OPEB Accounting and Teacher Diversity

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Abstract

Despite extensive literatures documenting the importance of teacher diversity and teacher compensation, few studies explore relationships between the two. Fewer still examine effects of governmental accounting standards, even though these standards evolve regularly and could have substantial implications for how school districts allocate resources. I use staff- and district-level data from California to explore the effects on the teaching force of a change in accounting standards that required districts to recognize the costs of retiree health benefits (and other post-employment benefits, or OPEBs) as employees earned them. By making the true costs of this deferred compensation more apparent, this reform may have changed teachers' incentives or encouraged districts offering such benefits to shift expenditures toward other aspects of compensation or working conditions more highly valued by relatively novice teachers (e.g., higher salaries). I illustrate how such reforms could impact the diversity of the teaching force by showing how teachers of different races and genders were likely to be differentially affected by deferred compensation policies due to differences in previous experience (and thus proximity to retirement). However, comparative interrupted time series analyses do not show that districts affected by the change in accounting standards saw their teaching staffs diversify at different rates than other districts. Thus, while the costs of deferred compensation are likely an important – and underdiscussed – factor in determining the diversity of the teaching force, accounting reforms alone are unlikely to moderate their impacts on the race and gender composition of teachers, at least in the medium-term.

Key Words: teacher diversity, OPEB, teacher compensation, accounting standards, deferred compensation

Researchers, policymakers, and the general public are concerned about the diversity of the teaching force (e.g., Meckler & Rabinowitz, 2019). This concern is motivated by a range of considerations, including the fact that public school teachers in the United States remain considerably whiter and more female than the students that they teach (Boser, 2014; Hussar et al., 2020; Lindsay et al., 2017; Spiegelman, 2020). Moreover, demographic alignment between students and teachers seems to be beneficial (e.g., Egalite & Kisida, 2018; Gershenson et al., 2016; 2018).

At the same time, there are growing concerns that deferred compensation for teachers represents looming challenges for districts' financial health. Most notably, researchers have highlighted how underfunded pension and health insurance plans for retirees will strain state and district budgets as teachers increasingly claim benefits they have been promised over their careers (e.g., Bruno, 2018; Koedel & Gassmann, 2018). These studies sometimes highlight equity implications of these financial challenges for students (e.g., Backes et al., 2016; Bruno, 2019), but they rarely link these challenges to the racial and gender diversity of the teaching force. Additionally, this work typically focuses on the expenditures and liabilities associated with deferred compensation, while largely neglecting the role of accounting guidelines that determine if and when those expenditures and liabilities become salient for school districts.

In this paper I link the accounting standards to which school districts are held to issues of teacher diversity. I use as a case study the adoption and implementation of Statement No. 45 from the Governmental Accounting Standards Board (GASB 45). Issued in 2004, GASB 45 required that school districts account for the costs of other-than-pension postemployment benefits (OPEBs, consisting primarily of retiree health benefits) as employees earn them, rather

than waiting until former employees claim them (Governmental Standards Accounting Board, 2004).

I then use district- and staff-level data for almost every school district in California over 22 years to do two things. First, I show why OPEBs – and accounting reforms like GASB 45 – could have important implications for the diversity of the teaching force. I illustrate this by showing that at the time of GASB 45's adoption teachers of color, and especially Hispanic teachers, were substantially less experienced than white teachers, making them plausibly less likely to value OPEBs. Thus, teachers – or prospective teachers – of color could have been disproportionately affected by GASB 45. For example, by making the true costs of OPEBs more visible GASB 45 may have incentivized districts to shift compensation into forms, like salary, that were more attractive to less experienced teachers (including teachers of color).

Second, I use subsequent years of data to look for evidence that GASB 45 had effects on the diversity of teachers in districts that were affected by it. I conduct comparative interrupted time series analyses, comparing teacher demographic trends in affected and unaffected districts before and after GASB 45 implementation. Perhaps because of the fairly modest requirements it imposed, I do not find evidence that GASB 45 had any effect on teacher diversity. However, the results point to important directions for both policy and future research.

Literature Review and Policy Background

Two strands of previous research are relevant for my analyses. First, there is considerable interest among practitioners and policymakers in increasing the diversity of the teaching force, and this is driven in large part by research indicating that such diversity can have benefits for students and teachers alike. Second, concern has grown that deferred compensation for teachers

is both inefficient and a threat to school district budgets. I consider each of these topics in turn, and then consider how they intersect and motivate my research questions.

Teacher Diversity

The elementary and secondary public school student body in the United States has diversified steadily over the last several decades in terms of race. In 2000, 61% of the country's public school students were white. By 2017 that figure had fallen to 48%. This was driven in large part by steady growth in the Hispanic student population, from 16% to 27%. Growing racial diversity among students was not accompanied by similar growth among teachers. On the contrary, over the same period, the share of teachers who are white changed by much less: from 84% to 79% (Hussar et al., 2020).

As a consequence, America's public school teaching force does not reflect the racial diversity of its students. This is mitigated to some extent by teachers and students of the same race tending to sort into the same schools (Boyd et al., 2013; Hanushek & Rivkin, 2007; Sun, 2018). However, even within a given school, teachers tend to be much whiter than students (Spiegelman, 2020).

The relative infrequency with which students of color can expect to have a same-race teacher has long raised equity concerns for a variety of reasons. For example, it has been suggested that students from racial groups historically marginalized in educational settings can benefit from regular exposure to educationally-successful "role models" in the classroom (Boser, 2014), or could suffer as a result of white teachers' racism (Chin et al., 2020; Quinn & Stewart, 2019).

In recent years, these concerns have garnered considerable empirical support. For instance, students have better achievement, behavior, and attendance outcomes when they have same-race teachers (Dee, 2004; Egalite et al., 2015; Holt & Gershenson, 2019; Lindsay & Hart, 2017). These benefits may be because students with same-race teachers have more positive attitudes toward their education (Cherng & Halpin, 2016; Egalite & Kisida, 2018) or are more optimistic about the returns to education after having a same-race teacher role model (Gershenson et al., 2018), or because their teachers have more positive views toward them (Downey & Pribesh, 2004; Gershenson et al., 2016; Wright et al., 2017). This kind of racial congruence seems to benefit teachers as well and has been linked to teacher retention (Hanushek et al., 2004; Strunk & Robinson, 2006; Sun, 2018). Overrepresentation of white teachers may also result in a vicious cycle for teacher diversity; teachers with fewer same-race colleagues may find less support at work and be more likely to leave their jobs (Bristol & Shirrell, 2019; Grissom & Keiser, 2011). These findings have fueled additional calls to recruit teachers of color into the profession (e.g., Bristol & Martin-Fernandez, 2019).

Concerns about demographic congruence between students and their teachers are further compounded by the fact that public school teachers were roughly as disproportionately female in 2017 (76%) as they were at the turn of the century (75%; Hussar et al., 2020). For instance, researchers have pointed out that Black boys may be particularly likely to suffer from lack of access to same-race-and-same-gender teachers (Lewis & Toldson, 2013; Lynn, 2002). And the benefits of student-teacher and teacher-coworker gender congruence appear to be similar to those of racial congruence (e.g., Egalite & Kisida, 2018; Grissom et al., 2012).

