

A policy agenda to address the teacher shortage in U.S. public schools

The sixth and final report in the ‘Perfect Storm in the Teacher Labor Market’ series

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Summary

The teacher shortage in the nation’s public schools—particularly in our high-poverty schools—is a crisis for the teaching profession and a serious problem for the entire education system. It harms students and teachers and contributes to the opportunity and achievement gaps between students in high-poverty schools and their more affluent peers. Policy choices as well as policy inaction have contributed to the factors that have eroded the appeal of the teaching profession and it will take a comprehensive policy agenda to address those factors.

EPI’s teacher shortage policy agenda plots a course to return teaching to a profession in which teachers are compensated on par with their college-educated peers, operate in environments where they can teach effectively, get the training they need early in their careers and the professional development they need throughout their work lives, have their professional judgment incorporated, and have the opportunity to use the expertise they attain to help shape what goes on in their classrooms and their schools. This policy agenda has two components: a set of four foundational recommendations for how to understand the context and approach the problem in a way that will actually solve it, followed by specific policies that, if implemented together, could go a long way toward solving the teacher shortage crisis. This policy agenda builds on an in-depth analysis of the size, scope, and drivers of the teacher shortage, as detailed in the first five reports in the EPI’s “Perfect Storm in the Teacher Labor Market” series. The agenda addresses the factors we identified in the series as well as other specific or underlying factors that our past research and understanding of the issue tell us are important, such as lack of a properly resourced system, the lack of a diverse teaching workforce, student loan debt payments burdening teachers, and the uneven effectiveness of initiatives for teachers-in-training. We review the analysis, present the principles underlying the agenda, and then present the specific agenda items, which fall into two categories:

Overarching principles for how to approach the teacher shortage problem

- **Understand that the teacher shortage is caused by multiple factors and thus can only be tackled with a comprehensive set of long-term solutions.**
- **Understand that the complexity of the challenge calls for coordinated efforts of multiple stakeholders.**
- **Increase public investments in education.**
- **Treat teachers as professionals and teaching as a profession.**

Specific proposals in the policy agenda to address the teacher shortage

- **Raise teacher pay to attract new teachers and keep teachers in their schools and the profession.**
- **Elevate teacher voice, and nurture stronger learning communities to increase teachers' influence and sense of belonging.**
- **Lower the barriers to teaching that affect teachers' ability to do their jobs and their morale.**
- **Design professional supports that strengthen teachers' sense of purpose, career development, and effectiveness.**

The need for an agenda: A review of the size and scope of the shortage and the factors behind it

■ **The teacher shortage is large, growing, and worse than we thought.**

Assessing the teacher shortage must go beyond counting positions we are unable to fill in a given school year. We must also look at 1) the shares of teachers who lack the credentials associated with highly effective teaching, 2) the little to no progress in reducing those shares over time, and 3) the larger shares of such teachers in high-poverty schools relative to low-poverty schools. When we factor in all these aspects, we see that the shortage is worse than we thought.

■ **The shortage is a complex problem that is driven by many factors.**

There are multiple factors driving teachers to leave the profession and dissuading people from entering the profession. These factors include low relative pay, poor working environments, uneven or absent opportunities to grow professionally, and the weak prestige of teaching.

■ **The shortage isn't just a crisis for the teaching profession. It undermines our education system's mandate to provide an excellent education equitably to all students regardless of their socioeconomic status or demographic characteristics.**

—The teacher shortage impedes student learning. And because the teacher shortage has a greater impact on high-poverty schools, it exacerbates existing opportunity and achievement gaps driven by underfunding, concentrated poverty, and inequality of resources.

—Underfunding and poverty also fuel the teacher shortage—if we had a

properly resourced system, we wouldn't suffer as much of a shortage.

■ **The shortage will likely persist and could worsen without intervention.**

—The factors driving teacher attrition and recruitment challenges will likely persist or even worsen in the absence of sound policy interventions and a shift toward valuing the teaching profession.

—Other trends appear likely to put upward pressure on the demand for teachers. For example, the student population is expected to increase but states are still trying to reduce class size to return student-per-teacher ratios to pre-recession levels (with the pressure to downsize spurred by evidence that smaller class sizes boost performance). And on the supply side, larger shares of teachers are reaching retirement age, which will create vacancies that must be filled.

The teacher shortage in the nation's public schools is an increasingly recognized but still poorly understood crisis. Much attention has focused on the size of the shortage (about 110,000 teachers in the 2017–2018 school year, by one estimate), its monetary costs, and some of its negative effects on students and teachers.¹ But the full size of the teacher shortage when accounting for credentials, the multiple causes of the teacher shortage, and the unequal distribution of the shortage across low- and high-poverty schools had received less scrutiny. In 2019, EPI published the “Perfect Storm in the Teacher Labor Market” series of reports examining the full magnitude of the teacher shortage and the working conditions and other factors that contribute to the shortage. In the series, we looked at public schools overall, and compared trends and conditions in low- and high-poverty schools.² We found a sizable and in some cases growing share of teachers without the teaching credentials associated with being a highly effective teacher, and even higher shares of teachers without these credentials in high-poverty schools.³ We traced the struggle to adequately staff schools to high turnover and attrition and to a sharp drop in the number of people on track to pursue a career in teaching.⁴ And we identified a number of factors that are prompting teachers to quit and dissuading people from entering the profession, including low relative pay, safety hazards and other challenging aspects of the school environment, a lack of respect for teachers' knowledge and judgment, and uneven access to useful types of professional development.⁵ We found turnover and attrition a bigger problem in high-poverty schools than in low-poverty schools.⁶ The higher turnover and attrition in high-poverty schools is perhaps not surprising given that shares of teachers reporting difficult working conditions were higher in high-poverty schools than in low-poverty schools.⁷

As the series warned, the teacher shortage isn't just a sudden, intense, and increasing decoupling of the number of new teachers needed in our public schools and the number available to be hired each year since 2013. The shortage of teachers is a crisis for the teaching profession, and a serious problem for the entire education system. It harms students, teachers, and the public education system as a whole. It deters student learning, reduces teachers' effectiveness, consumes economic resources that could be better

deployed elsewhere, and makes it more difficult to build a solid reputation for teaching and thus to professionalize it, which further contributes to perpetuating the shortage. Finally, the uneven distribution of highly qualified teachers across low- and high-poverty schools impedes the goal of providing a sound education equitably to all children in the United States. The greater shortage of teachers in high-poverty schools contributes to the opportunity and achievement gaps that plague our system as a result of underfunding, poverty, and inequality. The series, and a summary of its findings, are available on the Economic Policy Institute’s Teacher Shortage page, <https://www.epi.org/research/teacher-shortages/>.⁸

This is the sixth and final report in the “Perfect Storm in the Teacher Labor Market” series, and it presents a policy agenda to confront the teacher shortage—including closing the gaps in access to sufficient, highly qualified teachers across schools. It addresses the factors we identified in the series as well as other specific or underlying factors that our past research and understanding of the issue tell us are important, such as lack of a properly resourced system, the lack of a diverse teaching workforce, student loan debt payments burdening teachers, and the uneven effectiveness of initiatives for beginning teachers.

But, admittedly, reaching an equilibrium between the number of teachers available and the number of teaching positions to fill in a given year is a complicated process. None of the factors or conditions that affect supply and demand for teachers operate in isolation, and they are likely to change, at any time, due to myriad reasons. Despite this fact, we do know that some of the factors that create a need for new teachers are only going to increase in the years ahead. For one, the expected enrollment in public and secondary schools is expected to increase by close to a million students between 2019 and 2028.⁹ Student-to-teacher ratios, another quality indicator, have shown a decline when long-term trends are examined, but are still not below the pre-Great-Recession parameters in the aggregate and in many states, and are substantially larger in public schools than in private schools (NCES 2019c; Hussar and Bailey 2020). And quality arguments would, if anything, recommend smaller class sizes (Chetty et al. 2011; Mishel and Rothstein 2002). Demand for teachers is also spurred by the need to hire specialized teachers who can provide instruction in changing content areas and competencies. Finally, the teaching workforce is aging, which adds to demand by increasing the number of teacher vacancies while shrinking supply (the number of teachers available for rehire) (Ingersoll et al. 2018).¹⁰

Unless decisive action is taken, the realities indicate that the teacher shortage crisis will potentially turn into a new perpetual ill of the educational system, leaving students, schools, and the education system as a whole behind where they need to be. This set of policy recommendations would also make teaching a more attractive career and make possible a shift in how we see and treat the teaching profession.

