29***	-.31***	-.16***	-.32***	-.23***	.13**		
Male (vs. Female)		.11*				-.10*				-.17***			.14*		.12*
		.30***	.12***	-.08***	-.18***	-.05*	-.16***	-.15***	-.12***	-.08***	-.19***				

Note: All numeric values are standardized. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 6 cont.
 Statistically significant ($p < 0.05$) relationships between teacher demographics and factor importance values as determined by simple regression

Factor	Salary	Job Security	Assignment	Class Size	Planning Time	Collaboration	Professional Development	Principal Support	Autonomy	Organizational Fit	Influence over Policy	Student Race	Student SES	School Achievement
Salary	1.00													
Job Security	-.08	1.00												
Assignment	-.30	-.08	1.00											
Class Size	-.22	-.06	-.09	1.00										
Planning Time	-.09	-.04	.05	.04	1.00									
Collaboration	-.47	-.08	.03	-.05	-.05	1.00								
Professional Development	-.53	.01	-.02	-.02	-.14	.47	1.00							
Principal Support	-.45	-.04	.06	.00	-.13	.37	.39	1.00						
Autonomy	-.30	-.10	.09	-.12	-.03	.09	.10	.02	1.00					
Organizational Fit	-.46	-.16	-.06	.04	-.06	.33	.38	.27	.07	1.00				
Influence over Policy	-.38	-.01	-.09	-.09	-.07	.36	.41	.29	.12	.22	1.00			
Student Race	-.05	.01	-.08	-.15	-.10	-.18	-.16	-.13	-.13	-.11	-.14	1.00		
Student SES	-.08	-.04	-.07	-.11	-.07	-.15	-.15	-.18	-.14	-.13	-.13	.64	1.00	
School Achievement	-.13	-.01	-.18	-.16	-.13	-.16	-.08	-.12	-.17	-.05	-.12	.44	.48	1.00

Key findings from this portion of the study include: (1) more-experienced, higher-paid teachers care substantially more about salary and substantially less about nearly all non-monetary factors than less-experienced and lower-paid teachers and (2) teacher preferences are context-dependent, with large differences in preferences among teachers who teach in different types of schools and teaching different subject areas.

Salary and Experience. As noted above, experience and current salary are correlated, so it is not surprising to see similar relationships between each of these demographic factors and the importance of each monetary and non-monetary job factor. Increases in salary and experience are associated with an increase in the importance of salary and job security, and a decrease in the importance of every non-monetary factor except for influence over policies, school achievement, student race, and student SES. Thus, once teachers reach a certain level of experience or salary, additional salary and job security are substantially more important than other factors. This is possibly an artifact of the range of salary utilized in this study, which varied from 70% to 130% of the state average salary; for teachers whose current salaries are at or above that upper bound, it is possible that these results overstate their salary sensitivity. There are two additional possible explanations that may explain this phenomenon, which are explored below.

First, it could be hypothesized from these results that teachers are more willing to exchange salary for non-monetary benefits only to the extent that the final salary does not represent a decrease from their current salary. In other words, teachers may be exhibiting loss aversion with regards to salary; they may be unwilling to give up a salary level that has already been attained. Secondly, it is also possible that inexperienced teachers feel as though their success depends on additional supports such as professional development and principal support or easier conditions such as smaller classes or teaching in content area.

In order to determine the relative impact of these related characteristics, multiple regressions were conducted with experience and the linear salary measure predicting the importance of Salary and select non-monetary factors². In the model with the importance of salary as the dependent variable, current salary was predictive of the importance of salary ($p < 0.001$), while experience was not, indicating that the trend towards preferring salary over non-monetary factors at high levels of experience and salary is likely more driven by a loss aversion to salary than by the experience level. A similar result is found with a sample non-monetary factor such as professional development. The importance of professional development is negatively correlated with increases in experience and current salary individually, but when both experience and current salary are used as predictors, current salary remains predictive of the importance of professional development ($p < 0.001$), but experience does not. The same trend held for all non-monetary factors tested, including principal support, opportunities for collaboration, and organizational fit (agreement with the school's mission statement).

Context Factors. A teacher's current context had a large influence on his/her preferences in some cases. Middle school and high school teachers had substantially different preferences in some cases, as did rural, urban, and suburban teachers, charter versus district teachers, and teachers of different subject areas.

