

Measuring Teacher Valuations of Non-Monetary Job Factors
Through Adaptive Choice-Based Conjoint Analysis

Jeffrey M Gunther

Utah State University

jeffreymgunther@gmail.com

DRAFT

Abstract

The importance of teacher recruitment and retention and factors influencing teacher recruitment and retention are oft-studied topics 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 value placed by teachers on factors such as salary, student demographic factors, school conditions, and other working conditions such as class size, curricular autonomy, and administrative support, to name a few. This study utilizes 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. This paper describes the need for better tools that measure the value of various job factors to teachers, the results of this particular implementation of an ACBC survey to secondary teachers in Utah, and the promise of this methodology in a variety of additional contexts to address a substantial area of need in the teacher and recruitment literature: identifying how much teachers value various job factors and working conditions.

Keywords: teacher recruitment, teacher retention, teacher supply and demand, teaching conditions'

Introduction

Due to the immense impact that teachers can have on student achievement, teacher recruitment and retention is often viewed as a key lever for improving overall educational attainment and reducing achievement gaps between students of different racial and socioeconomic backgrounds. Teachers are regularly cited as one of, if not the, most important school-level factor influencing student achievement (Darling-Hammond, 2010; Ferguson, 1991; Hanushek, Kain, & Rivkin, 2004; Sanders & Rivers, 1996; Sanders, Wright, & Horn, 1997). It is also well-known that many teachers tend to have short careers, with 5-year attrition rates as high as 50% (Ingersoll, 2001). Additionally, teacher quality and the rate of turnover of teachers is inequitably distributed, with poorer and more Black/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; Darling-Hammond, 2010; Holzman, 2012; Lankford, Loeb, & Wyckoff, 2002). It is thought that this inequitable distribution of teachers contributes to the persistent achievement gaps between students of different racial and socioeconomic backgrounds (Darling-Hammond, 2010; Lankford et al., 2002).

Given the impact of teachers on student achievement, the high rate of teacher attrition, and the potential for teachers to reduce the achievement gap, the field of teacher recruitment and retention has been subject to a great deal of research. This field of research has led to many important findings, including that both monetary and non-monetary factors matter; it has also resulted in a large set of non-monetary factors regularly found to be associated with teacher movements in the labor market. Unfortunately, this body of research, while substantial, often fails to answer key practical questions that are needed to transform research into policy. The

current literature struggles to adequately address the relative importance of different job-related factors when evaluating potential employment opportunities. It also struggles to evaluate the monetary value placed by teachers on non-monetary job factors.

This study aims to address the weaknesses in the existing literature by allowing teachers to choose between hypothetical sets of schools using an Adaptive Choice-Based Conjoint analysis survey. By systematically varying conditions between the school choices offered, this survey tool generates a value placed by individual teachers on individual job-related conditions. These values can be utilized to determine the relative utility of different specific conditions, the relative importance of different job factors, and an estimated monetary indifference point for substitutions of one condition for another. This methodology extends the existing research into teacher preferences and allows it to be more effectively utilized by administrators and policy makers. Specifically, this study aims to quantify the value placed on non-monetary benefits and investigate trade-offs teachers make in evaluating potential jobs. The study aims to answer the following questions:

1. What is the relative importance of each of the factors studied?
2. What is the monetary value placed by teachers on the non-monetary factors being investigated?

Review of the Literature

Due to the great importance of teacher recruitment and retention on our overall educational system, as well as the equity impacts of an inequitable distribution of high quality teachers, this topic is one that has been the subject of many studies. With the work of Ingersoll (2001), highlighting the “revolving door” of the teaching career and the No Child Left Behind (NCLB) requirements for highly qualified teachers in every classroom introduced at the start of

the century, the focus on recruitment and retention has intensified in the past 15-20 years. During this time period, over 200 papers have been published that aim to address issues of teacher recruitment and retention in the US K-12 education sector (Gunther, submitted manuscript, 2017). These studies have generally found that both salary and working conditions are important considerations when teachers are considering opportunities in the teacher labor market.