The policy agenda

The policy agenda to confront the teacher shortage while closing the gaps in access to highly credentialed teachers by school poverty has two components: a set of four

foundational recommendations for how to approach the problem in a way that will actually solve it, followed by specific policies that, if implemented together, could go a long way toward solving the teacher shortage crisis.

This collective set of policies would improve the working conditions and other factors that have diminished the appeal of teaching as a career. In addition, the policies in this agenda that treat teaching as a true profession could help nudge a societal and political shift reinstating the prestige of the profession, a profession only partially respected: While people say they highly value public schools and have fond memories of the impact teachers have had in their lives, a record low of 46% of those polled said they would like their child to become a teacher (PDK 2018).

Overarching principles for how to approach the teacher shortage problem

The success of the specific policies in the proposed agenda to tackle the teacher shortage hinge on four key overarching system-level recommendations. These overarching recommendations have to do with how to approach the problem from the outset. We make a distinction between the overarching and the specific recommendations for the following two reasons. First, because the teacher shortage problem is profoundly shaped by the broad education context, recommendations that tackle the broad context also tackle the drivers of the shortage. Second, recommendations that tackle the broad context would if fully implemented make the specific recommendations easier to implement, and, in some aspects, even unnecessary. If, as our overarching recommendations suggest, we address the challenges that threaten equity and excellence in our education system, treat teachers as professionals, get all stakeholders involved, and tackle the issues with a set of comprehensive long-term solutions, then factors such as worsened conditions in high-poverty schools or a lack of useful professional development would take care of themselves.¹¹ These overarching recommendations are discussed in detail below.

- **Understand that the teacher shortage is caused by multiple factors and thus can be tackled only with a comprehensive set of long-term solutions.**
 - Address *all* of the factors behind the shortage.
 - Pursue solutions that are comprehensive and long-term—not reactive, one-shot “fixes.”
 - Recognize that if this long-term and comprehensive approach is not taken, the fundamental problems will persist.
- **Understand that the complexity of the challenge calls for coordinated efforts of multiple stakeholders.**
 - Acknowledge that the factors fueling the teacher shortage also affect teachers’ ability to do their jobs effectively, and this barrier to teacher effectiveness impedes children’s success.

—Enlist unions, school boards, parent-teacher associations, national education associations (of superintendents, teachers, principals, etc.), and other institutions that help shape working conditions, pay, and professional development opportunities for teachers in reforms and coordinate their efforts.

■ **Increase public investments in education.**

—Increase public funding for education enough to address the lack of resources contributing to the teacher shortage while also addressing longstanding concerns about outdated facilities and inadequate supplies. Increasing investment in the system overall will demonstrate that society does value teaching.

—Boost funding even more in high-poverty schools, where the teacher shortage is more acute. The inequities in resources in these schools not only make it harder to attract and retain highly credentialed teachers, they also exacerbate socioeconomic gaps in student performance.

—Make targeted investments that directly address specific causes of the teacher shortage, like low teacher pay.

■ **Treat teachers as professionals and teaching as a profession.**

—Listen to what teachers say, know, and need.

—Elevate the status of teaching as a profession.

Understand that the teacher shortage is caused by multiple factors and thus can be tackled only with a comprehensive set of long-term solutions

In public policy and media spheres, single “magic remedies” to U.S. education challenges sometimes gain traction, with their appeal of easy—and fast—solutions. But while well-intentioned short-term remedies may temporarily ameliorate some of the conditions that lead to the teacher shortage crisis, the benefits of these quick fixes will be short-lived and not at the scale of the problem.¹² A lasting, sufficient response to the teacher shortage thus requires a systemic policy strategy tackling multiple underlying, interdependent causes simultaneously. Specifically, we are referring to low relative teacher pay and compensation, teachers lack of say in how they do their jobs, difficult working environments (“school climates”), and lagging professional supports.

Note, however, that this list of components in our policy strategy is likely not exhaustive. Not addressed here are other drivers that we lack the data to assess or for which there are not yet evidence-based policy solutions that we can build upon.¹³ All these explored and unexplored factors are interrelated, and all reflect and respond to the context in which they occur. This is the nature of the problem and the realities states and school districts encounter.¹⁴ Thus, although our analysis of the data and learnings from other research provide a substantial understanding of the problem, we acknowledge that our agenda is

limited by the absence of complete data or experimental evidence on some factors that play a role in the teacher shortage. We call for continued research on the problem, including controlled experiments to test the effectiveness of policy solutions and the use of a comprehensive look of all the factors at play. We also strongly urge researchers and policymakers scrutinizing teacher labor markets and the drivers of the shortages to use the quality and equity framework used in our series so that we can protect and improve the equity and excellence in our education system.

Understand that the complexity of the challenge calls for coordinated efforts of multiple stakeholders

As noted, policy solutions to address the teacher shortage must be comprehensive and long term. Adding to the complexity of the challenge, redressing these longstanding and multifaceted problems that impede children’s success and teachers’ ability to do their jobs effectively will require that stakeholders at all decision-making levels—schools and districts in local communities, states, and even federal entities—coordinate their efforts.

Both research and practice tell us that many institutions beyond schools and school districts—such as states, parent-teacher associations, school boards, and unions—play a role in shaping the overall status of teachers and their working conditions. This underscores the importance of aligning all the institutions that need to work together to address the teacher shortage.¹⁵

Increase public investments in education

Insufficient school funding is a well-documented problem that affects everything from the state of school facilities to student performance—and is a particular problem in high-poverty schools.¹⁶ With regard to the teacher shortage, the lack of funding is evident in many of the factors that contribute to teacher attrition and the declining attractiveness of teaching, such as low pay relative to other college-educated professionals, challenging working conditions, and inadequate professional development. Thus boosting funding overall is a foundational step: At the very least we must bring funding up to a basic, adequate level to educate children to the levels desired and to meet growing needs in our schools. Furthermore, funding needs to be progressive—greater for high-poverty schools so that resources are equitable (i.e., given the current inequities, the highest-poverty districts need more resources in order to deliver a sound education to all their students).¹⁷

In addition, we need specific investments that directly address all the specific causes of the teacher shortage, like low teacher pay and challenging working conditions. In summary, better-funded systems overall would make the profession more attractive and supportive of teaching and learning. Society claims that teachers are incredibly important and yet when it comes to investing in teachers and education our actions don’t match our professed values. Increasing the investment in the system overall will demonstrate that society does value teaching.

Treat teachers as professionals and teaching as a

profession

As a society we claim—and policymakers often grant—that teachers are professionals, but the ways we treat them indicate otherwise. The prestige of the profession is questionable (PDK 2018) and teachers’ voices are often ignored. Generally, professionals’ voices are central in key decisions regarding how they do their work, the kinds of supports they need to do it well, or their interactions and relationships with peers and supervisors. As described below, none of these is true with respect to teachers.

Teachers report being frustrated, demoralized, and dissatisfied due to the combination of underfunding, challenging working environments (described in García and Weiss 2019d and summarized below), disrespect for their profession, and generalized distrust between teachers and administrators (Weingarten 2019; Schultz 2019). Little respect for teachers’ professional judgement and consideration for their knowledge is a problem across the board. Teachers don’t feel supported and valued: According to a recent survey of public school teachers, just 10% say they feel they’re valued a great deal, whereas 42% say their community values them a good amount and 48% say they feel valued either “just some” or a little or not at all (PDK 2019). Our data showed that teachers’ voices are systematically missing in decisions around their own working conditions. Specifically, our analysis in the Perfect Storm series looked at what teachers reported about their situations and found that the following are factors in the teacher shortage: A lack of teacher influence and autonomy, poor learning communities (i.e., environments in which teachers have little opportunity to learn from one another or through professional development activities), and low satisfaction with working conditions and appreciation for the profession. We compared teachers who had quit the profession by the time of a follow-up survey with those who had stayed and found that among teachers who quit, larger shares lacked influence over school policy or the activities, routines, and rules that take place in their classrooms, and were not fully satisfied with teaching at the schools—with gaps ranging from 3 to 17 percentage points. We also showed that larger shares of teachers who quit worked in less cooperative environments (without a great deal of cooperation among staff members), and said they did not get strong support or encouragement from the administration (García and Weiss 2019d, 2019e).