Middle-school teachers showed a substantially lower sensitivity to salary than high-school teachers, as well as less concern about teaching assignment or planning time. However, middle school teachers were more concerned with class size, school achievement, and principal support

² Due to the high correlation between these two characteristics, the variance inflation factor (VIF) was measured. The VIF is equal to only 2.0, indicating that there is not a major collinearity concern (Cohen, Cohen, West, & Aiken, 2003, pp. 423-424).

than high-school teachers, and somewhat more concerned about collaboration time, organizational fit, and professional development.

The location of the school in which a teacher is currently employed also influenced preferences. As seen in Table 6, compared to teachers in suburban schools, teachers in both urban and rural schools placed a higher importance on job security and a substantially higher importance on class size. Teachers in urban schools were less concerned with student demographics or school achievement and those in rural schools placed a substantially lower importance on teaching assignment, possibly because rural school teachers may sometimes be expected to teach multiple areas in small schools.

District and charter school teachers demonstrated many substantially different preferences. District teachers were substantially more concerned with salary and tenure and substantially less with class size and organizational fit than charter school teachers. Additionally, district teachers placed a somewhat higher importance on student demographic factors than charter school teachers, although there was no significant difference in the importance placed on overall school achievement. All of these findings hold true when controlling for the fact that district school teachers also tend to be more experienced, with the exception of the greater preference for salary which is no longer statistically significant when experience is controlled for.

Teachers of different subject areas were found to have different preferences, particularly with regards to teaching assignment, class size, and curricular autonomy. Math teachers were significantly more concerned with their teaching assignment than all other core subject area teachers. Class size mattered the most to special education teachers, then math teachers, with all other subject areas placing a significantly lower importance on class size than those two groups. Social studies teachers placed the lowest importance on class size of all subject areas. Curricular autonomy was valued less by special education teachers and more by all other teachers compared to math teachers. English teachers in particular placed an especially high importance on curricular autonomy. Social studies teachers placed a substantially higher importance on salary than math teachers, with no other subject areas showing a significant difference.

Discussion

This study is motivated by the challenge that schools, particularly hard-to-staff schools, face in recruiting and retaining high-quality teachers. This challenge not only affects student achievement overall (Darling-Hammond, 2010; Ferguson, 1991; Hanushek, Kain, & Rivkin, 2004a; Sanders & Rivers, 1996; Sanders et al., 1997), but also likely contributes to achievement gaps between different student populations (Darling-Hammond, 2010; Lankford et al., 2002). Therefore, a key aim of this study was to generate actionable outcomes for policymakers and school administrators. Many of the factors studied are ones that are either actionable by school or district administrators or are ones that can be easily identified for use in public policy. The specific results of this study are likely limited in application to secondary teachers and may be limited geographically due to the single state population used; however, it is possible that the general trends hold for teachers in other areas as well. The results of this study provide insight into the critical policy issue of compensating differentials, prescribe different approaches to recruiting different types of teachers, and provide recommendations for developing efficient and/or low-cost school structures that maximize a school's desirability. Additionally, by describing the way in which demographic and contextual factors are related to the importance teachers place on various factors, this study allows for the development of targeted strategies aimed at increasing the recruitment and retention of teachers in particular stages of their careers, in specific content areas, or in different school contexts.

The Need for Supplementing Salaries in Hard to Staff Schools

The concept of compensating differentials, commonly called “combat pay”, has been around for some time in the literature (e.g., Boyd et al., 2003; Hanushek et al., 2004b; Hanushek & Rivkin, 2007), but has been difficult to quantify. The idea that one must compensate teachers additional amounts of money to work in “harder” schools with more low-income or minority students is one of the key arguments for ensuring that these schools have additional funding relative to their whiter and more affluent peers (as contended in Arroyo, 2008). Although this study found that student race and SES were the least important factors, it did find that school achievement was very important. These results would seem to indicate that the primary factor making hard-to-staff schools less desirable is their achievement, rather than student makeup; however, it is very possible that this result demonstrates a social desirability bias in the data. It is also notable that there is a moderately large correlation between the importance placed on school achievement and student demographic figures.