Studies that investigate teacher recruitment and retention often find salary to be an important factor influencing teachers' decisions. The importance of salary and other monetary factors are regularly cited in individual papers and in reviews of the teacher recruitment and retention literature (ex. Kelley & Finnegan (2004); Guarino, Santibanez, and Daley (2006); Borman & Dowling (2008); Schaefer, Long, & Clandinin, 2012). In addition, the body of literature has also identified a variety of other factors such as school and student characteristics, as well as a number of working conditions, associated with teacher preferences and movements (ex. Boyd et al., 2005; Scafidi, Sjoquist, & Stinebrickner, 2007; Schaefer et al, 2012; Stotko et al., 2007). This latter set of studies has generated a large list of non-monetary factors found to influence teacher recruitment and retention, such as student characteristics (e.g. SES and race), school characteristics (e.g. resources and facilities), the school program (including teacher autonomy and influence), administrative support, professional development, collegial relationships, job stressors (e.g. class size and planning time), parent and community factors, and other job factors (such as job security and respect/professionalism).

While the abundant teacher recruitment and retention literature has provided to the research community a large set of important factors, attempts to quantify, and specifically to monetize, the impact of these factors have been limited. Many studies make no attempt to rank the importance of the factors identified (Gunther, submitted manuscript, 2017), while others

utilize methods that are hard to operationalize. Studies will often identify the proportion of participants citing a factor as important (ex. Fish & Stephens (2010)), report mean likert values (ex. Gilman, Peake, and Parr (2012)), or utilize odds ratios to determine which factors are most associated with particular teacher movements (ex. Hancock (2008)). While these are valuable attempts to identify the relative importance of different factors, they are often either hard to interpret or are indirect associations between survey data and teacher behavior. For example, the practical implications of a study revealing that administrative support was cited as a factor contributing to a decision to leave the career by 11% of respondents is unclear. Similarly, knowing that one factor had a mean rating 0.1 points higher than another on a 5-point scale of job satisfaction is not obviously of practical use. Even studies using odds ratios can be challenging to convert to policy; showing that teachers from high poverty schools are 20% more likely to transfer than those teaching at low poverty schools does not have clear and direct policy implications. What is needed is a new method of quantifying the importance of these factors that results in a more intuitive understanding of the value teachers place on specific working conditions and how teachers navigate trade-offs between these factors.

There are a few studies in the literature that have made an attempt to quantify trade-offs that teachers are making. One is Kain, Rivkin, and Hanushek (2004), 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. This approach is limited because it involves only predicting valuation based on regression outcomes rather than observing actual teacher behavior or directly asking teachers, but it is a useful step in attempting to quantify non-monetary benefits. Two other 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. Unfortunately, each of these studies were limited in their sample and in the depth of their analysis. However, these two studies form the basis for this particular study.

The existing literature has helped identify what makes for an ideal or an unacceptable school for a teacher and has generated a list of potentially important factors for administrators to consider when attempting to recruit and retain teachers. However, this research does not adequately assist administrators in prioritizing their limited resources, nor does it show how teachers make trade-offs between a mix of favorable and unfavorable conditions, similar to the decisions made in the labor market. This study aims to address these limitations by asking teachers to make a number of choices between hypothetical schools in order to better understand how teachers value different non-monetary factors associated with working conditions.

Methodology

In order to address the research questions described above, a survey utilizing Adaptive Choice-Based Conjoint Analysis (ACBC) is used. This is similar to the procedure used by Horng (2009) and Robinson (2012), described above. The primary difference between ACBC and the Adaptive Conjoint Analysis used in these two studies is that ACBC relies on forcing a choice between competing options, rather than a ranking of a single option (Johnson, Huber, & Bacon, 2003). This is more similar to the conditions faced by teachers in the job market when they are choosing between alternative options.