Puzzlingly, though these issues of teacher say were a clear factor in the teacher shortage, it is hard to find other research or policy papers on teacher retention or recruiting that have explicitly looked at the importance of giving teachers a voice.¹⁸

In short, teachers do not feel treated as the professionals they are, and policies don’t reflect a high value placed on teaching, which further reduces the prestige of teaching and impedes the professionalization of teaching. Overall, then, the recommendation is simply to stop doing what we are doing wrong and put in place the steps needed to treat teachers as true professionals.

To illustrate the point that teachers are not treated as professionals, we can look to physicians as an example. We do not expect a new medical school graduate to march into the operating room and be in charge of a full procedure. This is not because we do not value medical school or doubt the ability of a new doctor, but because we recognize that it

takes many years of hands-on training, peer-to-peer and veteran mentoring, and ongoing professional training to be fully prepared. Yet many teachers go right into classrooms, often ones in which students have multiple unmet needs, with little on-the-ground training or support, and are judged based on their performance in those circumstances.

Taking the legal and judicial professions as further examples: Lawyers and judges find that their views and judgments are respected and that their profession is accorded a great deal of prestige. Yet many teachers find their judgment is ignored when it comes to making decisions on the priorities, practices, tools, and other features of daily classroom work.

The status of university professors provides another example: They keep up with the changing needs and nature of their profession by participating in continuous training and accessing new career opportunities. In contrast, K–12 teachers are told what types of professional supports they will receive, and when and how they receive them (“professional development [is] done to the teachers, not with them” as noted in Ferlazzo 2018), and often face incentive systems and schedule limitations that push them to compete rather than to collaborate.

This overall change in the way we view and treat teachers would make many of the specific policy and practice recommendations outlined in the next section either much easier to implement or, in some cases, unnecessary because the problems they seek to fix would cease to exist.

Specific proposals in the comprehensive policy agenda to address the teacher shortage

In what follows, we focus on specific policies designed to tackle the underlying factors that drive the teacher shortage, as described in the previous installments of the “Perfect Storm in the Teacher Labor Market” series.

As noted earlier, all components—low relative teacher pay and compensation, teachers’ lack of say in how they do their jobs, difficult working environments (“school climates”), and lagging professional supports—are interrelated and all need to be addressed. Given the likely difficulty of addressing all the factors at once, the proposals detailed below will likely need to be implemented incrementally. Policymakers who must make difficult choices should prioritize first steps based on the unique circumstances of their states, districts, and schools. But it is important to remember that the teacher shortage has great costs and thus that not moving forward on this agenda to address the teacher shortage would incur even greater costs for schools, students, communities, and the nation as a whole.¹⁹

Raise teacher pay to attract new teachers and keep teachers in their schools and the profession



- **Increase teacher base pay across the board.**
 - Raise teacher base salaries to make teaching more attractive as a profession for potential new teachers and to encourage current teachers to stay.
 - Close the teacher pay gap (the gap between what teachers make and what similarly educated professionals make) to ensure that teaching is no longer underpaid relative to comparable occupations.
- **Enact higher increases to teacher base pay in high-poverty schools.**
 - Enact targeted pay raises to close substantial gaps between salaries in high- and low-poverty schools.
- **Adequately fund pension benefits and remove obstacles to accessing them.**
- **Consider programs that reduce the major financial burdens that are barriers to entering and staying in the teaching profession.**
- **Acknowledge and take steps to address other financial burdens that arise when teachers in under-resourced schools must take on safety net roles.**

One concrete reason why teachers are leaving the profession and why fewer people are interested in becoming teachers is low pay, in both absolute and relative terms. In 2018, average teacher wages adjusted for inflation were lower than they were in 1996 and the average teacher earned 13.1% less in wages and benefits than other comparable college graduates, a pay gap that had grown substantially from 1993, when teachers earned just 2.9% less (Allegretto and Mishel 2019).²⁰ Teacher salaries have been described as too low “to support a middle-class existence” (Podolsky et al. 2016), and, depending on family size, may put teacher heads of household below the income threshold to receive public subsidies.²¹

Another indicator that low teacher pay is a source of financial distress is the growing share of teachers who are taking second jobs, on top of their full-time jobs at school (59.0% took on additional work in the 2015–2016 school year, up from 55.6% in 2011–2012). For these teachers, moonlighting during the school year brings in on average \$4,100, making up 7.0% of their combined base salary and moonlighting income (García and Weiss 2019c). News reports attribute moonlighting to teachers’ need to supplement their income.²²

The total teacher pay penalty is even greater for teachers in high-poverty schools.²³ Relative to teachers in low-poverty schools, teachers in high-poverty schools are paid about 10% less (teachers in low-poverty schools are paid \$53,300 vs. \$58,900), and also earn slightly less from moonlighting (\$4,000 vs. \$4,300) (García and Weiss 2019c).

Among individuals taking a college entrance examination, low salaries for teachers is the most often cited reason for a lack of interest in teaching (Croft, Guffy, and Vitale 2018). Parents, too, cite low teacher pay as a concern: They say that despite their continued respect for the profession, they would not want their children to become teachers, given

the low pay (PDK 2018).

In addition to affecting recruitment and retention, low pay affects the relative qualifications of the teaching workforce.²⁴ Research has shown how lower pay can reduce the share of highly credentialed teachers in schools by changing both who applies to become a teacher and who stays in the profession.²⁵

The following reforms aim to increase teacher pay in a way that will strengthen recruitment and retention—particularly in high-poverty schools. Each reform listed below is necessary because it plays a specific role in addressing the challenges associated with compensation.

1) Increase teacher base pay across the board

At the outset, strengthening base salaries by giving every teacher a flat increase would help close the gap in pay between teachers and their peers in other professions, keep more teachers in the school and in the profession, and strengthen the credentials of the teaching workforce.²⁶ In fact, our regression analysis using the teacher salary information in García and Weiss 2019c shows that higher salaries correlate with increased teacher retention (see **Appendix Table 1**). We find that a \$1,000 increase in a teacher's base salary is associated with a 0.4 percentage-point increase in the probability of that teacher staying in the same school and with a 0.3 percentage-point increase in the probability of that teacher staying in teaching. These associations are modest, but any proposed increase in teacher base salary is likely to be much larger than \$1,000 (a \$1,000 increase would represent less than 2% of the average public school teacher salary in 2015). As our research also shows, increases have larger effects at lower levels of base salary: i.e., increases would be particularly helpful in keeping novice teachers in schools long enough to gain critical experience, and to retain teachers in high-poverty schools where teacher salaries are lower and the shortages are the most acute.

Moreover, in addition to their positive effects on recruitment and retention, higher salaries could strengthen the workforce's credentials and potentially help diversify the workforce. Higher salaries would provide incoming teachers from traditionally underrepresented groups, and those who take on substantial student debt to finance their bachelor's degree, with a career option that is financially more attractive and that will enable them to more easily pay off that student debt.²⁷

2) Enact higher increases to teacher base pay in high-poverty schools

Due in large part to a heavily local public education funding system that channels more money into districts serving children from higher-income families, teachers in high-poverty schools face a double disadvantage: They are not only paid less than comparable workers in nonteaching jobs (Allegretto and Mishel 2019; Allegretto 2019), but also are paid, on average about \$5,600 less than teachers in low-poverty schools—a gap representing close to 10% of teachers' base salary in 2015–2016 (García and Weiss 2019c). Because across-the-board raises would thus still leave teachers in high-poverty schools worse off, on average, relative to teachers in low-poverty schools, additional, targeted raises are

needed to equalize salaries across high- and low-poverty school districts.