In sum, there are likely substantial benefits to developing a teaching force with a racial and gender composition similar to that of students. However, public school teachers in the

United States have diversified along those dimensions only very slowly, if at all. And public school teachers today still look very different from public school students.

Deferred Compensation and OPEB Accounting

Most commonly, attention to teacher compensation focuses on compensating teachers for taking "hard-to-staff" positions (e.g., Clotfelter et al., 2008; Feng & Sass, 2017) or for being more effective (e.g., Pham et al., forthcoming). Recently, however, attention has increasingly focused on the extent to which teacher compensation is deferred for teachers until relatively later in their careers. For example, researchers have pointed out that while teacher salary schedules often require teachers to work for many years before receiving substantial salary increases (Grissom & Strunk, 2012; Vigdor, 2008), giving new teachers raises more rapidly might recruit and retain them more effectively (Ballou & Podgursky, 2002; Grissom & Strunk, 2012; Hendricks, 2014, 2015; Lankford & Wyckoff, 1997; Vigdor, 2008).

A growing concern in recent years has been that many school systems have deferred large portions of teachers' compensation until retirement. Most commonly, this compensation takes the form of pensions and other-than-pension post-employment benefits (OPEBs), the primary component of which is health and welfare benefits for former employees. Concerns about deferring this compensation so far into the future are two-fold.

First, retirement benefits may not be an efficient way of compensating teachers. In practice, teachers do not appear to value deferred compensation very highly. For example, in one study teachers in Illinois appeared to value pension benefits far below their actual value (Fitzpatrick, 2015). This suggests that despite their considerable cost to states and districts, retirement benefits may not be a useful incentive for teachers. Indeed, even where such benefits

are offered, large proportions of teachers do not persist in their jobs long enough to earn them (Aldeman & Robson, 2017). Much as with salary schedules, school systems might reap greater gains from shifting compensation from retirement to earlier in teachers' careers, when novice teachers are more likely to value them (Fitzpatrick, 2015; Koedel & Podgursky, 2016)

Second, deferring large portions of teacher compensation far into the future has often allowed school districts and states to accumulate large, unfunded liabilities (Backes et al., 2016; Bruno, 2019; Koedel & Gassmann, 2018). This may be because the costs of this deferred compensation are difficult for the public to assess, allowing school district employees – teachers and administrators alike – to secure large amounts of (future) compensation with relatively little public accountability (Glaeser & Ponzetto, 2014). Providing health benefits to retirees might also save state and local governments money on pensions and salaries by inducing highly-paid veteran teachers to retire earlier (Fitzpatrick, 2014). Regardless of the motivation for offering these benefits, teachers have often earned – and been promised – benefits for which insufficient money has been set aside by their employers.

These costs can strain school district budgets, prompting efforts by policymakers to ensure that governments fund the post-employment benefits they offer employees on a sustainable and ongoing basis. In addition to being the subject of my analyses below, California is an illustrative example. In 2014 the state passed a law increasing the amounts that the state, school districts, and working teachers themselves are required to contribute each year to the state's pension fund for teachers. This was intended to address a gap of roughly $74 billion between the amount the fund was estimated to eventually owe retired teachers, and the amount it was estimated to have available (Kasler, 2014; Koedel & Gassmann, 2018). While improving the

long-term financial footing of the pension fund, this has increased stress on district budgets in the short term (Bruno, 2018).

While teacher pensions in California are largely managed at the state level, OPEBs for teachers are collectively bargained by individual districts and their teachers' unions. Consequently, while most teachers in the state are eligible to receive post-employment health and welfare benefits from their districts (Legislative Analyst's Office, 2017), the extent to which districts have accumulated unfunded liabilities for those benefits varies substantially. For example, in 2018 most California districts had virtually no unfunded OPEB liability, but 10% of districts representing 28% of statewide enrollment had unfunded liabilities of $2,795 or more per pupil (Bruno, 2019).

The growth of unfunded liabilities has spurred a number of reforms intended to promote more sustainable financial management of teachers' post-employment compensation. Among these have been accounting reforms intended to make the costs of such compensation more transparent. Several of these reforms have been driven by the Governmental Accounting Standards Board (GASB), a private organization that provides accounting guidance and best practices for state and local governments.

In June of 2004, the GASB issued GASB 45, aimed at making the true costs of OPEBs clearer in financial reporting. It did this primarily by requiring that employers account for OPEB costs on an "accrual basis." This meant that employers would have to recognize the costs of OPEBs as they were earned by employees, rather than accounting for them only when the benefits were claimed by former employees (and thus paid for by the employer). GASB 45 provided guidance for estimating an "annual required contribution" (ARC) by the employer to the OPEB plan that factors in both what current employees could be expected to receive based on

their current work as well as the extent to which the employer had funded the plan in the past. If employers did not make their ARC, they would have to report the difference between the ARC and their actual contribution to the plan as a liability on their financial statements.[1]

Importantly, GASB 45 did not prohibit districts or other employers from accumulating unfunded OPEB liabilities. Indeed, as noted above, many districts in California continued to maintain large unfunded liabilities many years later. However, it did require making accumulated OPEB costs, including unfunded liabilities, more transparent in financial reporting. Making the costs of deferred compensation more transparent may have removed one of the incentives for districts to defer that compensation in the first place (Pratt, 2007). Changing compensation practices may, in turn, have changed teacher hiring and retention patterns, but to date there is no evidence about whether such changes occurred.

The Intersection of Teacher Diversity, Deferred Compensation, and OPEB Accounting

If changing OPEB practices have effects on teacher hiring and retention, they could in turn have impacts on the diversity of the teaching force. After all, changing compensation structures could change the willingness of teachers to remain in their jobs, or change the composition of prospective teachers applying for open positions.

Some research links deferred compensation, including OPEBs, to student demographics. For example, Bruno (2019) finds that in California, districts with the largest unfunded OPEB liabilities are also those with the largest populations of students considered educationally disadvantaged under state law (i.e., low-income students and English learners), raising equity

[1] Additional support for districts implementing these requirements was provided by the California Department of Education, including guidance related to how GASB 45 would be incorporated into the state's existing accounting regulations, implementation timelines, and information about how to monitor OPEB liabilities (Hannan, 2007).

concerns. Other work has linked deferred compensation to teacher experience, for example finding that – consistent with considerations discussed above – deferred compensation limits the ability of districts to attract and retain newer teachers in particular (e.g., Hendricks, 2014, 2015).

However, to date no studies directly examine the relationship between deferred compensation practices and teacher diversity. This is arguably surprising because both deferred compensation and teacher diversity have been the focus of a great deal of recent research. Moreover, as discussed above, teacher retention has been linked to compensation structure and the diversity of the teaching force depends in part on the rates at which incumbent teachers, who are disproportionately white and female, turn over.