Survey Instrument

The survey instrument 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 collects personal characteristics that may be important covariates with the preferences collected in the ACBC. Questions addressed the most commonly cited personal and qualification/contextual factors that were associated with teacher preferences or movements in a review of the literature (Gunther, submitted manuscript, 2017). The demographic covariates surveyed in this study are below:

Personal Factors	Qualifications and Context
<ul style="list-style-type: none"> · Age · Teaching experience · Race · Gender · Marital status 	<ul style="list-style-type: none"> · Level (HS vs. Middle School) · Subject Area · Certification · Degree · Urban, Suburban, Rural · Charter vs. Non-Charter

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.

Build Your Own. In the first stage, respondents build their ideal school and working conditions, choosing from options on a variety of different measures, including salary, student demographics, professional development practices, class sizes, preps, etc. The specific factors investigated in this study are those that have strong theoretical support, strong support in the literature, and/or strong support from a pilot study. These factors are listed below:

· Salary	· Planning Time	· Opportunities for Collaboration
· Job Security	· Class Size	· Professional Development and Mentoring

- | | | |
|----------------|--------------------------|--|
| · School Grade | · Curricular Autonomy | · Mission and Vision Alignment (“Fit”) |
| · Student SES | · Administrative Support | · Teaching Assignment |
| · Student Race | | |

For each of these factors, a set of different levels were provided to choose from. The complete set of factors and their levels can be found in Appendix I.

Screening. Next, the survey develops a series of potentially desirable and undesirable schools to ask whether the respondent would definitely, or never, choose to work in one of these schools. These responses are used to generate the set of factors to consider for this particular individual. It also will allow for the generation of always/never rules that narrow the consideration set.

Choice tasks. Using the responses from the screening task, the survey adaptively generates a set of three hypothetical schools with combinations of desirable and undesirable factors, and asks the respondent to choose between them. Each choice task varies a subset of the factors, making any two choices in the task more similar than not. However, 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.

Calibration stage. A final calibration stage is completed where a single set of conditions is presented and the respondent is asked how likely they would be to take a position at that hypothetical school. This stage is used by the algorithm 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 were included that ask the respondent to reflect on the reason for their decisions.

Population

The population surveyed for this study included 2016-2017 school year secondary teachers in public schools, including district schools, within the state of Utah. The population included teachers in certified areas, including special education, but excluded paraprofessionals, teachers' aides, media specialists, and similar positions. This population, as of the 2015-2016 school year, consisted of 14,941 individuals. 14,388 teachers were contacted through their work email addresses posted on their school's website. Survey participants were incentivized with the opportunity to win one of three \$50 gift cards.

Analysis

The ACBC tool generates individual estimates of utility values for each level of each factor using Hierarchical Bayes (HB) estimation. This utility value is a unit-less measure indicating the desirability of a level of a factor. The range between the best and the worst rated level of a given factor indicates the relative importance of that factor. By comparing the utility value of the extremes of the salary range presented, a dollar value for each "utility point" can be calculated, which can then be used to calculate monetary indifference points between different levels of a single factor. This calculation makes the assumption that the utility value of money is constant across salary ranges, which is addressed below.

The software uses HB estimation to estimate the mean utility value of a level of a factor both for individuals and across the entire sample. The use of HB allows for the estimation of individual utilities at all levels of all factors. The HB analysis allows for individual parameter estimates of importance (Research Question 1), and, using the calculation described above, estimates of the dollar value placed by individuals on changes from one level of a factor to another (Research Question 2).

Results

Over the course of a one-month period, 2228 teachers completed the survey, with 16 respondents later removed who did not meet the inclusion criteria described above, resulting in a final sample size of 2212. This represents a response rate of 15.5% and an overall sample representing approximately 14.8% of the study population. Utility values were generated for each of the 2212 participants for each level of each factor investigated. These utility values were used to determine importances of each factor and a monetary value for each level of each factor using the methods described above. The average utility values for each level of each factor are displayed in Figure 1.

Relative Importance

For this study sample of secondary teachers in Utah, salary was by far the most important factor. The salary range provided in the survey, from 30% below the average salary in the state to 30% above that average, was on average more than twice as important as the range provided of any other conditions. For example, increasing the salary from 70% to 130% of state average was on average 2.2 times more valuable than reducing a class size from >35 students to 25 students (the preferred level). The overall ranking of the factors studied is provided in Table 1. Factors with a different numerical rank had a significantly different average importance from the ones above and below in the table as determined by a t-test ($\alpha=0.05$).

