Supply and Demand in the Postpandemic Teacher Labor Market

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Abstract

Teacher staffing challenges were pervasive throughout the pandemic, but the downturn in student enrollment combined with the end of ESSER funds leaves considerable uncertainty about the postpandemic teacher labor market. We use data on new teacher endorsements and job postings scraped from district hiring websites in Washington to measure supply and demand for teachers over time and by subject area. Relative to prepandemic levels, the supply of new endorsements has recovered from a pandemic-era dip, demand for teachers has declined, and supply modestly exceeds demand for new teachers *in the aggregate*. This aggregate measure, however, masks considerable heterogeneity across subject areas; demand for special education and science teachers, for instance, considerably outpaces the supply of new endorsements in these areas.

1. Introduction

Research on the state of the teacher labor market paints an incomplete picture of how the supply and demand for new teachers is changing in the postpandemic era. On the supply side, the number of new teacher preparation program completers has modestly increased since 2018, after a sharp decline over the previous decade (Kraft & Lyon, 2024), but there is little large-scale evidence about how the supply of teachers has changed across subjects. This is an important gap in the literature, given evidence that staffing challenges are far more severe in some subjects—like special education and STEM—than others (e.g., Edwards et al., 2024; Mason-Williams et al., 2023).

The picture of teacher demand is even less clear. On the one hand, teachers' declining perceptions of working conditions during the COVID-19 pandemic (e.g., Doan et al., 2023; Kraft et al., 2021) and increasing teacher attrition (e.g., Bacher-Hicks et al., 2023; Camp et al., 2023; Goldhaber & Theobald, 2023) could translate to *increased* demand for teachers postpandemic. On the other hand, the expiration of Elementary and Secondary School Emergency Relief (ESSER) funds could force schools to downsize their teacher workforces (Goldhaber et al., 2024), *decreasing* the demand for new teachers postpandemic. And although recent evidence has shown that demand for STEM and special education teachers continued to outpace other subjects during the pandemic (e.g., Edwards et al., 2024; Goldhaber et al., 2024), there is no large-scale evidence about how these patterns across subjects have changed in recent years.

This paper uses data from Washington state through the start of the 2024–25 school year to provide a first look at how the supply and demand for new teachers has changed in the 5 years since the onset of the pandemic. Importantly, our data include direct measures of both teacher supply (new teacher credentials issued by the state) and demand (teacher job postings scraped

from district hiring websites). We first discuss the literature motivating this analysis and then outline our research questions.

1.1 Prior literature

Considerable prior research has used data from state credentialing records (e.g., Goldhaber et al., 2023) or national data like IPEDS or Title II (e.g., Cook & Boe, 2007; Cowan et al., 2016; Kraft et al., 2020) to study changes in the supply of teachers in U.S. public schools. While these national datasets provide slightly different information about teacher supply (Goldhaber & Holden, 2023), and disagreement about the implications of these trends for teacher shortages in public schools (e.g., Goldhaber & Theobald, 2016; Sutcher et al., 2016), there is little disagreement about the fact that new teaching credentials provide a direct measure of the supply of *potential* teachers in public schools. Thus, the most recent estimates from Title II data (e.g., Kraft & Lyon, 2024) documenting a recent recovery in the supply of new teachers after a decade-long downturn since the Great Recession are welcome news.

The above types of data provide only a partial picture of the state of the teacher labor market because they speak only to the supply side of the market. Although the number of new teachers hired by districts has been used as a proxy for teacher demand in previous work (e.g., Cowan et al., 2016; Sutcher et al., 2016, 2019), this measure comes with two important limitations. The first is that administrative hiring data cannot measure the number of teachers districts *would have hired* if there was adequate teaching supply. The second is that hiring numbers typically are available only well after the start of a given school year, making them difficult to use to project future demand.

More recent research has focused on alternative measures that plausibly address these weaknesses and provide a leading indicator of teacher demand. Studies that focus on teacher

attrition (e.g., Bacher-Hicks et al., 2023; Camp et al., 2023; Goldhaber & Theobald, 2023) or intent to leave the profession (e.g., Doan et al., 2023; Nguyen et al., 2022) have shown an uptick in teacher attrition (actual and intended) following an initial drop at the outset of the COVID-19 pandemic, but this does not necessarily translate into greater demand. Student–teacher ratios are malleable, and districts do not have to replace all the teachers they lose. Monitoring departures from teaching only approximates hiring needs. Other studies have used district- or media-reported teacher vacancies showing substantially greater staffing challenges in subjects like STEM and special education (Bruno, 2023; Edwards et al., 2024; Nguyen et al., 2024; Theobald et al., 2025). But again, these measures do not directly disentangle demand for teachers from potential supply-side issues.