Research Questions

To better understand the relationship between OPEB accounting and teacher diversity, I consider two questions. First, *were white or female teachers more (or less) likely than teachers of color or male teachers, respectively, to be affected by OPEB programs or GASB 45?* Specifically, I consider the possibilities that OPEBs and GASB 45 had different implications for white or female teachers, relative to other teachers, because they have different experience levels than other teachers (putting them different distances from retirement).

Second, *did GASB 45 affect teacher diversity?* If GASB 45 had different implications for teachers of different racial backgrounds or gender identities, then that should be reflected in the abilities of districts to recruit and retain teachers of those backgrounds and identities. In particular, I hypothesize that by making deferred compensation costs more salient, GASB 45 induced districts to shift resources toward investments (e.g., higher starting salaries or professional development) that are relatively more attractive to relatively novice teachers.

Because novice teachers may tend to be less white or less female than more veteran teachers (research question 1), this will have increased the diversity of the teaching force.

Data

To answer these questions, I use publicly available administrative data from the California Department of Education (CDE) on every public school teacher in the state from 1997 to 2018.[2] These data files link each teacher to a school, and I exclude from analyses below teachers in charter schools because charter schools typically do not offer OPEBs and are generally not bound by whatever OPEB arrangements operate in their local school districts. These data files also indicate each teacher's race, gender, and years of previous teaching experience (both overall and in their current district).

Answering my research questions requires knowing which districts were impacted by GASB 45 and which were not. This is difficult because I do not have any direct documentation of districts' OPEB offerings at the time GASB 45 was adopted. Instead, I infer the existence of OPEB plans from districts' 2003 financial reports to the CDE, which include any expenditures districts made to provide OPEBs.

This method of identifying districts affected by GASB 45 is imperfect because it is possible that districts in 2003 might have spent money to provide OPEBs to former employees that were no longer available to current employees. That is, by this method I may incorrectly classify districts as affected by GASB 45 if they had previously stopped offering OPEBs but were continuing to pay for benefits earned under a discontinued benefit program. However, this

[2] For brevity, I refer to school years using the calendar year of their fall term (e.g., "1997" refers to the 1997-1998 school year). This is especially appropriate for the staff data used here, which the CDE collects as a snapshot in the fall, near the beginning of the school year.

is unlikely to be a major problem because despite the considerable costs of OPEBs, districts rarely cease to offer them; even by 2015 most districts in California offered OPEBs to their teachers, and the vast majority of teachers worked in such districts (Legislative Analyst's Office, 2017).

Teacher characteristics from 929 observed districts in California in 2003 are summarized in table 1. Despite the fact that the large majority of teachers – almost 80% - worked in districts offering OPEBs, they are observationally very similar to teachers in other districts in terms of gender, race, and experience. Similar to the national statistics mentioned above, teachers in this California sample are disproportionately female (72%) and roughly three quarters are white.

Table 1 – Teacher Characteristics in 2003

	Teachers in Districts Not Offering OPEBs in 2003					Teachers in Districts Offering OPEBs in 2003				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Female	59610	0.72	0.45	0	1	221723	0.72	0.45	0	1
Native American	58981	0.01	0.07	0	1	219541	0.01	0.08	0	1
Asian	58981	0.04	0.20	0	1	219541	0.05	0.21	0	1
Pacific Islander	58981	0.00	0.06	0	1	219541	0.00	0.04	0	1
Filipino	58981	0.01	0.10	0	1	219541	0.01	0.11	0	1
Hispanic	58981	0.15	0.36	0	1	219541	0.14	0.35	0	1
Black	58981	0.03	0.16	0	1	219541	0.05	0.22	0	1
White	58981	0.76	0.43	0	1	219541	0.74	0.44	0	1
Years Experience	59163	11.82	9.79	0	59	221179	11.87	9.97	0	58
Years Experience in District	58984	9.25	8.85	0	59	220818	9.70	9.08	0	55

Note. Includes teachers with the largest portion of their assignments in non-charter schools in elementary, unified, or high school districts in the fall of 2003.

Table 2 presents similar statistics at the district level. My district-level sample is slightly restricted compared to my teacher-level sample because I include only 857 districts observed in the staffing data files every year between 1997 and 2018. This makes my district-level panel strongly balanced. Despite this restriction, similar to what is observed in table 1, districts offering OPEBs in 2003 had teachers who were observationally similar to those in other districts.

Table 2 – District-level Teacher Characteristics in 2003

	Districts Not Offering OPEBs in 2003					Districts Offering OPEBs in 2003				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
%age Female	296	75.41	15.65	0.00	100	561	73.13	12.05	33.33	100
%age Native American	296	0.68	3.41	0.00	50.00	561	0.74	1.42	0.00	14.29
%age Asian	296	2.35	4.43	0.00	33.33	561	2.65	3.85	0.00	38.39
%age Pacific Islander	296	0.26	1.56	0.00	20.00	561	0.14	0.44	0.00	6.25
%age Filipino	296	0.41	0.87	0.00	5.41	561	0.69	1.38	0.00	13.89
%age Hispanic	296	8.65	13.77	0.00	83.33	561	10.01	11.80	0.00	87.50
%age Black	296	1.17	2.61	0.00	20.00	561	1.60	4.46	0.00	51.26
%age White	296	86.48	16.48	13.89	100	561	84.17	14.93	6.25	100

Note. Includes elementary, unified, and high school districts in 2003. Excludes charter schools in those districts and any district not observed in any year from 1997 through 2018.

Methods

I answer my first research question using descriptive methods to compare experience levels for different groups of teachers. A challenge to answering my second research question – whether GASB 45 affected teacher diversity – is that my measure of whether a district was treated by GASB 45 is simply an indicator of whether the district was providing OPEBs in 2003. Consequently, simply comparing districts that were affected by GASB 45 to those that were not will conflate the effects of GASB 45 with the effects of offering OPEBs in 2003. This could be a problem even looking at districts several years after GASB 45 was adopted in a standard difference-in-differences (DiD) framework. This is because while a DiD analysis will adjust for initial differences between districts in 2003 it will not account for any differences in preexisting teacher demographic *trends* between districts.

For example, consider the possibility that (as motivates my hypothesis) OPEBs incentivize relatively experienced teachers to persist in the district and that relatively experienced teachers are demographically dissimilar to less experienced teachers. If this is the case, then districts that were and were not offering OPEBs in 2003 might already have been diversifying at

different rates prior to GASB 45. Were those trends (and their differences) to continue after the adoption of GASB 45, subsequent demographic differences between teachers in those districts would reflect both the effects of GASB 45 and the effects of OPEBs generally.

To address this issue, I assess the impacts of GASB 45 in a comparative interrupted time series (CITS) analysis. In its simplest form, I estimate the following model:

$$Y_{dt} = \alpha_0 + \alpha_1 time_t + \alpha_2 affected_d + \alpha_2 post_t + \alpha_3(affected_d \times time_t) + \alpha_4(time_t \times post_d) + \alpha_5(affected_d \times post_t) + \alpha_6(time_t \times affected_d \times post_t) + \varepsilon_{dt} \quad (1)$$

In model 1, *Y* is the percentage of teachers of different races or genders in district *d* in year *t*. The variable *time* is the number of years since (or until) GASB 45 was adopted centered on 2003 (e.g., 2002 = -1, 2004 = 1), *affected* indicates districts affected by GASB 45 (i.e., those with observed OBEP expenditures in 2003), and *post* indicates years 2004 and later (i.e., after GASB 45 was adopted).