Regardless of whether student or school factors are driving the need for additional salary to compensate teachers for conditions perceived as “more challenging”, it is clear from this study that there is a need for this additional compensation to staff such schools. While the salary difference between an “A”- and a “B”-rated school are minimal (approximately \$250), the salary drag becomes substantial by the time a school is “D”-rated. The median salary drag associated with exchanging an “A”-rated school with an otherwise identical “F”-rated school was approximately \$9,300. The results of this study indicate that the lowest performing schools need funds to be able to compensate their teachers with an additional \$5,000-10,000 each in order to remain competitive with higher-performing schools. Changes in student demographic factors associated with a change in school performance would add to the compensating salary needed, as there were more minor, but still negative, impacts on school desirability based on student demographics independent of school achievement.

Balancing Monetary and Support Factors

One key conclusion from this research is that while teachers broadly exchange monetary and non-monetary benefits, the extent to which they are willing to do so shows high variability among individuals. It is notable that while salary had the highest average importance, it also has by far the highest standard deviation of importance values in this study sample. Importance of salary was moderately negatively correlated with the importance of opportunities for collaboration, professional development, and principal support. These findings indicate that there may be sets of individuals who are more or less likely to be open to exchanging salary for additional supports. This conclusion has implications for administrators in resource-scarce environments who are likely to need to recruit staff who place a high value on these support elements.

Recruiting and retaining experienced vs inexperienced teachers. The dichotomy described above is clearly seen in a dichotomy between inexperienced, lower-paid teachers and their more experienced, higher-paid peers. While inexperienced and lower-paid teachers still place a high value on salary, they also place a substantially higher value on factors that increase teacher capacity and the ease of the job such as class size, opportunities for collaboration, professional development, and principal support. Schools typically aim to increase the average years of experience of their teaching staffs, but, in the face of teacher shortages and limited resources, it is important to understand that the ability to compensate teachers for less competitive salaries with improved working conditions may be most effective with lower paid and inexperienced teachers. Recruiting and retaining the most experienced teachers is likely to require increases in salary and is less likely to be made up for by improving working conditions or other non-monetary job factors. One exception

to this is that the most experienced teachers do place a relatively higher importance on job security than mid-or early-career teachers. For administrators in resource-scarce environments, it may be necessary to emphasize non-monetary benefits with early-career, lower-income teachers and reserve limited monetary resources for incentives for later-career, higher-paid teachers. Additionally, the evidence of loss aversion regarding salary for higher-paid teachers is important for administrators to consider as they aim to recruit and retain highly-paid teachers.

Efficient use of resources. As shown above, the results of this study can inform school leaders on strategic decisions regarding school administration in an effort to ensure that their staffing efficiently utilizes limited resources. The monetary values placed on various levels of many of the factors have implications for administrators seeking to develop a high-quality staff with limited resources.

When considering the structure of the teachers' work day, the value placed on planning time and on opportunities for collaboration are particularly informative. It is clear from these results that providing additional time for teachers to prepare beyond 45 minutes a day is likely not an economical use of a school's resources because doubling the amount of time is worth a median value of \$1,630, likely less than the cost of the additional staffing that increasing prep time would require. However, halving the prep time to 45 minutes every other day is also likely not a good use of the school's resources, as it is equivalent to a salary drag of approximately \$4,600. Administrators can be intentional with that 45 minutes per day by providing opportunities for collaboration at the grade and department level in order to have a positive impact on recruitment and retention.

Similarly, there are limits to the extent to which schools should increase class size in order to maximize teacher recruitment and retention. Based on these results, it is unlikely that a Utah secondary school will be severely penalized for increasing class sizes to 30 students. It is also possible that even the increase from 30-35 students is economical for a school due to the reduction in labor force required. It is possible that savings from this reduction in labor force are larger than increases in the average salary needed to compensate teachers for the larger class sizes. However, due to the exponential increase in salary needed to compensate for increased class sizes beyond 25 students, there are limits to how large a school can make its classes without negatively affecting recruitment and retention. It is also notable that average class sizes of 15 were less desirable than average class sizes of 25. This counterintuitive result may be unique to Utah due to its high average class sizes where such small class sizes are rare, but is worthy of further investigation in other contexts.

Other salient results found in this study suggest that hiring outside of an individual's content area is unlikely to result in stable employment for those with alternative opportunities, even if that content area is closely related. Moreover, the findings indicate that while there is a penalty for not offering tenure, it is less than 9% of the average salary in the state. Interestingly, offering tenure but making it less available is only slightly better to teachers, on average, than not having it available at all, indicating that schools desiring to take advantage of the recruitment and retention benefit of tenure need to make it widely available.