Monetary Value

For each individual, based on his/her utility value of salary, a salary difference between any two levels of a factor can be calculated as described above. Table 2 displays median values for differences between select levels of key factors and the most often preferred level. The value in the third column represents a median salary drag of moving from a preferred level of a factor

to the identified level. The results indicate that the median secondary teacher in Utah would give up \$2281 in salary to teach in school with average class sizes of 25 students rather than a school with average class sizes of 30 students, for example. These results demonstrate the not only the relative importance of these different factors in a concrete way, but also gives estimates of the actual value placed on different levels of these factors. From these results, it is clear just how important the high importance factors of teaching assignment and class size are. It is also clear that much of the importance of class sizes comes from the large drag associated with increasing class sizes to over 35 students. This demonstrates the importance of carefully interpreting importance values with respect to the range of levels of that factor, as will be discussed below.

Discussion

This study demonstrates the viability of ACBC as a survey methodology capable of advancing research in the field of teacher recruitment and retention. The results of this study show that this methodology is well-suited to answering key questions of interest to researchers, policy makers, and administrators. This study demonstrates the potential value of ACBC surveys in the teacher recruitment and retention field, warns of potential limitations of the methodology, and suggests extensions of this survey methodology to novel questions in the field.

Advantages of ACBC Surveys

As can be seen from the results of this study, surveys using Adaptive Choice-Based Conjoint analysis generate a number of interesting results for researchers, policy makers, and school administrators. Studies using this methodology are able to address key weaknesses in the current literature, giving researchers a new tool for advancing the field. This methodology allows for a clear and relatively easy to interpret understanding of the relative importance of different monetary and non-monetary factors to teachers. It also allows for the quantification and even

monetization of the value of different levels of different factors. This is a more direct means of measuring the amount of “combat pay” needed to work in different conditions or with different student populations, for example. While the vast majority of the research in this field up until this point has focused on identifying factors that matter, using ACBC surveys allow researchers to better understand how much these factors matter and how they are considered in situations where teachers are forced to make trade-offs similar to those made in the job market. While the nature of the survey has some limitations, discussed below, it also allows for some benefits to researchers, such as the ability to disentangle the effect of factors that are highly correlated in actual schools. An example is the ability to separate the effect of school grade, student SES, and student race in this particular study. Another benefit of this tool is asking participants to make decisions that mimic the phenomenon of interest, which is how teachers choose between competing job offers, rather than trying to infer how teachers would make this choice from other data sources or more abstract surveys (such as in Kain, et. al., 2004)

For administrators and policy makers, there are many potential benefits to replications of research of this kind. A better understanding the impact of factors beyond a school’s control, such as student demographics, may be beneficial for policy makers attempting to better understand how to equitably fund schools with different student populations. For an administrator, understanding the drag or benefits created by factors beyond the school’s control may be interesting, but even more important is the ability to identify high leverage and efficient job benefits in order to better compete for a limited set of teachers. For example, based on the results of this study, it makes sense, from a teacher recruitment and retention perspective, for administrators to increase teacher salaries rather than hiring additional staff to reduce class sizes from 30 to 25 students. Another example is that while daily planning time is important to the

teachers in this study, doubling planning time is likely not an efficient use of resources for an administrator. Similarly, these particular results indicate that, for secondary teachers in Utah, some curricular autonomy is very advantageous and should be actively promoted by an administrator who chooses to allow this sort of freedom to his/her teachers.

Additionally, by incorporating a demographic component, all stakeholders can gather information on what benefits are most valued by teachers with certain qualifications or in certain contexts. Understanding this could help to better understand how to recruit and retain specific subsets of teachers or to recruit and retain teachers teaching in specific contexts, such as in charter versus traditional district schools.

Limitations of ACBC Surveys

Despite the promise of this tool in addressing key limitations within the teacher recruitment and retention literature, there are intrinsic and practical limitations associated with this tool.