Other targeted raises—such as compensation for teachers who teach in high-poverty schools or a rural school or choose to teach math—would help address teacher shortages in specific settings or for specific subjects. Such increases for teachers who meet certain criteria would not eliminate the teaching pay penalty (only a generalized increase can) but could—especially in the short run—be seen as a first step²⁸ to increasing the attractiveness of teaching in contexts in which the shortages are most worrisome.²⁹ These kinds of targeted raises could still help strengthen collaboration and other aspects of the teacher workforce in a way that merit pay increases and other incentives-based strategies do not.³⁰

3) Adequately fund pension benefits and remove obstacles to accessing them

Pensions have been a critical factor in both attracting teachers to the profession and retaining them as teachers, and to improving their retirement security (Morrissey 2017; Keefe 2018; Rhee and Joyner 2019). But there are hurdles to accessing these benefits—including portability across states (Rhee and Joyner 2019), cuts during the last recession (Doherty, Jacobs, and Madden 2012), and more general underfunding (Pew 2019)—which diminish their positive contribution to teachers' total compensation and teacher retention (Morrissey 2017).

It is important to readdress the changing needs of the current pension systems, and move away from misguided descriptions of their burden, generosity, and coverage.³¹ In order for the existing pension system “to serve the goals of attracting and retaining teachers, promoting orderly retirement, and providing retirement security” we must safeguard them by ensuring transparency and adequate investments, and by removing obstacles to portability and vesting (Morrissey 2017).

4) Consider programs that reduce the major financial burdens that are barriers to entering and staying in the teaching profession

By increasing teachers' capacity to repay their student debts and handle other expenses, higher salaries would address key barriers to entering and remaining in the teaching profession. Other policies that address major expenses burdening teachers financially are also worth consideration, particularly if designed to help teachers that make a long-term commitment to the profession.³²

Given the high cost of quality teacher preparation programs, initiatives such as service scholarships and student loan forgiveness programs can support recruitment. Indeed, the majority of states have established some sort of service scholarship and/or loan forgiveness program. These programs “underwrite the cost of teacher preparation in exchange for a number of years of service in the profession. Research has found that effective service scholarship and loan forgiveness programs leverage greater recruitment into professional fields and locations where individuals are needed, and support retention” (Espinoza et al. 2018).

Research assessing such programs, which have long been supported by federal and state governments, shows them to be effective in attracting and preparing candidates to meet the demand for teachers in certain settings (Podolsky and Kini 2016; Podolsky et al. 2019; Feng and Sass 2015).³³ Effective program models emphasize preparation, offer a sufficiently substantial award (i.e., covering all or a large percentage of a student teacher’s tuition), target high-need fields and/or locations, recruit and select candidates who are academically strong and committed to teaching, encourage recipients to teach for a number of years (i.e., the financial consequences if recipients do not fulfill their commitment are strong but not so punitive that students avoid the scholarship entirely), and are bureaucratically manageable for participating teachers, districts, and higher education institutions (Podolsky et al. 2019).

A recent initiative designed to increase the number of teachers in officially designated “TSAs” (i.e., teacher shortage areas) is the TEACH grant, which offers \$4,000 per year to undergraduate and graduate students who enroll in coursework to become a teacher in a high-need field and commit to teach for at least four years (Barkowski et al. 2018).³⁴ Nearly one in five TEACH grant recipients said that the grant was very influential in their decision to pursue teaching as a career, and almost a quarter, 23%, said the grant strongly influenced their decision to pursue teaching in a high-need field at a high-need school.³⁵

One recent legislative proposal to extend loan forgiveness to teachers is the Supporting the Teaching Profession Through Revitalizing Investments in Valuable Educators (STRIVE) Act, which would provide incremental loan forgiveness each year to public school teachers who teach in low-income schools, and cancel student loans completely after seven years. The STRIVE Act, which was introduced by Sen. Cory Booker (D-NJ), “would be retroactive, so current teachers who have been teaching for at least seven years would also have their loans canceled.” (Booker 2019). A number of initiatives—designed not to expire—that complement national-level initiatives such as the Perkins Loan Forgiveness and Teacher Loan Forgiveness programs have been implemented in Connecticut, Illinois, Oklahoma, Tennessee, Virginia, Washington, and Wisconsin (American Federation of Teachers 2019).

A non-exhaustive look at some initiatives implemented or underway reveals several types of housing-related interventions. For example, in many locations, especially cities, high housing costs and the lack of available affordable housing make teaching even more burdensome and unattractive. Local initiatives in Massachusetts and New Jersey offer reduced interest rates, or fixed rates, and 100% financing for teacher and other municipal employee homebuyers (Cisneros et al. 2007). In states such as Mississippi, Illinois, and Maryland, teachers who commit to teaching for a number of years are offered grants to cover a down payment, closing costs, mortgage insurance, or prepaid items for buying a home. In rare cases, where the lack of housing is particularly severe, districts have built dedicated housing for teachers, including in McDowell County, West Virginia, and several locations in California (Balingit 2019; Picchi 2019; Lambert and Willis 2019; and Richards and Wynn 2019).

5) Acknowledge and take steps to address other financial burdens that arise when teachers in under-resourced schools must take on

safety net roles

In some districts, teachers are increasingly called on to serve as first responders when it comes to children’s basic needs, whether it is connecting them up with laundry services or a place to shower (Weiss and Reville 2019; Kirp 2019; Da Costa 2019). That generosity extended by teachers includes filling the gap when schools, districts, and states fail to provide all the needed educational goods. The nation’s K–12 public school teachers personally spend, on average, \$459 annually on school supplies for which the overwhelming majority—more than nine out of ten—will not be reimbursed (García 2019).³⁶

Spending on school supplies and students’ basic needs can be considered a (negative) component of the total compensation package. In addition to addressing the inequitable funding system and adequately budgeting for all expenses, districts should ensure that teacher salaries are not further diminished by out-of-pocket expenses they should not be expected to incur.

Elevate teacher voice, and nurture stronger learning communities to increase teachers’ influence and sense of belonging

- **Increase teacher autonomy and influence.**
—Ensure that teachers have a say in the curriculum they teach, the classroom practices they follow, and the materials they use.
- **Nurture stronger learning communities through acknowledging and fostering teacher collaboration.**

Teacher influence, autonomy, and the role of teachers in creating learning communities play a key role in the teacher shortage. Comparing teachers who stay in their schools with teachers who quit the profession, we found that larger shares of those who quit reported that cooperation among staff was not great, said they lacked influence over school policy or what takes place in their classrooms, and said that they were not fully satisfied with teaching at the schools than among teachers who stayed, with gaps ranging from 3 to 17 percentage points. We also showed that larger shares of teachers who quit said there was not a great deal of cooperative effort among staff members and said they did not feel strongly supported by the school’s administration (García and Weiss 2019d and 2019e).

The two recommendations that follow seek to address the lack of consideration and respect for teachers’ voices that discourage teachers from remaining in the profession. It is important to note that giving teachers a greater say and increasing cooperation among teachers are also foundational to establishing positive working environments and enhancing professional development, which are addressed in subsequent sections of this report. The fact that the factors behind the teacher shortage straddle several policy buckets underscores our argument that the factors are so closely associated and

interwoven that they must all be addressed comprehensively.

1) Increase teacher autonomy and influence

Our analyses showed that only small shares of teachers report having a great deal of influence or control over school policy. A scant 3.2%, for example, report having a great deal of influence over how teachers are evaluated; only 5.3% have a great deal of influence in hiring new teachers; and only 8.9% have a great deal of influence setting discipline policy. The shares of teachers reporting a great deal of influence setting performance standards for students or establishing the curriculum are higher, but at 17.6% and 20.4% respectively, still are at or under one in five (García and Weiss 2019d). This alone should put those concerned about teachers on notice: setting the curriculum is among the most fundamental responsibilities of teachers, and the fact that four in five lack such authority speaks volumes about how much teachers' voices have been ignored.

Although teachers report much more influence in individual classroom planning and teaching than on schoolwide policies, they still indicate a surprisingly low level of control over their daily activities. The shares of teachers who report a great deal of control is 61.2% when it comes to evaluating and grading students and is 68.3% when it comes to assigning the amount of homework. Again, the fact that these shares are not closer to 100% is certainly surprising. Also concerning is the much lower share (under 30%) of teachers who report a great deal of control selecting textbooks and other instructional materials and selecting topics and skills to be taught. And just 11.1% of teachers report having a great deal of influence in determining the content of professional development programs (García and Weiss 2019d). All these findings from García and Weiss 2019d indicate very low regard for teachers' knowledge and judgment. Teachers sense that they are not treated as professionals, and their increasing exit from education should thus come as no surprise. All of these findings point to the need for urgent and comprehensive changes to how we treat teachers and support their profession.