Finally, there are some opportunities to prioritize certain school factors in recruitment of new staff for benefits at very little cost. The results point to the benefit of having a strong mission statement and utilizing it as a key teacher recruitment tool; teachers are likely to self-select out if they do not support the mission statement and it may be a relatively low-cost way of providing something of value to teachers. Schools that provide for some curricular autonomy are likely to be more attractive to prospective teachers if this is clearly marketed. Finally, the high value placed on academic achievement indicates that marketing school achievement should be a key recruitment strategy for administrators of successful schools.

It should be noted that this study cannot account for the extent to which these changes affect other conditions. For example, it is possible that increasing class sizes or offering curricular autonomy results in impacts on school achievement that mitigate or exacerbate the effect of those factors on school desirability. It is also possible that some decisions such as hiring for mission-alignment increases student achievement, increasing the impact of this intervention over that seen in this study.

The importance of context. The demographic trends reveal important implications for administrators and policymakers attempting to improve recruitment and retention among certain sets of teachers or in certain types of schools. For example, the high importance that English teachers place on curricular autonomy relative to other subject areas is likely to be important in recruiting and retaining teachers in that subject area. Similarly, knowing that class size is of a different importance to teachers in different subject areas and in middle school versus high school should change the way in which administrators recruit and retain those teachers and staff their schools.

One of the key takeaways for administrators and policymakers is the differences seen between charter and district employees. Mission/vision alignment and average class sizes are substantially more important to charter school teachers, while district school teachers place a substantially higher value on salary and tenure. This means that district school administrators should be more willing than charter school administrators to utilize instructional staffing dollars to increase average salaries rather than reduce class sizes. Additionally, charter school administrators are more likely to be successful selling a compelling school mission in the absence of competitive salaries than a district school.

Recommendations for Staffing Low-Performing Schools

Taken together, the results of this study provide practical implications for helping low-performing schools with limited resources to overcome the barriers they typically face in recruiting and retaining high quality teachers (Boyd, Lankford, Loeb, & Wyckoff, 2005; Clotfelter, Ladd, & Vigdor, 2011; Darling-Hammond, 2003; Feng, 2010; Hanushek & Rivkin, 2007; Ingersoll & May, 2012; Opfer, 2011; Stotko, Ingram, & Beaty-O’Ferrall, 2007). The first, and possibly most important, factor is to provide additional funding on the order of at least \$5,000 to \$10,000 per teacher to low-performing schools in order to increase teacher salaries to compensate for the lower school performance and any student demographic characteristics that are less preferred by the average teacher. Although this may be politically challenging, this study shows the extent of the disadvantage low-performing schools are at when it comes to recruiting and retaining talent without additional funds to allocate to salaries.

It is also important to be aware of factors that mitigate or exacerbate the salary drag associated with working in high-needs schools. For example, having a strong mission statement that teachers agree with as opposed to a non-existent mission statement is worth a salary premium equal to approximately half of the drag of moving from an “A”- to an “F”-rated school. Similarly, strong leadership, professional development, and meaningful collaboration may be able to mitigate some of the impact of low school performance in the absence of additional funding. One factor that requires some caution is the salary drag associated with teaching a scripted curriculum. Compared to the preferred level of the factor presented, requiring a scripted curriculum had a salary drag nearly as large as that of exchanging an “A” school for an “F” school. Given the extent to which failing urban schools tend to utilize scripted curricula (Milner, 2013), they are likely exacerbating their teacher recruitment and retention challenges.

There are many things that administrators of these hard-to-staff schools can do to make the most effective use of their limited resources when recruiting and retaining teachers. Providing 45 minutes of preparation time every day and using that time for grade-level and departmental collaboration, having locally developed curricular materials, and ensuring that teachers are only teaching within their certification areas are likely to make the schools more desirable, while effectively using limited resources. Additionally, having a strong mission statement that is made clear to teachers in the hiring process may limit the pool of possible candidates, but will act as a strong incentive to those hired, particularly in charter schools. Offering tenure and increasing salaries by increasing class sizes up to 30 or 35 students could make a school more desirable, particularly in district contexts. Finally, these non-monetary factors should be strategically used as a key selling point to early-career, lower-salaried teachers, with salary incentives targeted to more experienced teachers and those unresponsive to the benefits of non-monetary support factors.