A more direct measure of demand is the teacher jobs that are advertised by districts. As Goldhaber et al. (2024, 2025) show, measures of filled teacher job postings are highly aligned with new teachers in a district and can be used to provide a timely indicator of teacher demand. Consistent with the patterns discussed above, these analyses of job postings also find the demand for special education and STEM teachers far exceeds demand for teachers in other subject areas. To date, however, there has not been a direct comparison of postpandemic teacher supply and demand to complement prior work using different measures from prepandemic years (e.g., Cowan et al., 2016; Sutcher et al., 2019). The two primary aims of this paper are to provide a first look at supply and demand in the postpandemic teacher labor market by leveraging an improved measure of teacher demand (district job postings) that yields nuanced insights into the ways in which supply is, or is not, meeting demand overall and across different subject areas.

1.2 Research Questions

We use data from multiple sources in Washington State to investigate two questions:

1. How have supply and demand for teachers changed relative to prepandemic years?
2. How does postpandemic demand for teachers differ across specific subject areas and relative to the recent supply of new teachers in each subject area?

2. Method

Our analysis relies on real-time data from teacher job postings in Washington state, which have been collected twice weekly from December 2021 through September 2024 (the data also include a snapshot of all job postings between October and November 2021). Teacher job postings were scraped from school district websites and job boards, covering most school districts in the state (283 of the 295 school districts, capturing more than 99% of all students in the state). To categorize each job posting, we parse job titles for specific key words or terms and then sort them into different job types.

For the purposes of this paper, we measure the total number of *open positions* in a month by calculating the number of positions posted by a district that remain active at any point in the month. For example, the number of open positions in October 2022 includes posts that were posted prior to that month but remain online in October, as well as any new positions posted that month. To make comparisons across subject areas, we scale these job postings relative to prior year full-time equivalent (FTE) teacher counts that are based on staffing and endorsement data from Washington. This creates a measure of demand relative to the size of the state's existing workforce in that subject area. We aggregated posts for each year starting October 1 such that total posts in 2022 span posts that were online between October 1, 2021, and September 30, 2022.

Because our first research question compares pre- and postpandemic years, and the job postings data are only available postpandemic, we also use a public source of administrative staffing records in Washington (the Washington S-275) to create additional measures that have

been used as a proxy for hiring demand in prior work. First, we calculate district attrition, which we define as the percentage of teachers from the prior year no longer teaching at the same school. We disaggregate this measure into three exhaustive and mutually exclusive groups: the percentage of teachers who have left the workforce (i.e., no longer appear in the S-275), left teaching but remain as staff in public schools in Washington (e.g., were promoted to principal), and transferred to another school in the state. The S-275 provides a snapshot of employment on October 1 of each school year, so turnover measures include the percentage of teachers in October of a given year who are no longer in the public teaching workforce the following October (attrition), the percentage who are still in the workforce but in nonteaching positions (move to nonteaching), and the percentage who are still teaching but in a different school (school mobility).

As our preferred measure of teacher supply, we aggregate new teacher endorsements from Washington's teacher credentialing data by subject area and month. When we aggregate endorsements to annual counts, we center our years on October 1 so they align with our post totals and administrative data timelines. As a measure of total new supply in a given subject area, we include both initial credentials (i.e., an individual's first teaching endorsement) and added endorsements (i.e., a credentialed individual's first endorsement in a given subject area), although we disaggregate these two measures in all analyses.

Finally, we construct year-by-subject totals of teaching staff FTE from the S-275 to serve as a point of comparison for our supply and demand measures. We allow teachers' FTEs (range 0 to 1) to count across multiple subject areas if teachers have multiple subject endorsements. Generally, we allow for this double-counting because teachers often earn endorsements in some

subject areas, such as special education, as a secondary endorsement; not allowing for double-counting would underrepresent the supply and workforce size of teachers in that area.

3. Results

RQ1. How have supply and demand for teachers changed relative to prepandemic years?

We begin with an assessment of the overall levels and trends in teacher supply—here measured by the number of new endorsements in a year—and demand since the pandemic. Figure 1 presents annual totals of all new credentials (darker shading) and all new subject endorsements (including lighter shading), along with rolling monthly totals of total new endorsements (line plot), from 2015–16 through 2023–24. While the number of new credentials dropped in 2020 at the outset of the pandemic, we observe a catch-up of elevated endorsement totals in 2021 and 2022 compared to prepandemic years. This momentum appears to have slowed more recently, however, with the number of initial and all new endorsements in 2024 dropping to the lowest levels since the onset of the pandemic.