Interacting these three variables thus allows me to estimate the (linear) teacher demographic trends separately for districts that did and did not offer OPEBs in 2003, and separately before and after GASB was adopted. Specifically, α_1 estimates the average annual change in teacher demographics prior to GASB 45 in districts that did not offer OPEBs and α_2 estimates the extent to which the average annual change differed in districts offering OPEBs. Adjusting for these preexisting time trends helps to mitigate concerns that any differences between the districts observed in later years simply reflect continuations of those trends.

Similarly, α_4 captures how (if at all) the time trend changed for unaffected districts after GASB 45 was adopted, and α_6 – my coefficient of primary interest – estimates whether the time trend changed *differently* in districts offering OPEBs than it did in other districts. I restrict my

analyses using model 1 to the years 1997 through 2009 because after 2009 the impact of the Great Recession on California schools became substantial, and patterns of teacher hiring and turnover changed considerably. The assumption that demographic trends continued linearly after that point is dubious.[3]

Even after restricting the sample to 2009 and earlier, the assumption that demographic changes in school districts happened linearly is a strong one. Moreover, trends in districts may have changed after GASB 45 was adopted for reasons correlated with – but not caused by – GASB 45. For example, because California is a large state, it is possible that demographic trends or alternative labor market opportunities for teachers differed in different regions of the state at different times. If districts offering OPEBs and those not offering OPEBs in 2003 were located in different regions, their demographic or labor market trends might not only differ but might accelerate or decelerate at different rates. It could therefore be a mistake to attribute demographic changes in the teaching force to GASB 45, even after controlling for preexisting linear time trends in each group of districts.

To account for these possibilities, I also adopt a more conservative model specification:

$$Y_{dct} = \beta_0 + \beta_1 affected_d + \boldsymbol{\beta_2} \sum_{i=1998}^{2018} year_t^i + \boldsymbol{\beta_3} \sum_{i=1998}^{2018} \left(year_t^i \times affected_d\right) + \\ + \boldsymbol{\beta_4} \sum_{i=1997}^{2018} \sum_{j=2}^{46} \left(year_t^i \times county_c^j\right) + \epsilon_{dct} \quad (2)$$

In model 2, interacting the indicator for districts (nested in counties *c*) affected by GASB 45 with a dummy variable for each year allows me to estimate the difference between affected and unaffected districts separately in each year. Those estimates are captured by the coefficients

[3] For example, see figure 4 below for descriptive evidence that while California's teaching force became increasingly female at a roughly linear rate after GASB 45 was adopted, that trend sharply reversed after 2009.

in the $\boldsymbol{\beta_3}$ vector**.** Since I no longer assume that demographic trends were linear, I include additional years of data, up through 2018, though I do not use teacher race data in 2015 due to data quality concerns.[4] I also interact the school year indicators with indicators for each of the 46 counties represented in this estimation sample of districts. This controls for year-to-year variation in teacher demographics common to all districts in a county, relaxing to some degree the assumption that unobserved time-varying factors are common across the state.[5] In both model 1 and model 2, I cluster standard errors at the district level.

Results

RQ1: GASB 45 and Teacher Race and Gender

As shown in figure 1, California teachers of different races and genders had very different levels of previous experience on average in 2003. Statewide, white teachers were among the most experienced, with a mean of 12.6 years of completed previous teaching experience. White women, representing 53% of teachers, had 12.4 years of experience. Only Native American teachers – 0.6% of California's teaching force – were more experienced on average (12.9 years) than white teachers. The mean white teacher was only slightly more experienced than the mean Black teacher (with 12.5 years of experience), but this obscures substantial differences by gender; Black men teaching in California had only 10.7 years of experience, vs. 13.2 years for Black women.

[4] In the data files released by the CDE, in 2015 there is a large increase in the number of teachers classified as white and a corresponding decrease in the number classified as Hispanic. These anomalies disappear in 2016, and no such anomaly is apparent for teacher gender indicators.

[5] When estimating model 2, I drop counties if all districts in that county offered OPEBs in 2003 or if all districts in that county did not offer OPEBs in 2003. This is because after controlling for county-by-year fixed effects such districts would not contribute to my coefficients of interest but could bias my standard errors (Correia, 2015). The estimation sample for model 2 thus includes 829 districts rather than the 857 used in model 1.

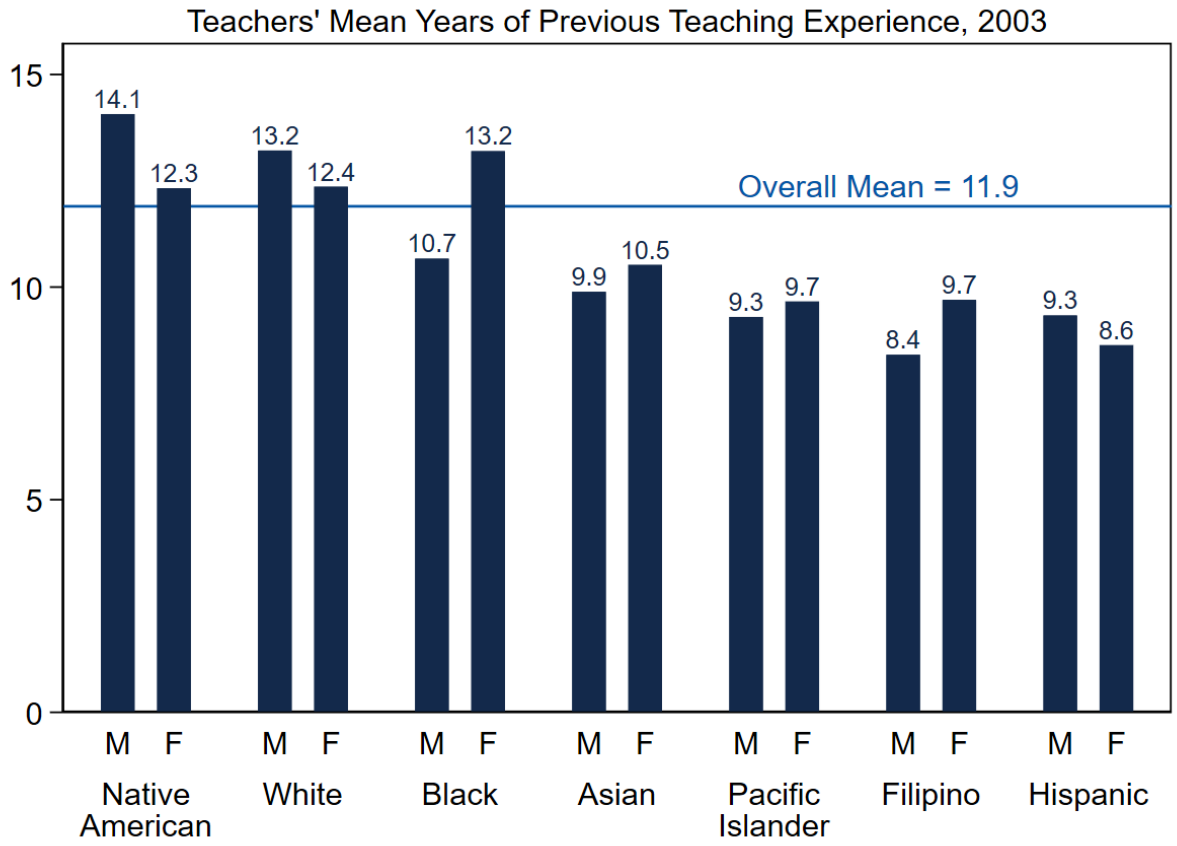

Figure 1. Mean years of previous teaching experience by teacher race and gender. M = male, F = female.