Given this feedback, a comprehensive strategy to address the teacher shortage must ensure that teachers have a say in the components of teaching that they are trained to master and that shape their daily activities and their professional lives. These components include the curriculum they teach, the classroom practices they follow, and the materials they use with their students, as well as the type of professional development they participate in. Their expertise should also be tapped when decisions about school policies are made: Research has pointed to the need for efforts to retain more experienced teachers by giving them "shared decision-making roles" (Sorensen and Ladd 2020). Top-down policies that ignore teacher expertise, misguided accountability policies that make teachers feel disrespected, and lack of attention to what teachers have to say about the policies in their schools and classrooms are critical obstacles in the way of the professionalism of the teaching profession.

The regression analyses included in **Appendix Table 2** confirm the practical and critical importance of giving teachers a greater voice. Reporting more influence on school policy and classroom activities is associated with an increase in the probability that a teacher stays at his or her school.³⁷ The effect of influence on a teacher's probability of staying is

higher in high-poverty schools than in low-poverty schools. As with cooperation and support (see below), measures of influence are among the largest predictors of retention.

2) Nurture stronger learning communities through acknowledging and fostering teacher collaboration

The majority of teachers are not working in the kinds of learning communities that would support their teaching and their career growth. The data from teacher surveys analyzed in García and Weiss 2019d clearly signal limited opportunities to cooperate and coordinate, and weak learning communities surrounding teachers. Less than half of teachers strongly agree that their administrations' behavior is supportive and encouraging (49.6%) or that there is a great deal of cooperative effort among the staff members (38.4%). One in 20 teachers (4.9%) say that the stress and disappointments involved in teaching are not worth it; more than one-fourth of teachers say they think about leaving teaching at some point (27.4%); nearly half express some level of dissatisfaction with being a teacher in their school (48.7%); and more than half say they are not certain that they would still become teachers if they could go back to college and make a decision again (57.5%).³⁸

School districts must heed this feedback and change policies and procedures to ensure that teachers have sufficient time for collaboration, cooperation, observation, and feedback. Peer learning opportunities must be incorporated into classroom and schoolwide operations. Teachers are more likely to stay in their schools and in the profession when they are satisfied with the school and its management. Quint (2011) emphasizes the idea of “a broader conception of teaching learning that involves all teachers in a school in a professional learning community that is engaged in a continuous and collegial cycle of learning, practice, reflection, and improvement.” These collaborative practices, if made systematic, would also serve as a way to build career ladders for teachers that leverage their experience and expertise.

The regression analyses included in Appendix Table 2 confirm the practical and critical importance of a more cooperative and supportive learning community. Reporting a greater level of cooperation and support is associated with an increase in the probability that a teacher stays at his or her school.³⁹ The effect of cooperation and support on a teacher's probability of staying is higher in high-poverty schools than in low-poverty schools. As we saw around the “influence index,” measures of cooperation and support are among the largest predictors of retention.

Lower the barriers to teaching that affect teachers' ability to do their jobs and their morale

- **Hire support personnel with the right qualifications to help mitigate barriers to teaching and learning.**
 - These barriers include students coming to school unprepared to learn,

hungry, and sick; parents whose life circumstances make it hard to engage in their children’s education and in school decision-making; and threats to teachers’ physical safety and mental health.

—With more specialized assistance and with increased supports and resources, schools and teachers would no longer have to act as “first responders” to our national crisis of child poverty and associated trauma.

—Reduced stress and improved safety keep teachers in the schools and in the profession.

■ **Revisit disciplinary policies.**

—More effective disciplinary policies that address the behavioral problems that, unattended, contribute to an unsafe physical and mental space for teaching and learning.

Another factor behind the exodus of teachers from the profession and the shrinking supply of future teachers is teachers’ working environments (or school climates). These difficult working environments reflect the poor funding systems and the lack of resources and supports available to students and schools (described above), as well as the lack of consideration for teachers’ professional judgment, disregard of teachers’ voices, and poor learning communities. These difficult school climates are byproducts of broader problematic societal forces—poverty, segregation, inequality, and insufficient public investments—that administrators and policymakers have failed to tackle. Rather than expecting educators, students, and families to bear the burden of the challenging conditions (described below), officials charged with overseeing these systems must assume responsibility for remaking school climates.⁴⁰ Among the factors that make school climates so challenging are widespread barriers to teaching and learning and extensive threats to teachers’ emotional well-being and physical safety.⁴¹ Students are coming to school unprepared to learn (as reported by 27.3% of teachers), and parents are struggling to be involved (as reported by 21.5% of teachers), conditions that are exacerbated by greater needs among our students and insufficient supports to them in schools and in their communities.⁴² Teachers report stress and a lack of safety. More than one in five teachers (21.8%) report that they have been threatened and one in eight (12.4%) say they have been physically attacked by a student at their current school (García and Weiss 2019d).⁴³

The recommendations that follow seek to address the challenging working conditions—many springing from a lack of investment in schools and communities, as well as in children and their families—that make it extremely difficult to persuade young people to choose teaching as a career and that discourage teachers from remaining in the profession.

1) Hire support personnel with the right qualifications to help mitigate barriers to teaching and learning

Often, teachers wear far too many hats over their main one as educators: they are asked

to be first responders, social workers, physicians, counselors, and nurses, especially when schools offer insufficient numbers of these professionals. Several interconnected interventions are needed to meet children’s needs so that so much does not fall on teachers and add to the difficulties they have doing their jobs. These supports include investing in more counselors, nurses, librarians, and paraprofessionals, all of whom make schools healthier, more enriching places, and reduce behavioral issues (see below); and investing in strategies to meaningfully engage parents and families.⁴⁴ Before entering education professions and while on the job, administrators, teachers, and support personnel would benefit from receiving targeted training in trauma-informed practices, restorative practices, culturally responsive pedagogy, community schools strategies, or reflective discipline. School administrators can also play a significant role in promoting more positive school climate outcomes.⁴⁵

Mitigating the barriers to teaching and learning also requires ensuring the physical spaces are safe. School districts and policymakers must identify buildings with infrastructure problems that have led to unsafe or unhealthy schools and come up with plans for the necessary upgrades. Investing in these upgrades would enhance the working environments and would further minimize the shortage of teachers.⁴⁶

2) Revisit disciplinary policies

There are several reasons why student behavior problems may lead to tense relationships and even threats to teachers’ physical and mental health. Effectively reducing these problematic situations requires, first, understanding their drivers. For example, in some cases, children may act out due to trauma or toxic stress that originated outside of school. In other cases, the reactions and aggressions may result from children’s disengagement or disconnection from school. Each of the drivers demands a very different response.

In all cases, adequate supports for children will reduce unsafe episodes in school and make it much easier for teachers to teach and for children to learn effectively. In school, these supports include investments in school support personnel (mentioned above) and supportive policies. Evidence points to the efficacy of shifting from so-called zero-tolerance to preventive and supportive policies—“restorative” approaches such as peer mediation, group responsibility, and counseling that support and promote safe learning environments. Current disciplinary measures that focus mainly on punishing wrongdoing are unlikely to improve school climate. Rather, these measures should be rooted in schools’ ability to support and promote better behavior, and to prevent misbehavior, which are much more effective ways to keep teachers safe physically and emotionally (García and Weiss 2016; García 2014). In addition, shifting to restorative approaches benefits minority children because they are disproportionately more likely to be impacted by school disciplinary policies (RPWG 2014).

Sustained lack of attention to these realities has real consequences for teachers’ odds of staying in the profession (see summary in Katz 2018). The added analyses in **Appendix Table 3** also shows that facing higher stress and threats to safety, as measured by the “Stress and safety index,” decreases the probability that a teacher stays at her school a year later by about 4 percentage points overall, with greater reduction in high-poverty

schools than in low-poverty schools (columns 4-6).⁴⁷

Design professional supports that strengthen teachers' sense of purpose, career development, and effectiveness

- **Ensure that teachers have access to coherent, high-quality, lifelong systems of supports, and that they are engaged in designing these systems.**
 - Access means that not only do programs need to be available, but also teachers must have the time and resources to participate in them.
 - New teachers must have access to teacher mentoring and induction programs, and to teacher residencies.
 - Engage teachers in designing the professional development menu that is available.
- **Provide teachers with the option of meaningful second jobs that offer career advancement, not just survival.**

Teachers who receive strong professional supports will be more able to share their know-how, exert positive influence, and grow learning communities. But the systems of professional supports and development currently offered to teachers offer significant room for improvement. While some supports are broadly available, there are multiple weaknesses to address if we want to help teachers do their jobs better and advance in their careers (García and Weiss 2019e). Making the systems of supports effective and meaningful requires all of the following: that professional development opportunities are widely available early and during teachers' entire careers, that all teachers have financial resources and time allotted to participate, and that the opportunities are targeted to their particular needs and are of the necessary quality. One without the others will only lead to an unsatisfactory system of supports in need of further fixing.