Next, we turn to several proxies for teacher demand that can be observed pre- and postpandemic. Figure 2 displays trends in teacher attrition and mobility over this period. After the immediate drop in teacher attrition and mobility after the onset of the pandemic (see Goldhaber & Theobald, 2023), we observe a return to prepandemic levels in overall attrition in 2023. However, the share of job-leavers who are transferring to a teaching position at another school is lower than prepandemic levels. This means that more staff are either leaving teaching for other position types in Washington public schools or leaving employment in public education altogether. These changes are small in magnitude, but if they continue, could translate to greater demand for teachers in the coming years. As we note above, however, turnover only approximates teacher demand, as districts may choose not to replace teachers for a variety of reasons.

Figure 3 displays two other measures for teacher demand over the same period. The gray shaded areas of the bar in each school year depict the number of new teaching staff including (light gray) and excluding (dark gray) school transfers. These measures largely mirror the trends in attrition, with the same pandemic-era drop and recovery in subsequent years. That said, even with recovery in the postpandemic years and ignoring the punctuation, the general trend in both demand measures suggests a prepandemic gradual decline in teacher demand that continues in the postpandemic years.

We supplement these administrative data totals in more recent years with the more granular, web-scraped job postings data described above. The dashed line presents online posts at the month level, while we plot annual totals with the solid lines. Both levels of data illustrate a general slowing of demand for teachers from 2022 through late 2024, again underscoring the overall pattern of the figure. Because districts differ in their use of job board postings for transfer positions (Goldhaber et al., 2024b), it is unsurprising that the total job posting measure of teacher demand falls between the administrative totals with and without transfers. In other words, this measure likely systematically undercounts the total positions demanded by the school system but still captures the patterns in demand we observe in the administrative data. And perhaps most importantly, this measure provides a snapshot of teacher demand in the most recent school year that is not yet available from administrative data.

RQ2. How does postpandemic demand for teachers differ across specific subject areas and relative to the recent supply of new teachers in each subject area?

Our investigation of the second research question focuses exclusively on job postings data as our measure of demand because they are available for the most recent school year. In Figure 4, we contrast the total number of new endorsements (solid bars) with the total number of

job postings (transparent bars) by year and subject. Focusing first on the total number of new endorsements relative to the total number of newly posted positions (the "All" bars within each year), we observe that there are more new endorsements than open teaching positions in each year, meaning that supply modestly exceeds demand for teachers overall; i.e., there are roughly eight to nine new teaching posts for each 10 new teaching endorsements in each year. This ratio is slightly higher in 2022 (0.89) than in 2024 (0.76), suggesting that, while both demand and supply have decreased in the most recent year, the decrease in demand more than compensates for the declining supply of new teachers.

That said, the most important takeaway from Figure 4 is that these trends vary considerably across the six most common subject and licensure areas in the state—elementary, English, math, science, social studies, and special education—and an "other" catch-all category. Elementary education, English, math, and social studies all exhibit a more-than-adequate supply of newly credentialed teachers relative to the demand for teachers in these areas each year. These subjects make up a combined 60% of the existing teacher workforce and lead to an overall ratio of posts per endorsement of less than one each year. At the other end of the spectrum, science and special education appear to have considerably greater demand than supply in the most recent data. For example, in 2023 there were roughly 25 job postings for new science teachers for each 10 new individuals with science endorsements, whereas in 2024 there were about 16 new job postings for special education teachers for each 10 new individuals with special education teaching endorsements.

To explore the extent to which these trends may be driven by supply and demand for teachers in these subject areas relative to the size of the teacher workforce within each area, we scale both supply and demand measures by the teaching FTE within each area; i.e., the ratios of

supply and demand within each subject are the same as in Figure 4, but the relative supply and demand are now on the same scale across subjects. These scaled demand measures are particularly high in science and special education. For example, in 2024, there were about 17 new special education job postings per 100 special education teachers, and about 12 new science job postings per 100 science teachers, but fewer than 5 new job postings per 100 teachers in elementary, English, and social studies. The supply of teachers, on the other hand, varies little across subject areas relative to the size of the teacher workforce in each subject. A conclusion from this figure, then, is that although the supply of new teachers in Washington across subject areas is broadly representative of the existing teacher workforce in Washington, it is *not* representative of the demand for new teachers, which is dramatically higher in some subjects (e.g., science in special education) than others.