Other groups of teachers were less experienced still. For example, white women were 2.5 years (25%) more experienced than the mean male Asian teacher, and as much as 4 years (48%) more experienced than the mean male Filipino teacher. Given the sizeable population of Hispanic students in California schools, experience gaps between white and Hispanic teachers are particularly notable: among California teachers in 2003, white men were 3.9 years (42%) more experienced than Hispanic men, and white women were 3.8 years (44%) more experienced than Hispanic women.

That white teachers were more experienced than other teachers suggests that OPEBs may have been more salient – and more attractive – to them, since white teachers would likely have

tended to be closer to completing the requirements for earning OPEBs and closer to claiming them.

This can be seen more directly, and in some ways more starkly, if we consider the extent to which teachers of different races genders had accumulated at least 10, 15, or 20 years of service in their district, thresholds commonly used to establish eligibility for OPEBs. As shown in figure 2, 40% of Native American, white, and female Black teachers had completed at least 10 years of service in their district, at least one quarter had completed at least 15 years, and more than 14% had completed at least 20 years.

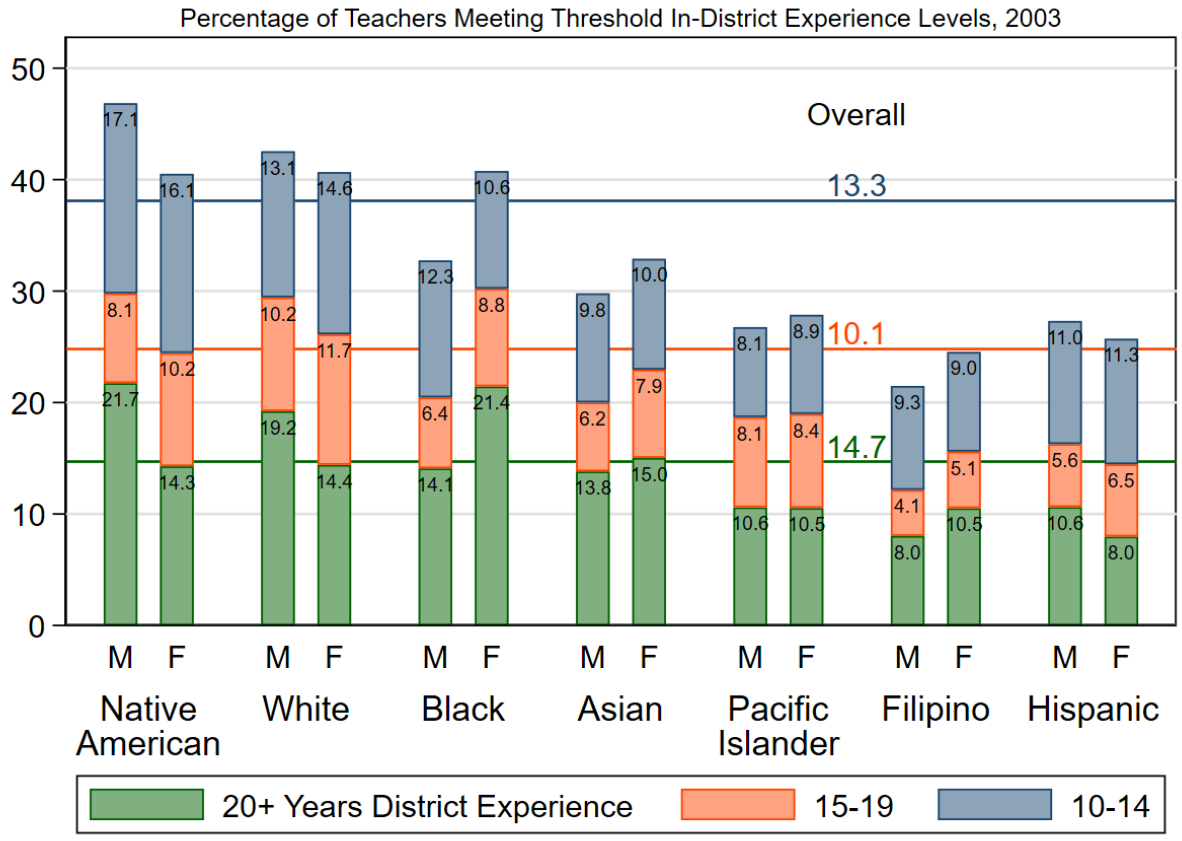

Figure 2. Percentage of teachers meeting threshold in-district experience levels by teacher race and gender. M = male, F = female.

These figures are much higher than the corresponding figures for Black men or for teachers of other races, in some cases by a factor of more than 2. At the least experienced end of the distribution, less than one quarter of Filipino teachers had 10 years of district service, and only 8.0% of Filipino men had 20 years of service. Pacific Islander and Hispanic teachers were only slightly more likely than Filipino teachers to have accumulated these threshold levels of experience. Similarly, only roughly one in three Black men teaching in California had accumulated 10 or more years of experience in their district.

In sum, in 2003 Asian, Pacific Islander, Hispanic, Filipino, and male Black teachers were much less likely than other teachers to be at or near the experience levels at which they would be likely to earn, let alone claim, OPEBs.[6] On the whole, male and female teachers of the same race had experience levels more similar to each other than to teachers of other races. This suggests that, conditional on race, male and female teachers might be similarly affected by OPEB policies generally and GASB 45 in particular.[7]

RQ2: Impacts of GASB 45 on Teacher Diversity

For context, it is useful to first note that, as shown in table 1, in 2003 districts offering OPEBs were staffed by teachers with more previous within-district experience compared to other districts. This difference was small: 9.7 years vs. 9.3 years, or about 4% of a standard deviation across all teachers. As shown in figure 3, this difference was similar across teachers of different

[6] This pattern was not unique to 2003. For example, the relative experience levels of these groups of teachers are qualitatively similar if I instead consider data from the fall of 2018, though teachers had become more experienced on average by that time (by roughly 1.5 years).

[7] However, an additional consideration is that female teachers may be more likely than male teachers to have a spouse through whom they can receive similar benefits. This would tend to make OPEBs relatively more important to male teachers (Fitzpatrick, 2014), though teachers' marital status is not observable in these CDE data.

races and genders, though relative experience levels between teachers were similar within both types of district.