Conclusion

The field of teacher recruitment and retention is of great importance to policymakers and practitioners, and so, as a result, has been heavily researched over the past decades. While this significant body of research has resulted in many very important findings, there are some questions that have remained challenging to answer, particularly regarding identifying the relative importance of non-monetary job factors and the monetary value placed on these factors.

This study, by utilizing Adaptive Choice-Based Conjoint analysis, has demonstrated that these questions can be answered if a new methodology is embraced. While this study is limited in scope to a subset of teachers within a single state, the results of this study provide practical recommendations that administrators and policymakers can apply within this limited context and that, with caution, may be extended to additional teacher populations. Additionally, the results provide additional support for conclusions in the existing literature regarding the importance of non-monetary job and working conditions factors. Finally, these results demonstrate the promise this methodology has for additional applications beyond the limited population investigated in this particular study. The introduction of a novel methodology may allow for pursuit of questions that will better guide policymakers and practitioners attempting to understand and influence the complex trade-offs teachers are making in the labor market. The results from this study and future replications and extensions may allow policymakers and school administrators to more effectively recruit and retain high quality teachers, especially in low-performing, hard-to-staff schools, improving overall student achievement and reducing achievement gaps.

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Appendix

Factors and Levels in ACBC Survey

Salary:

- Continuous from \$32,900 to \$61,100
- Represents a range of 70% to 130% of the state average salary of \$46,500 in the year the survey was given

Job Security

- Tenure is available, but not necessarily likely
- Tenure is available and likely
- Tenure is not available

Teaching Assignment

- Teaching in content area
- Teaching in closely related content area
- Teaching in an unrelated content area

Class Size

- 15 students per class
- 20 students per class
- 25 students per class
- 30 students per class
- 35 students per class
- More than 35 students per class

Planning Time

- 45 minutes every other day
- 90 minutes every other day
- 45 minutes per day
- 90 minutes per day

Collaboration

- No department or grade-level meetings dedicated to collaboration
- Common planning time with a planning partner
- Regular opportunities to collaborate with peers in grade-level and department meetings
- Regular grade-level and department meetings for collaboration, plus common planning time with a planning partner

Professional Development

- Limited to no opportunities for professional development exist
- Regular professional development opportunities that are selected by the administration without input from teachers and that are not differentiated
- Regular professional development opportunities that are selected by the administration without input from teachers and that are differentiated
- Regular professional development opportunities that are selected with input from the teachers and are not differentiated
- Regular professional development opportunities that are selected with input from the teachers and are differentiated
- Teachers have the ability to choose from multiple professional development opportunities

Principal Support

- Principal is not particularly supportive or visible. Principal provides adequate feedback and resources for teachers.
- Principal is supportive, encouraging, although not highly visible. Principal provides adequate feedback and resources for teachers while working behind the scenes.
- Principal is not particularly supportive or visible. Principal is largely absent from efforts to ensure adequate feedback and resources for teachers.
- Principal is supportive, encouraging, and visible. Principal provides adequate feedback and resources for teachers.

Curricular Autonomy

- Teachers all teach a common curriculum developed by the district.
- Teachers all teach a common scripted curriculum purchased by the district.
- Teachers develop their own curriculum.
- Teachers plan a common curriculum in grade-level teams.

Organizational Fit

- Disagreement with school's mission statement
- Strong agreement with school's mission statement
- Neutral feelings towards school's mission statement
- School does not have an obvious or meaningful mission statement

Influence over Policy

- Teachers have little to no involvement in the development of school/district policies and practices.
- Teachers are expected to sit on committees and leadership teams to develop school/district policies and practices.
- Teachers have the opportunity to sit on committees and leadership teams to develop school/district policies and practices.

Student Race

- 0-20% minority students
- 20-40% minority students
- 40-60% minority students
- 60-80% minority students
- 80-100% minority students

Student Socioeconomic Status

- 0-20% students in poverty
- 20-40% students in poverty
- 40-60% students in poverty
- 60-80% students in poverty
- 80-100% students in poverty

School Achievement

- "A" School Rating
- "B" School Rating
- "C" School Rating
- "D" School Rating
- "F" School Rating

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Jeffrey Gunther is a recently graduated PhD student from Utah State University. The results described in this paper are derived from his doctoral dissertation. His interests include education finance and policy, teacher recruitment and retention, and school choice.

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