Intrinsic Limitations

The first, and most obvious, limitation is that this methodology mimics a situation of interest, that of choosing a job from a number of competing options, rather than directly measuring the choices that individuals make. It is certainly possible that teachers will respond differently when faced with a rare and high stakes decision than a survey where a similar type of decision is made many times in quick succession. However, this possible source of error is well accepted in other fields that use choice tasks to predict natural behavior and will need to be accepted in this study (for example, in the delay discounting field (Madden et al., 2004)). Unfortunately, the choice being modeled here is one that is rarely made, making this sort of analysis impossible in the natural environment. The tradeoff for more directly measuring the

phenomenon of interest is that it is measured in an artificial environment. One advantage of this situation, however, is that the more controlled environment reduces the risk of unexpected and uncontrollable conditions influencing the outcome, such as movements due to family factors unrelated to the school conditions.

A related weakness is that there may be additional factors that matter that cannot be captured in this study. It is certainly possible that there are factors that are hard to put into words or hard to place a value on. It is also possible that the factor levels are described in a way that is either a) not commonly understood or b) less meaningful because they are being read, not experienced. This is a problem faced by all studies in the teacher recruitment and retention field that rely on survey data, however.

Another challenge is that importance values depend on the levels of a factor offered, as they are derived from the difference in utility of the extremes of a factor. The relative importance of salary will depend on how wide of a salary range is presented, for example. This is less a limitation than a caution to be heeded when reporting results. Avoiding misunderstanding due to this feature requires careful explanation of the study methodology and careful interpretation of the results.

The final intrinsic limitation is with the monetization calculation. The calculation done in this study assumes a constant marginal utility value of money across the salary range. This is an assumption worthy of future investigation. Future researchers should use ACBC surveys to test this assumption and provide for more refined estimates of the monetary value placed by teachers on non-monetary job conditions.

Practical Limitations

Despite the numerous opportunities this survey methodology allows for, it must be acknowledged that there are some practical limitations with using a survey of this sort. The first is that it is of course more challenging to deploy a novel survey instrument than relying on administrative data or already collected survey data. This is especially true because ACBC surveys require large samples; a minimum of 200 respondents in each analyzed subgroup are recommended (Orme, 2010). In addition, the survey can take a long time to complete if it is a large survey. In this study, where 13 factors with 3-6 levels each were considered, along with a demographic and an embedded qualitative component, the median response time was approximately 37 minutes. Removing the impact of the qualitative component reduces the median survey length to approximately 25 minutes for this particular survey. This is still a long survey to ask individuals to take, although it results in a very rich set of data. Despite these limitations, and despite not seeking organizational buy-in from the schools where surveyed teachers work, this particular study succeeded in receiving responses from a reasonably large subset of the population of secondary teachers in an entire state, showing that these practical concerns are not insurmountable. Future researchers are likely to be able to increase responses rates through a more intentional attempt at cultivating the relationships needed to successfully deploy a survey of this magnitude.

Implications for Future Research

The results of this study demonstrate that it is possible to utilize Adaptive Choice-Based Conjoint analysis to answer key questions that have posed challenges to earlier research in the field of teacher recruitment and retention; namely, how do teachers weigh the relative importance of different job and working conditions factors and what monetary value is placed on

certain non-monetary job and working conditions factors. This study's sample was restricted to secondary teachers in the state of Utah. The author would hypothesize that elementary teachers would respond differently due to the different nature of their work and preparation. Additionally, Utah is a unique state with low per pupil funding (US Census Bureau, 2014), median class sizes of 27-30 in secondary courses statewide (Utah State Office of Education, 2017a), and only three school districts, out of 41, with minority rates over 50% (Utah State Office of Education, 2017b). It is certainly possible that teachers in New York City or Washington DC or any number of different cities and states would respond differently.

There are also opportunities for addressing some of the underlying concerns raised about this methodology. For example, it would be beneficial to better understand the (non)linearity of the value placed by teachers on salary. It would also be valuable to investigate the extent to which the utility values and individual importances attributed to individual teachers aligns with choices actually made in the labor market. For example, evaluating the extent to which new teacher's espoused preferences align with the actual choices made would be beneficial for evaluating the validity of this methodology and for further refining it to better capture important factors.