4. Discussion

Despite significant changes in funding and modest changes in teacher attrition that could have influenced the demand for teachers, our analysis suggests the demand for teachers in Washington going into the 2024–25 school year is in line with trends from prior years and, overall, does not exceed the recent supply of potential teachers in the state. However, demand for special education and science teachers continues to outpace demand for teachers in other subject areas, and supply continues to fall below what is needed to cover demand in these areas. The consistency of this finding over the last three years, alongside considerable prior research on teacher staffing challenges in these subject areas, suggests this is a longer-term issue that should be a policy focus for teacher recruitment and retention efforts.

The lack of dramatic change in teacher supply and demand in postpandemic years also raises questions for future research about how school districts have responded to impending funding cuts and elevated attrition. One possibility, suggested by Goldhaber et al. (2024), is that

schools districts were able to manage necessary staff reductions through attrition, allowing them to keep 2024 hiring levels consistent with prior years. But districts may have also relied on temporary funding (e.g., from ESSER) to maintain hiring. If that was the case, the demand for teachers may still shift in the near future.

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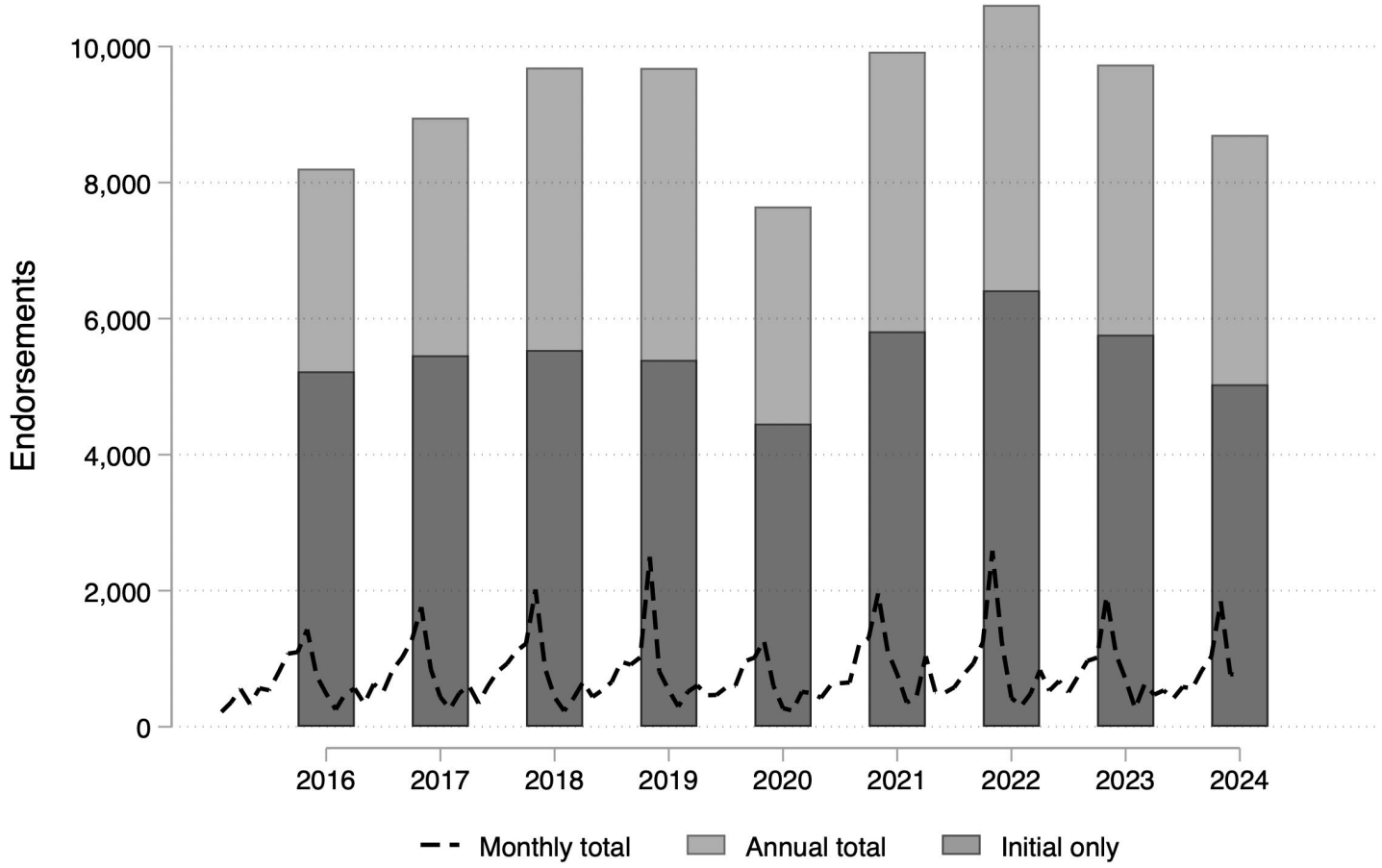
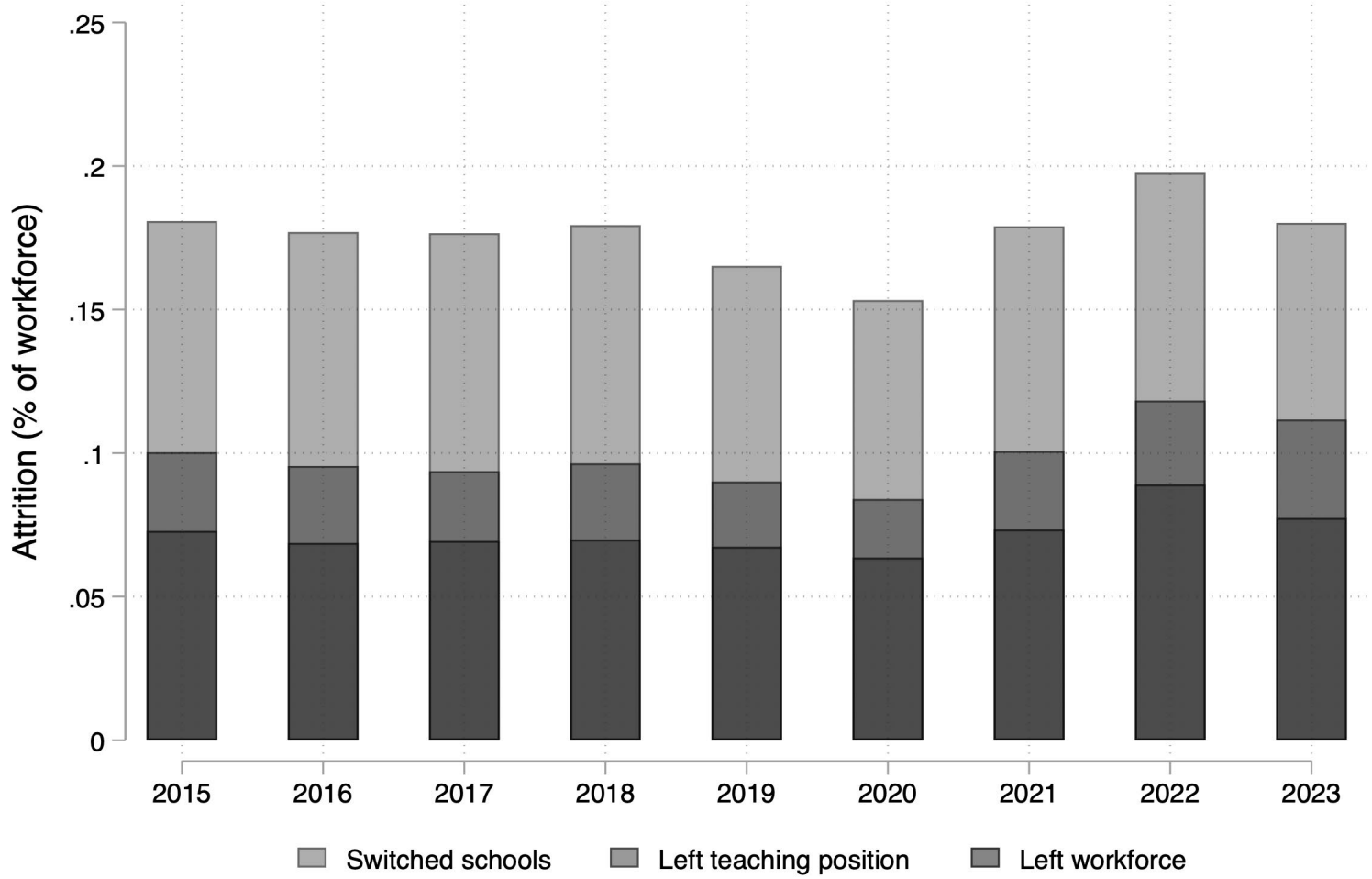
Figures

Figure 1. Supply of teachers, first-time teaching endorsements in Washington by month and school year (2015–16 through 2023–24)