On the positive side, large shares of first-year teachers work with a mentor (79.9%) and participate in teacher induction programs (72.7%), and the vast majority of teachers of all experience levels access certain types of professional development such as workshops or training sessions (91.9%) and activities focused on the subjects that teachers teach (85.1%) (García and Weiss 2019e). On the negative side, the seemingly widespread availability of basic professional development opportunities is negated by most teachers' inability to actually take advantage of them. Novice and veteran teachers largely do not have the time and resources they need to study, reflect, and prepare their practice. Only a minority of first-year teachers are released from classroom instruction to participate in support activities for new or beginning teachers (37.1%) or have aides to enhance classroom management and one-on-one attention for students (26.9%). Moreover, among all teachers, only half have released time from teaching to participate in professional development (50.9%), less than a third are reimbursed for conferences or workshop fees (28.2%) or receive a stipend for professional development accessed outside of regular

work hours (27.3%), and only one in 10 teachers (9.4%) receives full or partial reimbursement of college tuition.

Moreover, teachers have very limited access to the kinds of professional development that are highly valued and more effective: Just slightly over one-fourth of teachers attend university courses related to teaching and less than one-fourth serve as workshop presenters or make observational visits to other schools. And barely 1 in 10 teachers report having a great deal of influence in determining the content of professional development programs (11.1%).⁴⁸ This is in contrast with what teachers report wanting and with the norm in other professions—a more direct role in selecting the types of professional development offered and the content of that professional development (Quint 2011; Warner-Griffin, Cunningham, and Noel 2018; Schwartz 2019; Ingersoll and Collins 2018; OECD 2016, 2019). Given the critical importance of establishing a proper system of supports, we offer the following recommendations.

1) Ensure that teachers have access to coherent, high-quality, lifelong systems of supports, and that they are engaged in designing these systems

A proper system of professional supports—early career supports and meaningful continuous professional development—is key to profession-building and to effective teaching. Strong professional supports guided by educators enhance teachers’ practices, satisfaction, and sense of purpose; contribute to the professionalization of the teaching profession; and advance career development. In such a knowledge-based profession, in which the demands are constantly changing and teachers must continually adapt their knowledge and practice, adequate and effective professional development are critically important. All in all, adequate career supports elevate the prestige and appeal of teaching for novice and experienced teachers, and will thus help reduce the shortage of teachers.⁴⁹

Though there is a network for the provision of these supports in most schools, that network needs substantial improvement. The current system of supports must be made more coherent and purposeful, program quality must be improved, and teachers must have access to the resources that enable them to participate in the system of supports.

For novice teachers, the system of supports should ensure their early preparation and improve their adaptation to the profession and their schools in the first years.⁵⁰ One effective initiative for beginning teachers and teachers-in-training is a teacher residency (a program that provides new teachers with a year-long apprenticeship teaching alongside an expert mentor teacher).⁵¹ Also effective are mentoring and induction programs (programs in which the mentor offers orientation, useful knowledge, and skills to the mentee through modeling, feedback, and other support for the mentee).⁵² Residencies and mentoring and induction programs all combine to facilitate young teachers’ adaptation to the profession, foster cooperation and collegiality, and strengthen teachers’ professional knowledge and skills. These programs also would improve teacher retention: as our data show, the probability that teachers stay in the profession increases if teachers participate in teacher mentor or teacher induction programs.⁵³

Evaluations of teaching apprenticeships have demonstrated a positive influence on both the mentees and the mentors, as measured by the performance of their students, especially later in teachers' careers and especially in math (Goldhaber, Krieg, and Theobald 2018a and 2018b; Papay et al. 2016).⁵⁴ Existing residency programs shown to enhance retention, effectiveness, and teacher diversity include the Boston Teacher Residency,⁵⁵ the Denver Teacher Residency,⁵⁶ the San Francisco Teacher Residency Program, and teaching residency programs funded through the U.S. Department of Education's Teacher Quality Partnership grants program (Papay et al. 2012; Eisner et al. 2015; Guha, Hylar, and Darling-Hammond 2016; Silva, McKie, and Gleason 2015).

Throughout teachers' careers, continued professional learning and access to continuous preparation and to meaningful career ladder options are of critical importance.⁵⁷ Teachers must have resources (in both financial resources and time allotted to participate) and access to continuous training opportunities that are relevant and effective, and teachers should participate in determining the package of offerings.

Researchers note that effective professional development programs are content-focused, they support collaboration and job-embedded practice,⁵⁸ they are intensive and of sustained duration, they focus on discrete skill sets, they offer opportunities for feedback and reflection, and they are characterized by active learning and collaboration (Darling-Hammond, Hylar, and Gardner 2017; Kraft, Blazar, and Hogan 2018; OECD 2019).⁵⁹ Evidence also shows that curriculum development and lesson study, teacher research, teacher-led professional development (i.e., professional development that is more self-directed by teachers and more actively informed and overseen by them), and appraisal and feedback are key components of solid systems of professional supports (Darling-Hammond et al. 2017).⁶⁰ Across all of these programs, educators should provide crucial input in their design and be part of the solution.⁶¹

Our regression results also confirm how these systems of professional supports would substantially improve teacher retention rates, especially in high-poverty schools (**Appendix Table 5**). More resources (time and economic resources), more professional development, and being more satisfied with the professional development opportunities are associated with increased retention in the school (associations vary between about 2 to 5 percentage points, with generally larger coefficients for regressions run for high-poverty schools).⁶²

2) Provide teachers with the option of meaningful second jobs that offer career advancement, not just survival

Beyond accessing professional development programs, teachers can enhance their professional growth by taking on additional roles and responsibilities within the school system. These meaningful "second jobs" include mentoring or coaching other teachers, teaching evening classes, or leading teaching induction programs. (Note that while these activities do constitute an additional source of pay for teachers, they do not replace the need for stronger pay in the professions, and they are most relevant because they provide meaningful additional incentives to teachers and have a large set of positive repercussions.)⁶³ For example, more senior teachers can play leading roles in mentoring and induction programs. Reducing churn and increasing the number of experienced

teachers helps peer-to-peer mentoring and collaboration.⁶⁴ All of these within-school activities advance the positive professional development cycle described above; increased staff stability and the building of a more experienced workforce in turn improve the ability of the school to carry through on plans and medium-term strategies. At the core, lower turnover and attrition would thus help to not only build effective learning communities, but to make teaching a better respected and broadly valued profession.

Our regression results emphasize that teachers who work second jobs in their schools value the professional support and career- or profession-building aspect of those opportunities, and that these activities boost their retention (above and beyond the financial boost they provide). For example, we find positive retention effects of working inside the school system, and positive effects of the extra compensation received. For teacher retention, engaging in the activities seems to matter more than the amount of income received from the activities, particularly in high-poverty schools.⁶⁵ Thus when designing policy, it is important not to offer these activities as a substitute for raising salaries.⁶⁶

Conclusion

There is no question that the agenda that we have laid out is ambitious, but it is intentionally so.

The specific policy recommendations are designed to address, and sometimes, redress, the negative roles the different factors—low relative pay, the challenging school environment, the lack of respect and recognition for teachers’ knowledge and judgment, and uneven access to and resources for useful types of professional development—play in the teacher labor markets, and the severe, costly consequences the factors have in the education system. The overarching policy recommendations also address the context in which teachers operate and how to improve the context so that the teaching workforce crisis would lessen. The persistent inaction on this collective set of issues, accompanied by pressing needs for more (not less) teachers led up to a national teacher shortage crisis. We have shown during this series of reports that the teacher shortage crisis was “*worse than we thought*” not only because of the spiking shortage of highly qualified teachers, especially in high-poverty schools, but also because of the lack of attention and unacceptable inaction on the shortage and, more broadly, on public education.