Finally, there are opportunities to extend this research further into new lines of inquiry. Results from studies of this sort may reveal interesting demographic or context trends that allow for a better understanding of teacher subtypes or benefits that are well-matched to particular contexts. For example, it could be hypothesized that experienced teachers are less responsive to changes in a professional development system or that teachers in charter schools are more responsive to mission/vision alignment. Investigation into moderating factors would be a logical extension of this research. It is also possible that certain factors tend to form classes of benefits

that are preferred in tandem, such as is found in the research in the human resources field into human resource management bundles (Subramony, 2009). Similarly, it would be of use to investigate the distribution of values placed on different levels of a single factor within a population to learn more about those that place high value on things like working with high poverty students. Another interesting line of research would be to investigate how preferences and job fit are related to decisions to move within or exit the labor market. This would connect research similar to the current study back to the broader teacher recruitment and retention research that often focuses on movements within and out of the teaching career. It would be interesting to investigate the extent to which teacher burnout and early career attrition are connected to the match between the preferences espoused in this sort of survey and the actual conditions at the school in which he or she works.

Conclusion

The field of teacher recruitment and retention is of great importance to policy makers and practitioners, and so, as a result, has been heavily researched over the past decades. While this depth 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 are answerable questions if a new methodology is embraced. While this study was limited in scope to a subset of teachers within a single state, the methodology shows promise for application to additional contexts. And while there are limitations with the methodology, particularly the practical limitations of deploying similar surveys on large scales, the author believes that this methodology opens up new avenues for research in this heavily studied field. 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.

DRAFT

Figure 1: Average utility value for each level of each factor of the 2212 respondents.