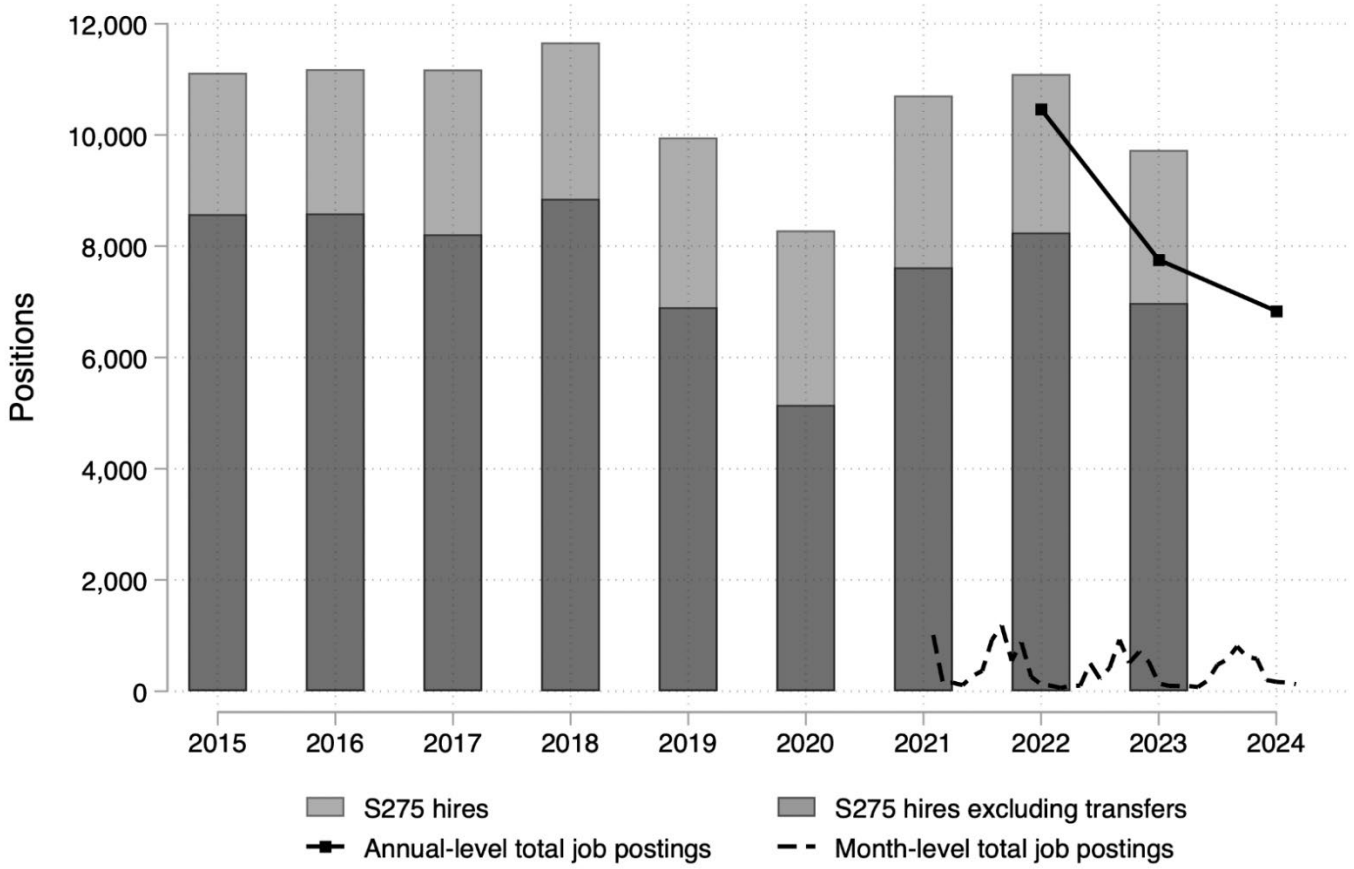
Notes. Annual totals accumulate from October 1 of the prior calendar year, so 2016 totals are the sum of all new endorsements between October 1, 2015, and September 30, 2016. Endorsements are "new" if an individual has not been endorsed in that subject area before. Subjects of uniqueness are elementary, English, math, science, special education, social studies, and a catch-all "other.

Figure 2. Demand for teachers, annual teacher attrition and mobility in Washington (2014–15 through 2022–23)