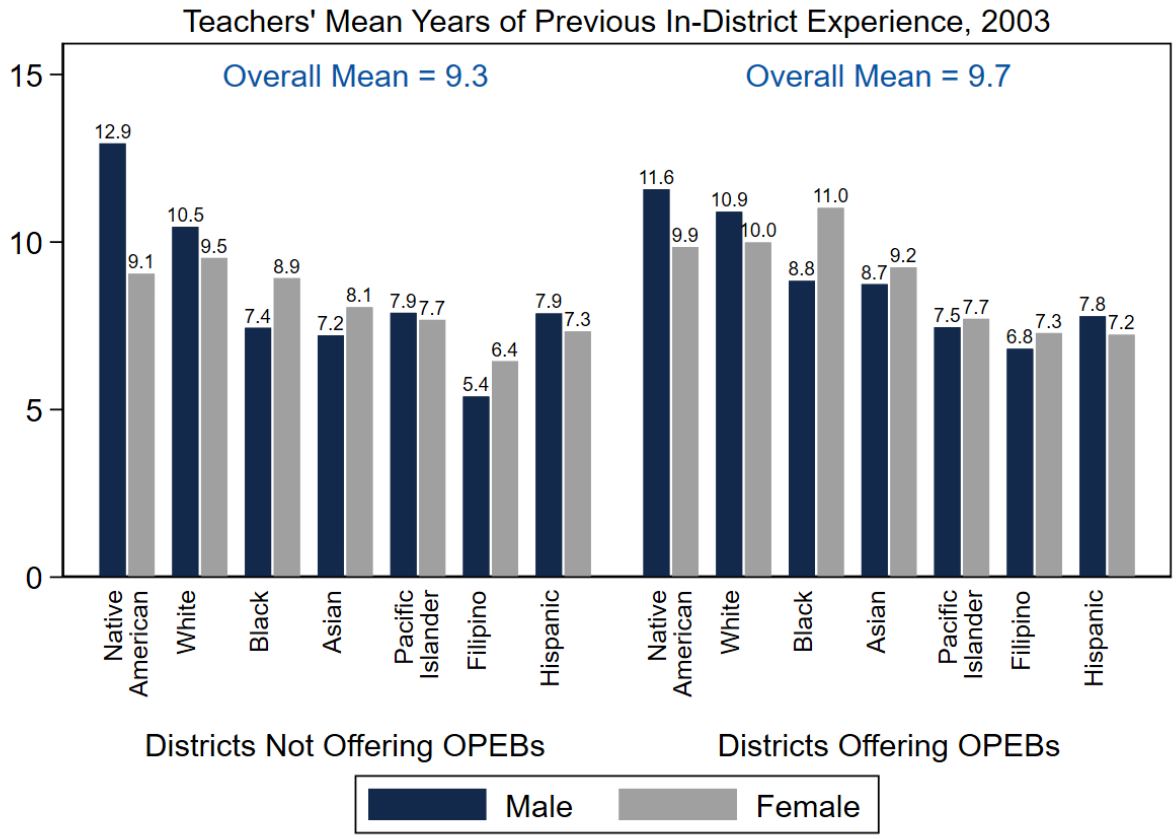

Figure 3. Teachers' mean years of previous in-district experience by district OPEB status and teacher race and gender.

Though the relationship is modest in magnitude, OPEB availability is associated with teachers' within-district experience levels. This is consistent with deferred compensation in the form of OPEBs encouraging teachers to remain working in their district (at least until the benefits are earned), or with more experienced teachers placing greater value on (and thus bargaining for) OPEBs.

However, GASB 45, by itself, does not appear to have substantially altered the demographic composition of teachers. Figure 4 presents initial descriptive evidence of this, as

well as context for interpreting later regression results. As of 2003, teachers in districts offering OPEBs were slightly less white and slightly less female than other districts. Since then, the state's teaching force has on average become less white and more female. Those trends predate the passage of GASB 45 and appear to have been broadly similar in districts regardless of whether they offered OPEBs. This suggests that the additional accounting transparency required by GASB 45 did not have a large impact on the demographics of teachers. If anything, contrary to my hypothesis, districts not offering OPEBs have diversified somewhat more rapidly than other districts: by 2018, districts offering OPEBs in 2003 had become whiter and more female than other districts.

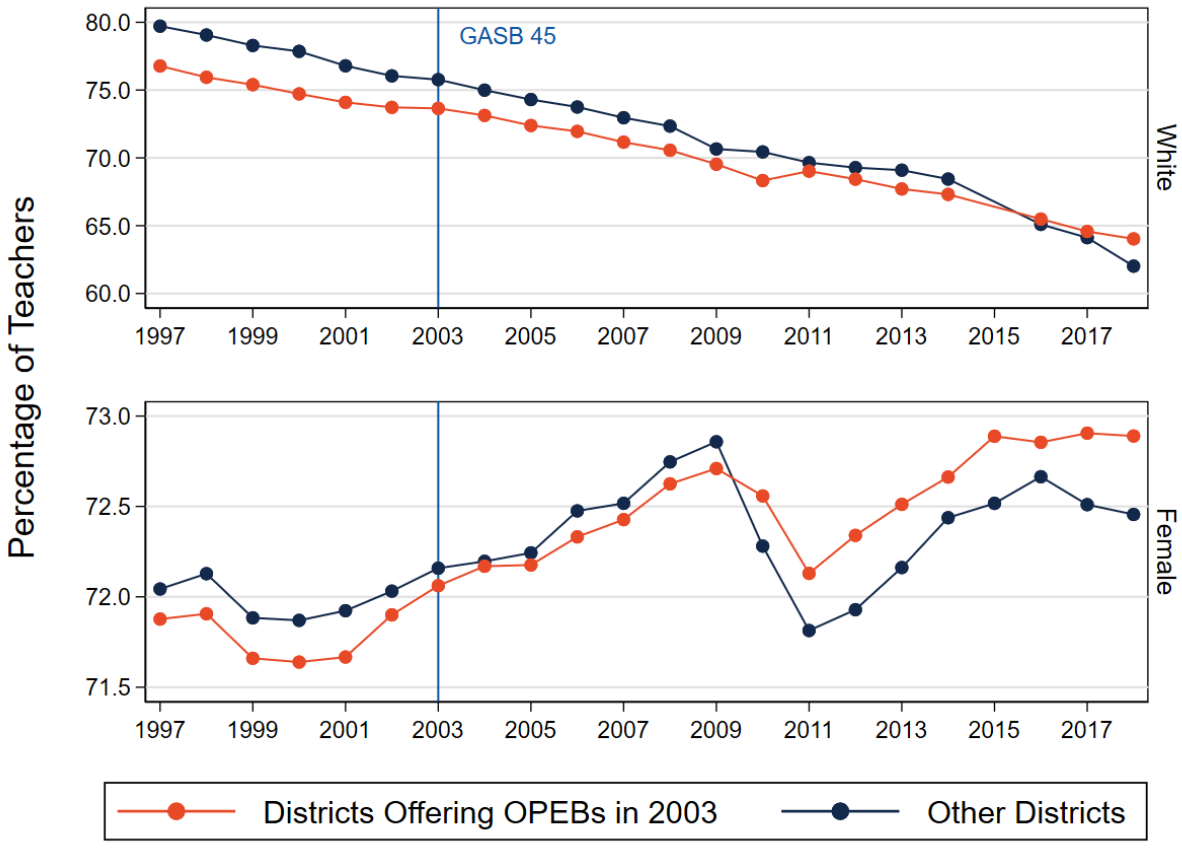

Figure 4. Teacher demographics, 1997-2018.