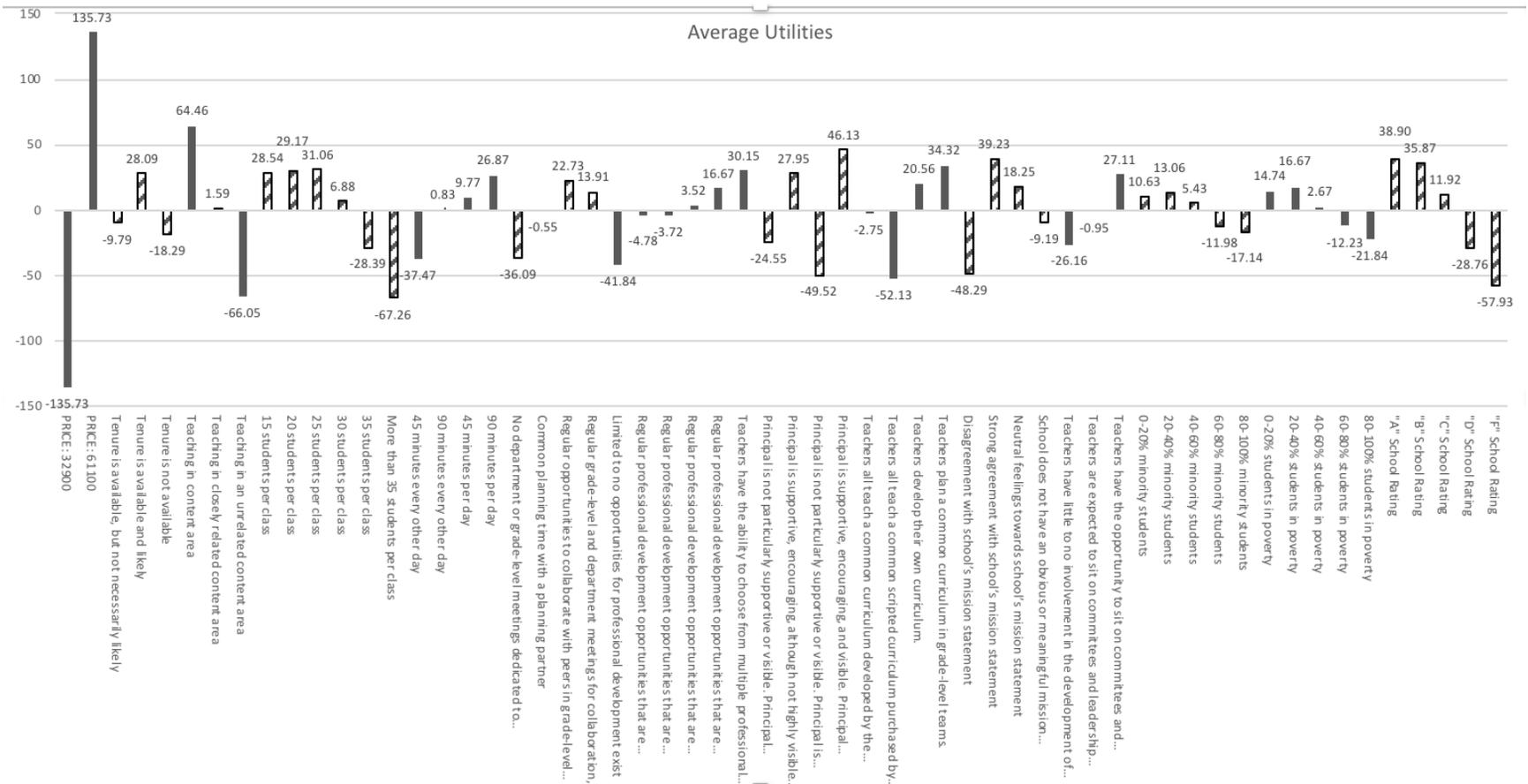


Table 1: Average relative importance of each factor investigated

Importance Rank	Factor	Importance
1	Salary	19.53
2	Assignment	9.56
3	Class Size	8.83
4	Curricular Autonomy	7.86
4	School Achievement	7.83
6	Administrative Support	7.41
7	Organizational Fit	6.59
8	Professional Development and Mentoring	5.69
8	Planning Time	5.62
10	Opportunities for Collaboration	4.93
11	Influence over Policies	4.48
11	Job Security	4.39
13	Student SES	3.89
14	Student Race	3.40

Table 2: Salary drag of select non-preferred 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	\$3919
Tenure is available, but unlikely		\$3177
Teaching outside content area	Teaching in content area	\$12,608
Teaching in closely-related content area		\$5902
30 students per class	25 students per class	\$2281
35 students per class		\$5717
>35 students per class		\$9896
45 minutes of daily planning time	90 minutes of daily planning time	\$1630
No department or grade-level meetings dedicated to collaboration	Regular opportunities to collaborate with peers in grade-level and department meetings	\$5551
Teachers all teach a common scripted curriculum purchased by the district	Teachers plan a common curriculum in grade-level teams	\$8082
School does not have an obvious or meaningful mission statement	Strong agreement with school's mission statement	\$4551
Disagreement with school's mission statement		\$8448
80-100% students in poverty	20-40% students in poverty	\$3822
"F" School Rating	"A" School Rating	\$9307

References

- Auguste, B. G., Kihn, P., & Miller, M. (2010). *Closing the talent gap: Attracting and retaining top-third graduates to careers in teaching: An international and market research-based perspective*. The McKinsey Company. Retrieved from http://mckinseysociety.com/downloads/reports/Education/Closing_the_talent_gap.pdf
- Betts, J. R., Reuben, K. S., & Danenberg, A. (2000). *Equal resources, equal outcomes? The distribution of school resources and student achievement in California*. Public Policy Institute of California, 500 Washington Street, Suite 800, San Francisco, CA 94111.
- Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research*, 78(3), 367-409.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review*, 24(4), 377-392.
- Darling-Hammond, L. (2004). Schools that work for all children. In Carl Glickman (ed.), *Letters to the next president: What we can do about the real crisis in public education* (pp. 239-254). NY: Teachers College Press.
- Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York: Teachers College Press.
- Ferguson, R. F. (1991). Racial Patterns in How School and Teacher Quality Affect Achievement and Earnings. *Challenge*, 2(1), 1-35.
- Fish, W. W., & Stephens, T. L. (2010). Special education: A career of choice. *Remedial and Special Education*, 31(5), 400-407.