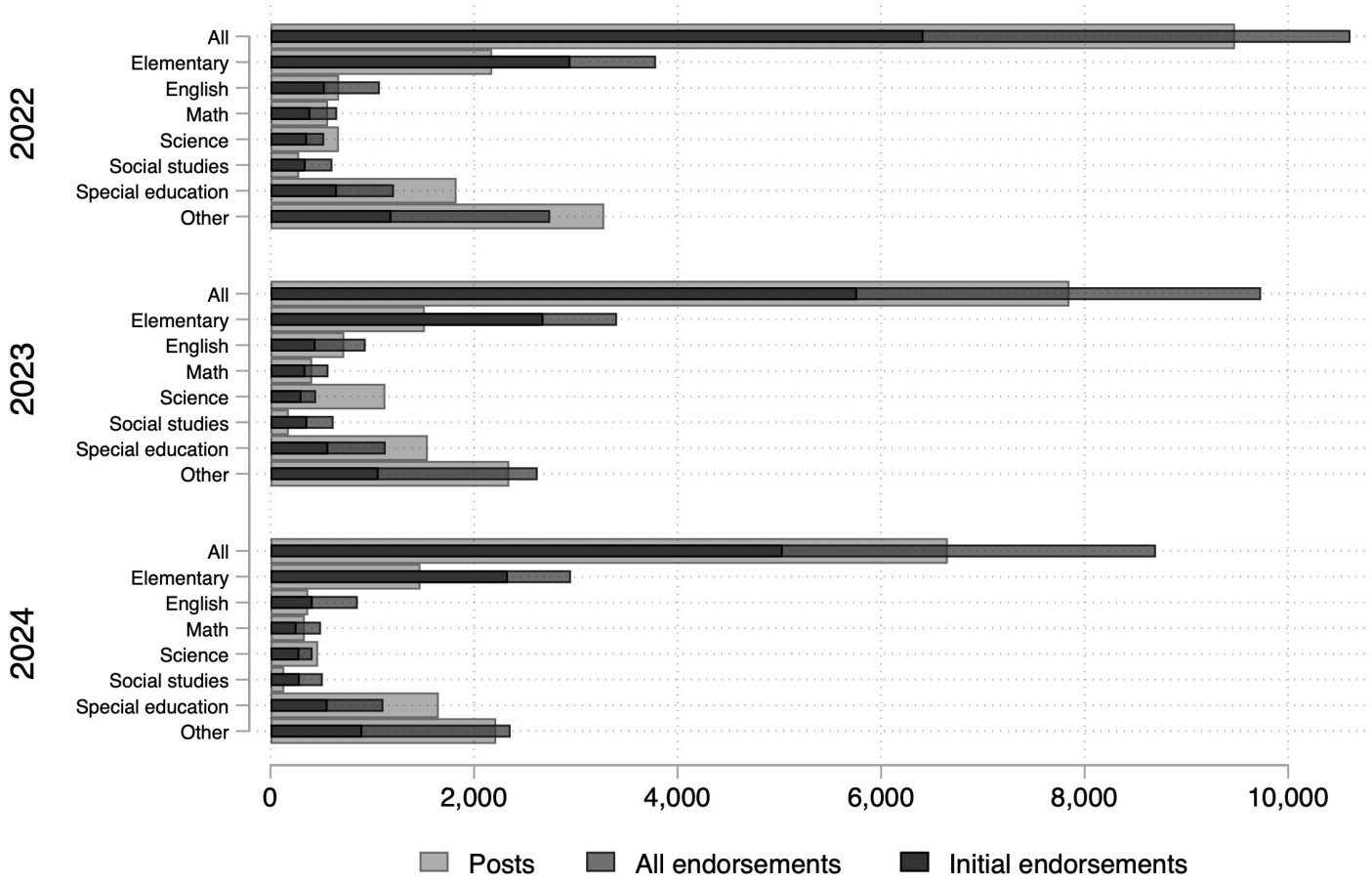
Notes. We define attrition as, relative to staffing in the prior year, the percentage of teachers that are no longer teaching at the same school. We disaggregate this overall loss of teachers into three exhaustive, mutually exclusive categories: those who transferred to teach in another school in Washington, those who left teaching but remain working in Washington public schools, and those who left the Washington public school workforce entirely.

Figure 3. Demand for teachers, observed teacher hiring (2014–15 through 2022–23) and scraped job postings (2022–2024)