I formally operationalize these comparisons using the CITS framework discussed above, with results shown in table 3. Recall that the indicator for districts offering OPEBs in 2003 is interacted with the time trend variable centered on 2003 and the treatment period indicator. Thus, the first row of coefficients on the table estimate the demographic differences in 2003 between teachers in districts that did and did not offer OPEBs. The coefficients on the time variable indicate that prior to GASB 45 teachers in districts not offering OPEBs were becoming less white and more female (by 0.32 percentage points per year on average in both cases), while becoming more Asian, Filipino, and Hispanic. The coefficients on the interaction between the time variable and the treatment indicator suggests that these time trends were largely parallel in districts offering OPEBs; the only statistically significant difference is for the share of teachers who were black.

Table 3 – Comparative Interrupted Time Series Analysis

	Percentage of Teachers in District							
	Native American	Asian	Pacific Islander	Filipino	Hispanic	Black	White	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Affected District	0.24	0.18	0.02	0.19^{+}	1.31	0.50*	-2.43*	-2.91**
	(0.18)	(0.31)	(0.04)	(0.10)	(0.91)	(0.23)	(1.12)	(1.04)
Time	-0.06	0.07*	-0.00	0.02**	0.26***	0.02	-0.32***	0.32*
	(0.04)	(0.04)	(0.00)	(0.01)	(0.05)	(0.02)	(0.07)	(0.14)
Affected x Time	0.03	-0.00	0.00	0.01	0.08	-0.04*	-0.08	-0.20
	(0.04)	(0.04)	(0.01)	(0.01)	(0.06)	(0.02)	(0.08)	(0.15)
Post	0.22	-0.14	0.14	-0.01	-0.41^{+}	0.17^{+}	0.28	-0.89
	(0.26)	(0.15)	(0.09)	(0.09)	(0.23)	(0.10)	(0.41)	(0.66)
Affected x Post	-0.29	0.26	-0.15	0.03	0.36	-0.13	-0.02	1.12
	(0.26)	(0.16)	(0.09)	(0.09)	(0.27)	(0.11)	(0.44)	(0.69)
Post x Time	0.01	0.04	-0.01	-0.00	0.39***	-0.04	-0.49***	0.25
	(0.07)	(0.05)	(0.01)	(0.02)	(0.11)	(0.03)	(0.14)	(0.22)

Affected x	0.02	-0.05	0.01	-0.01	-0.28*	0.06+	0.21	-0.06
Post x Time	(0.07)	(0.06)	(0.01)	(0.02)	(0.13)	(0.03)	(0.16)	(0.23)
Adj. R-sq.	0.00	0.01	0.00	0.01	0.02	0.00	0.02	0.01
Districts	857	857	857	857	857	857	857	857
N	11141	11141	11141	11141	11141	11141	11141	11141

Note. Standard errors clustered on districts in parentheses. Includes years 1997 through 2009. Affected = 1 if district offered OPEBs in 2003. Time is the number of years before or after 2003 and post indicates all years from 2004 onward.
+ p<.1, * p<.05, ** p<.01, *** p<.001

The time trends for the two groups of districts begin to diverge slightly after GASB 45, though not in such a way as to indicate that the new accounting standards increased teacher diversity in districts initially offering OPEBs relative to other districts. The interaction of the post-GASB 45 indicator and time suggest that in districts not offering OPEBs the rate at which the Hispanic teacher share grew more than doubled, from 0.26 percentage points to 0.65 percentage points per year. Similarly, the rate at which the white teacher share shrank in these districts increased from 0.32 percentage points to 0.81 percentage points per year. However, contrary to the hypothesis that GASB 45 would increase district diversity by nudging districts away from backloaded compensation, the coefficients on the three-way interaction term indicate that this acceleration of diversification was if anything attenuated in districts initially offering OPEBs, particularly for the Hispanic teacher share. The trends for the female teacher share, also similar between district groups prior to GASB 45, do not appear to have changed differentially in the post-GASB 45 era.[8]

As discussed above, a limitation of the analysis presented in table 3 is that it is restricted to years before 2010, when pre- and post-GASB 45 trends were plausibly linear. Moreover, even

[8] The coefficients of primary interest – those on the three-way interaction term – change only very slightly if district and county-by-year fixed effects are added to the model. The latter are particularly important for guarding against the possibility that differences in regional demographic changes are confounding the effects of GASB 45 estimated in my main results, but this does not appear to be a factor.

with that restriction the linear time trends assumptions of model 1 are questionable. This motivates the use of model 2, which uses all years of data and interacts the treatment indicator with year indicators, allowing the difference between districts that did and did not offer OPEBs in 2003 to vary flexibly each year. For simplicity, rather than present tables including all coefficients for all teacher demographics, I present in figure 5 estimated differences in the white and female shares of teachers between districts offering OPEBs in 2003 and those that were not. Recall that race data from 2015 are excluded due to quality concerns and that these estimates reflect adjustments for county-by-year fixed effects, and thus reflect differences between districts in the same county in each year.