This sixth and final report in our series is calling for immediate policy steps that are not only necessary but eminently doable. For one, several states and several peer nations have already implemented solid models for many of these steps, which could serve as model interventions in particular districts or states. Every school district and state is different but multiple examples show that we can take concepts and translate them into policy and action. In addition, we can expect that research, through more controlled experiments, and a broadened look at all factors prompting teachers to quit and dissuading people from entering the profession would provide further guidance informing additional policy steps for tackling the teacher shortage.

If this comprehensive policy agenda is followed, it would confront the teacher shortage in the nation’s public schools. Furthermore, in observation of the ongoing realities posed by the COVID-19 pandemic, the proposed agenda would strengthen the foundations and protections of our education system so that the next time we enter a crisis—in the system, in the country, or around the globe—our education system is in a “*better than we could have expected*” position to help children and educators emerge stronger.

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Elaine Weiss is the lead policy analyst for income security at the National Academy of Social Insurance, where she spearheads projects on Social Security, unemployment insurance, and workers’ compensation. Prior to her work at the academy, Weiss was the national coordinator for the Broader, Bolder Approach to Education (BBA), a campaign launched by the Economic Policy Institute, from 2011–2017. BBA promoted a comprehensive, evidence-based set of policies to allow all children to thrive in school and life. Weiss has authored and co-authored EPI and BBA reports on early achievement gaps and the flaws in market-oriented education reforms. She is co-author, with former Massachusetts Secretary of Education Paul Reville, of *Broader, Bolder, Better*, published by Harvard Education Press in 2019. Weiss came to BBA from the Pew Charitable Trusts, where she served as project manager for Pew’s Partnership for America’s Economic Success campaign. She has a Ph.D. in Public Policy from the George Washington University Trachtenberg School and a J.D. from Harvard Law School.

Acknowledgments

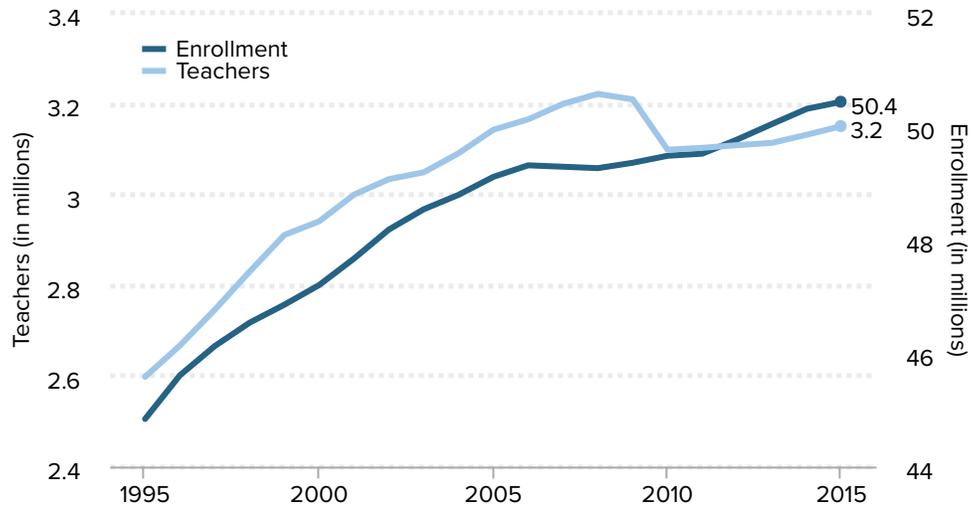
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Appendix tables

The need for more teachers to meet increasing enrollment continued

Public elementary and secondary teachers and student enrollment, 1995–2015

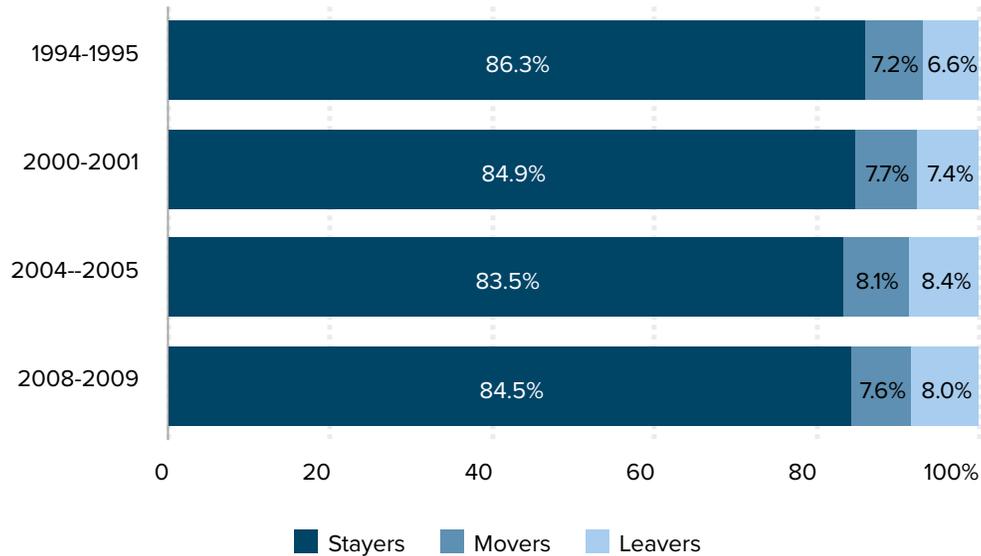


Source: Authors' analysis of NCES 2019c.

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The share of teachers who stay has slightly decreased over time while the shares who either switch schools or quit have slightly increased

Percentage distribution of public school teachers by stayer, mover, and leaver status, various years



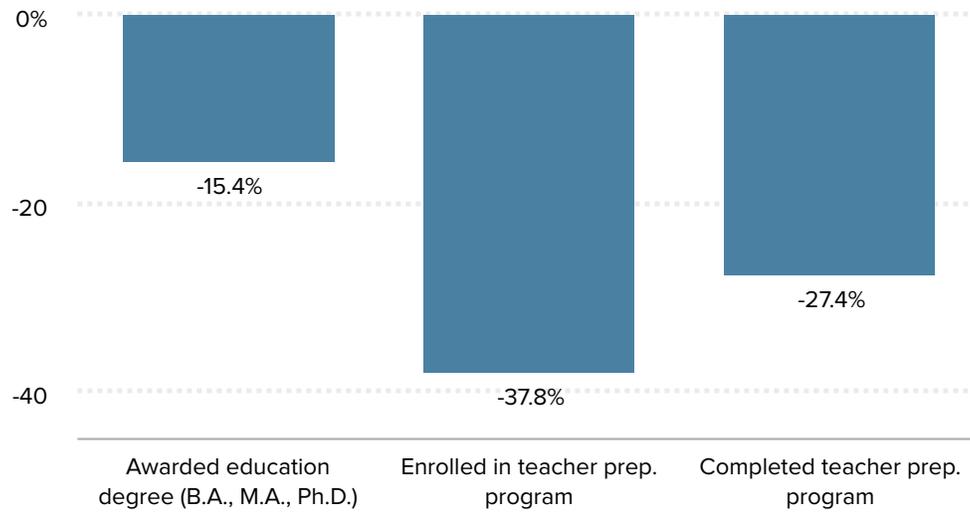
Note: "Stayers" are teachers who were teaching in the same school in the current school year (the year for which the survey was conducted) as in the previous year. "Movers" are teachers who were still teaching in the current school year but had moved to a different school after the previous year. "Leavers" are teachers who left the teaching profession after the previous year.

Source: Authors' analysis of NCES (various years).