- Gilman, D., Peake, J. B., & Parr, B. (2012). A gender analysis of job satisfaction levels of agricultural education teachers in Georgia. *Journal of Career and Technical Education, 27*(2).
- Guarino, C. M., Santibanez, L., & Daley, G. A. (2006). Teacher recruitment and retention: A review of the recent empirical literature. *Review of Educational Research, 76*(2), 173-208.
- Gunther, J. M. (2017). *A systematic review of the teacher recruitment and retention literature*. Manuscript submitted for publication.
- Hancock, C. B. (2008). Music teachers at risk for attrition and migration: An analysis of the 1999—2000 Schools and Staffing Survey. *Journal of Research in Music Education, 56*(2), 130-144.
- Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (2004). Why public schools lose teachers. *Journal of Human Resources, 39*(2), 326-354.
- Holzman, M. (2012). *A rotting apple: Education redlining in New York City*. Cambridge, MA: The Schott Foundation for Public Education.
- Hornig, E. L. (2009). Teacher tradeoffs: Disentangling teachers' preferences for working conditions and student demographics. *American Educational Research Journal, 46*(3), 690-717.
- Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499-534.
- Johnson, R. M., & Orme, B. K. (2007, October). A new approach to adaptive CBC. In *Sawtooth Software Conference Proceedings, Sequim, WA*.

Kain, J. F., Rivkin, S. G., & Hanushek, E. A. (2004). The revolving door. *Education Next*, 4(1).

Kelley, C., & Finnigan, K. (2004). Teacher compensation and teacher workforce development. *Yearbook of the National Society for the Study of Education*, 103(1), 253-273.

Lankford, H., Loeb, S., & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational evaluation and policy analysis*, 24(1), 37-62.

Madden, G. J., Raiff, B. R., Lagorio, C. H., Begotka, A. M., Mueller, A. M., Hehli, D. J., & Wegener, A. A. (2004). Delay discounting of potentially real and hypothetical rewards: II. Between-and within-subject comparisons. *Experimental and clinical psychopharmacology*, 12(4), 251.

Orme, B. (2010). *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*. Madison, Wis.: Research Publishers LLC.

Robinson, N. R. (2012). Preservice Music Teachers' Employment Preferences: Consideration Factors. *Journal of Research in Music Education*, 60(X), 294-309.

<http://doi.org/10.1177/0022429412454723>

Sanders, W. L., & Rivers, J. C. (1996). Cumulative and residual effects of teachers on future student academic achievement.

Sanders, W. L., Wright, S. P., & Horn, S. P. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of personnel evaluation in education*, 11(1), 57-67.

Scafidi, B., Sjoquist, D. L., & Stinebrickner, T. R. (2007). Race, poverty, and teacher mobility. *Economics of Education Review*, 26(2), 145-159.

- Schaefer, L., Long, J. S., & Clandinin, D. J. (2012). Questioning the research on early career teacher attrition and retention. *Alberta Journal of Educational Research*, 58(1), 106-121.
- Subramony, M. (2009). A meta-analytic investigation of the relationship between HRM bundles and firm performance. *Human Resource Management*, 48, 745-768.
- U.S. Census Bureau. (2014). *2014 Public Elementary–Secondary Education Finance Data*. Retrieved from <https://www.census.gov/data/tables/2014/econ/school-finances/secondary-education-finance.html>.
- Utah State Office of Education. (2017a). *Class Size for Elementary and Secondary Courses October 2017*. Retrieved from <https://www.schools.utah.gov/file/04827ec8-026d-4cc4-9a3f-28d6cf809c8a>.
- Utah State Office of Education. (2017b). *Fall Enrollment by Demographics October 2017*. Retrieved from <https://www.schools.utah.gov/file/68bf784e-5cf4-48c1-a5c7-c3eb943cbb6d>.

Appendix I – 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

Administration

- 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