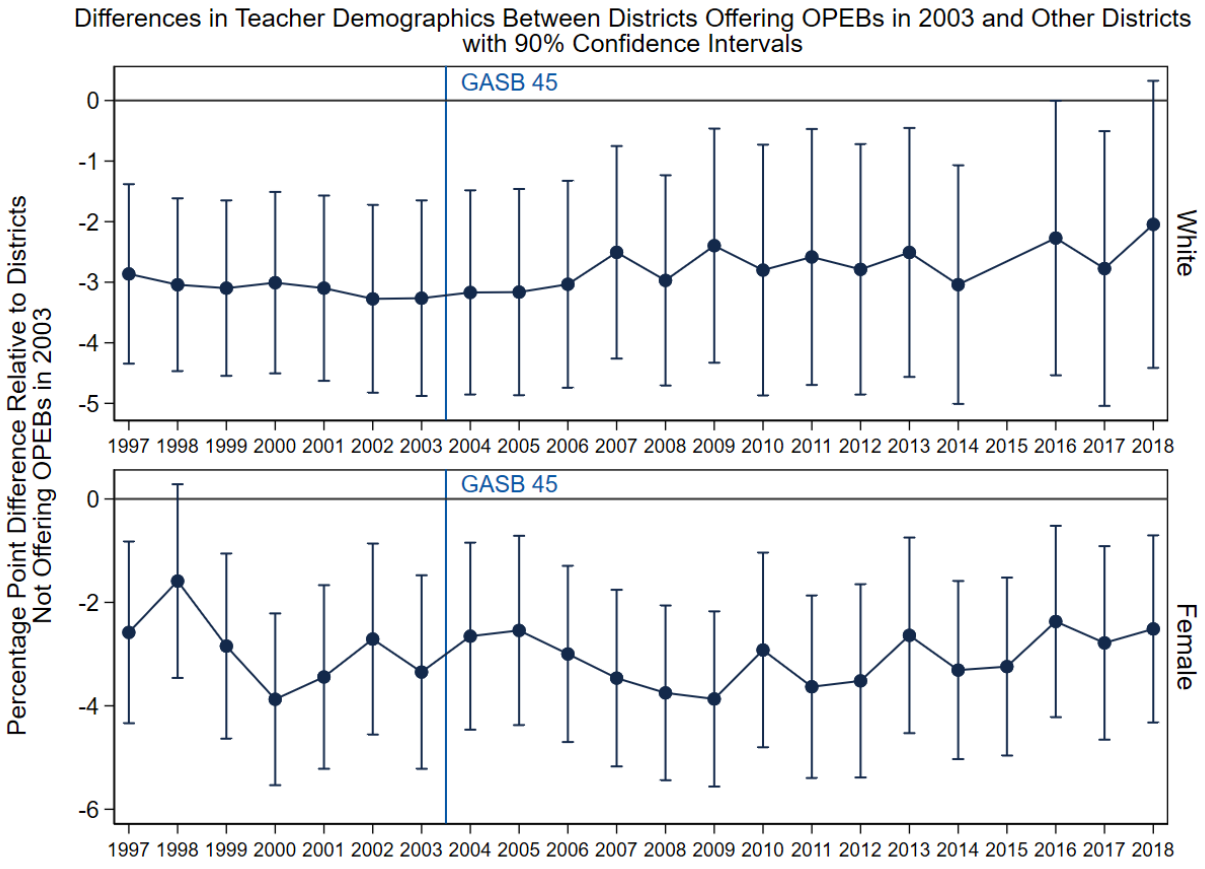

Figure 5. Differences in teacher demographics between districts offering OPEBs in 2003 and other districts with 90% confidence intervals. Coefficients and standard errors are estimated via model 2 and control for county-by-year fixed effects.

Interacting the treatment indicator with year dummies reveals broadly similar pre-trends in the two groups of districts in terms of both teacher race and teacher gender. That is, differences between districts that did and did not offer OPEBs in 2003 are largely consistent in the years before 2003, especially for the share of teachers who were white. Moreover, allowing the effect of GASB 45 to vary non-parametrically after 2003 does not reveal obvious treatment effects. While districts offering OPEBs were less white and less female than other districts in 2003, those gaps remain largely unchanged as time goes on. Similarly, incorporating additional years of data covering the Great Recession and subsequent recovery does not suggest that the effects of GASB 45 accumulated gradually over time. Demographic gaps between the teachers of these districts were largely similar in 1997, 2003, and 2018.

Discussion

In this paper, I take a preliminary look at two related questions. First, I show how teachers of different racial backgrounds can be disproportionately affected by choices about deferring teacher compensation. As an illustrative example, I show how at the time GASB 45 imposed more stringent accounting standards on school districts' OPEB programs, the teachers most likely to benefit from those programs by virtue of their accumulated experience were disproportionately white. Differences by teacher gender were less apparent, though male Black teachers were notably less experienced than female Black teachers.

Second, despite these differences in teacher experience levels, I do not find evidence that GASB 45 had effects on the racial or gender composition of districts' teachers. This is perhaps

not entirely surprising because GASB 45 did not require that districts allocate resources any differently. An important limitation of my work is that I do not directly observe details about districts' OPEB plans. This means that I cannot assess whether districts in fact made any changes to those programs – or to other aspects of their operations – as a result of GASB 45. Thus, GASB 45's lack of apparent effects on teacher demographics may reflect a lack of impact on district resource allocation. Alternatively, GASB 45 may have induced changes to district practices that ultimately had no net effect on teacher behavior. Shedding light on how these kinds of regulation affect district financial management is an important area for future work.

This work points to two broad lessons for policymakers and administrators. First, the relationship between teacher demographics and teacher experience means that the choice to defer teachers' compensation into later in their careers will tend to have different impacts on teachers of different races and genders. Such choices will therefore potentially have impacts on the diversity of the teaching force. Decisions about whether to defer teacher compensation to a greater or lesser extent should be informed by explicit consideration of how teachers of different backgrounds will be impacted and whether those impacts are consistent with the school system's objectives.

Second, accounting standards may need to be coupled with other forms of accountability to change resource allocation in schools. Though I do not directly examine changes in school district resource allocation, my results do not suggest that GASB 45 had large impacts on staffing as might be expected if district budgeting had changed radically. This points to the possibility that accounting transparency alone will not necessarily promote sustainable or efficient resource allocation. It may be useful to couple such accounting reforms that additional public reporting requirements, such as reporting financial health measures (e.g., unfunded

liabilities) on publicly-available school report cards. And stricter regulatory oversight, such as requirements that OPEB liabilities be funded at minimum levels, might usefully complement requirements that those liabilities be reported more transparently. Again, however, I cannot rule out that districts did respond to GASB 45 in ways that I do not observe.

Researchers should do more to look at the intersection of school finance and human resources, though both areas are independently well studied. Moreover, while there is considerable research linking teacher compensation to the quantity and quality of teachers available to schools, there is considerably less evidence on the effects of compensation on teacher diversity specifically. There is less work still exploring the accounting standards that govern districts' resource allocation, and virtually none linking those standards to the characteristics of the teaching force. This is surprising given the ubiquity of accounting standards, the evolution of those standards for compensation spending in particular, and clear evidence of the importance of compensation structure to the teaching force (e.g., Grissom & Strunk, 2012; Hendricks, 2014, 2015).

Additionally, my focus on financial and compensation factors should not be taken to imply that compensation structure is the only important determinant of teacher recruitment, retention, success, and diversity. An extensive literature documents the importance to the teacher workforce of a wide-range of non-pecuniary factors including student composition (e.g., Bruno et al., 2020), leader quality (e.g., Grissom, 2011), school climate (e.g., Kraft et al., 2016), and social networks (e.g., Cannata, 2011). Indeed, these factors have in some cases also been shown to be important not just for teacher recruitment and retention generally, but for teacher diversity specifically (e.g., Bristol & Shirrell, 2019; Noonan & Bristol, 2020). It would be useful to know more about how compensation reform impacts other, non-pecuniary factors that may themselves be important to

the teacher workforce, for example because cuts to deferred compensation may facilitate investments in teacher recruitment and hiring or supports for novice teachers.

A diverse teaching force is a priority for many stakeholders. Those stakeholders will thus be interested in knowing how the structure of teacher compensation – for example, the extent to which it is deferred until later in teachers' careers – affects the ability of schools to recruit and retain a diverse teaching force. Teacher compensation represents the large majority of most districts' budgets and can be structured in very different ways. Restructuring teacher compensation may therefore be an important lever for obtaining the teaching force we want.

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