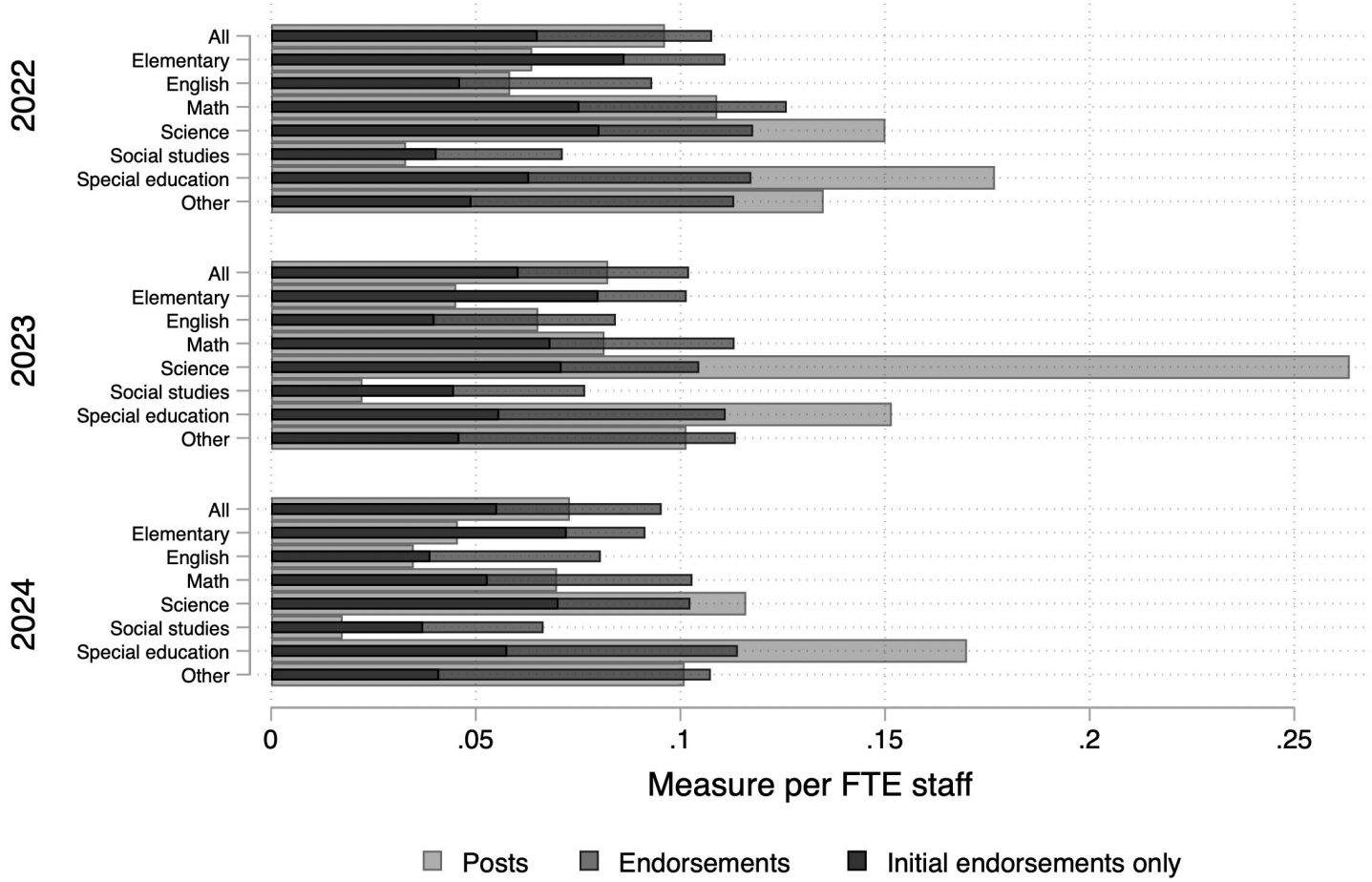
Notes. S275 hires is the total count of new teachers who were not teaching in their current school as of the prior year (i.e., teachers who were not in the public education system, who had non-teaching jobs in public education, or who worked at other schools in the public education system). The darker gray area captures hires from outside of public education or from non-teaching positions only, excluding transfers across schools. Annual- and month-level job posting totals include all posts that were online in that given period, so posts may count across multiple periods and month totals may not sum to the annual total. Annual totals for job posts are calculated for the period from October 1 of the prior year through September 30 of the indicated year to align with the S275 measurement timeline.

Figure 4. Demand for teachers by subject area, annual job postings and total new endorsements (2022–2024)



Notes. Existing staff FTE are not mutually exclusive across categories; if a staff member is endorsed in multiple areas, their FTE counts across all areas they are endorsed in. Job posting totals for each year capture all posts online at any point in that period, and thus posts may count across multiple years. Post totals are calculated for a period starting on October 1 and ending on September 30 of the indicated year. FTE = full-time equivalent.

Figure 5. Demand and supply of teachers by subject area, job postings and new endorsements relative to size of workforce (2022–2024)



Notes. Job posting and endorsement totals are for the period from October 1 of the prior year through September30 of the year indicated. The left panel scales these totals by total existing staff full-time equivalents in Washington as of October 1 of the prior year. The right panel shows how these volumes compare, with a 1:1 posts per endorsement ratio suggesting evenly matched supply and demand for positions in that area.