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Fewer people are interested in teaching

Change in number of people awarded degrees in education, and enrolling in, or completing, teacher preparation programs from 2008–2009 to 2015–2016

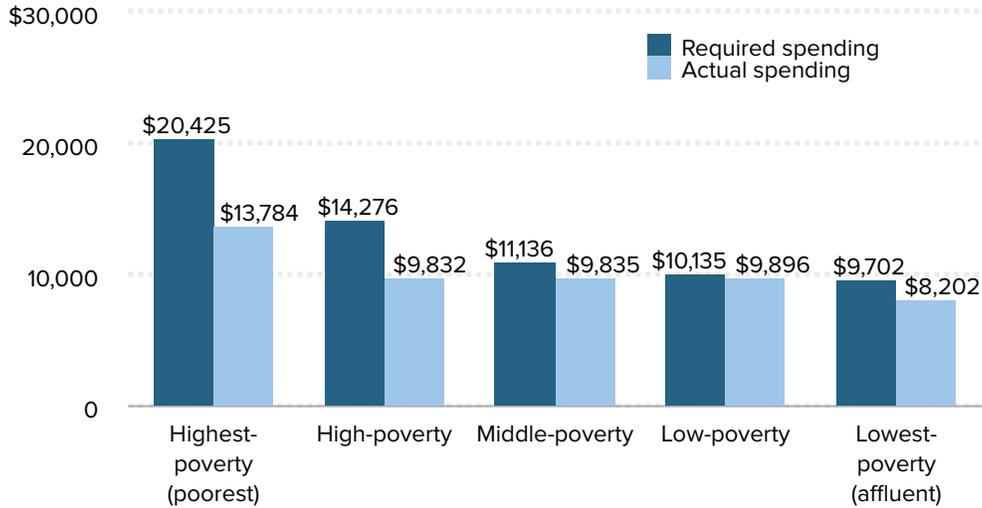


Source: *Digest of Education Statistics* (NCES 2018) and Higher Education Act Title II State Report Card System (U.S. Department of Education 2017a and 2017b).

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U.S. education spending is inadequate

Current per-pupil spending and predicted spending required to achieve national average test scores, by poverty quintile of school district, 2016



Notes: District poverty is measured as the percentage of children (ages 5–17) living in the district with family incomes below the federal poverty line using data from the U.S. Census Bureau. The figure shows the degree to which states and districts are allocating resources so that districts can achieve national average test scores, by level of poverty in the school districts. In moderate- and higher-poverty districts, the gaps between what is spent and what would be required to achieve at the national level are significant and increase with the level of poverty. In the middle group, districts are spending \$1,300 per student less than what would be required (about 88%). In the highest-poverty quintile, the gap exceeds \$6,600. This means that, on average, the highest-poverty districts are spending about one-third less than what they need to in order to deliver a sound education to their students.

Source: Reproduced from Baker, Di Carlo, and Weber 2019.

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Pay/moonlighting-related determinants of teachers staying at their school (relative to having quit or having moved to a different school) the year after initial survey

	Pay			Moonlighting		
	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty
<i>Base salary (in thousand)</i>	0.0043***	0.0087***	0.002			
<i>Base salary-squared (in thousand)</i>	-0.000***	-0.000***	0.000			
<i>Extra income from moonlighting (in thousand)</i>				-0.001	0.000	0.000
<i>Extra compensation for work in school system (coaching, mentoring teachers, etc.)</i>				0.036***	0.031**	0.040***
<i>Extra compensation based on student performance</i>				0.000	-0.034	0.009
<i>Extra compensation for work outside school system</i>				-0.022*	-0.033*	-0.018
<i>Extra compensation for work in school system</i>				0.014	0.013	0.014
Constant	0.688***	0.521***	0.800***	0.810***	0.794***	0.835***
Observations	33,100	8,800	13,000	33,100	8,800	13,000
R-squared	0.024	0.042	0.027	0.025	0.035	0.029

Note: Data are for teachers in public noncharter schools in the 2011–2012 Schools and Staffing Survey (SASS) whose status is known in the 2012–2013 Teacher Follow-up Survey (TFS). Base salaries and extra compensations are expressed in \$1,000. For those not receiving any compensation for the activities listed, the amount received is 0. A teacher is in a low-poverty school if less than 25% of the student body in his/her classroom is eligible for free or reduced-price lunch programs; a teacher is in a high-poverty school if 50% or more of the student body in his/her classroom is eligible for those programs. For statistical significance, *** denotes $p < 0.01$, ** denotes $p < 0.05$, and * denotes $p < 0.1$. Regressions control for credentials and state fixed effects.

Source: 2011–2012 Schools and Staffing Survey (SASS) and 2012–2013 Teacher Follow-up Survey (TFS) microdata from the U.S. Department of Education's National Center for Education Statistics (NCES 2011–2012, 2012–2013).

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Appendix
Table 2

Teacher-voices-related determinants of teachers staying at their school (relative to having quit or having moved to a different school) the year after initial survey

	Cooperation and support			Influence		
	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty
<i>Cooperation and support index</i>	0.045***	0.034**	0.056***			
<i>Influence index</i>				0.043***	0.023*	0.052***
<i>Constant</i>	0.818***	0.787***	0.858***	0.820***	0.794***	0.855***
<i>Observations</i>	33,100	8,800	13,000	33,100	8,800	13,000
<i>R-squared</i>	0.029	0.035	0.037	0.028	0.032	0.034

Note: Data are for teachers in public noncharter schools in the 2011–2012 Schools and Staffing Survey (SASS) whose status is known in the 2012–2013 Teacher Follow-up Survey (TFS). A teacher is in a low-poverty school if less than 25% of the student body in his/her classroom is eligible for free or reduced-price lunch programs; a teacher is in a high-poverty school if 50% or more of the student body in his/her classroom is eligible for those programs. For statistical significance, *** denotes $p < 0.01$, ** denotes $p < 0.05$, and * denotes $p < 0.1$. Regressions control for credentials and state fixed effects.

Source: 2011–2012 Schools and Staffing Survey (SASS) and 2012–2013 Teacher Follow-up Survey (TFS) microdata from the U.S. Department of Education's National Center for Education Statistics (NCES 2011–2012, 2012–2013).

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Appendix
Table 3

School-climate-related determinants of teachers staying at their school (relative to having quit or having moved to a different school) the year after initial survey

	Barriers index			Stress & safety index		
	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty
Barriers index	-0.018***	-0.009	-0.026***			
Stress & safety index				-0.042***	-0.036***	-0.047***
Constant	0.819***	0.792***	0.857***	0.819***	0.793***	0.852***
Observations	33,100	8,800	13,000	33,100	8,800	13,000
R-squared	0.024	0.031	0.029	0.029	0.035	0.035

Note: Data are for teachers in public noncharter schools in the 2011–2012 Schools and Staffing Survey (SASS) whose status is known in the 2012–2013 Teacher Follow-up Survey (TFS). A teacher is in a low-poverty school if less than 25% of the student body in his/her classroom is eligible for free or reduced-price lunch programs; a teacher is in a high-poverty school if 50% or more of the student body in his/her classroom is eligible for those programs. For statistical significance, *** denotes $p < 0.01$, ** denotes $p < 0.05$, and * denotes $p < 0.1$. Regressions control for credentials and state fixed effects.

Source: 2011–2012 Schools and Staffing Survey (SASS) and 2012–2013 Teacher Follow-up Survey (TFS) microdata from the U.S. Department of Education's National Center for Education Statistics (NCES 2011–2012, 2012–2013).

Economic Policy Institute

Early supports and preparedness-related determinants of teachers staying at their school (relative to having quit or having moved to a different school) the year after initial survey

	Teaching induction or mentoring			Early supports			Satisfaction and frequency with mentor		
	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty
<i>Teaching induction or mentoring</i>	0.063**	0.261***	0.036						
<i>Early supports index</i>				0.007	0.038	-0.005			
<i>Satisfaction and frequency with mentor index</i>							-0.003	-0.039*	0.005
Constant	0.738***	0.607***	0.742***	0.788***	0.827***	0.770***	0.787***	0.931***	0.731***
Observations	7,200	1,700	3,200	7,200	1,700	3,200	5,200	1,300	2,200
R-squared	0.019	0.113	0.027	0.017	0.087	0.026	0.022	0.116	0.045

Note: Data are for teachers with less than five years of experience in public noncharter schools in the 2011–2012 Schools and Staffing Survey (SASS) whose status is known in the 2012–2013 Teacher Follow-up Survey (TFS). A teacher is in a low-poverty school if less than 25% of the student body in his/her classroom is eligible for free or reduced-price lunch programs; a teacher is in a high-poverty school if 50% or more of the student body in his/her classroom is eligible for those programs. For statistical significance, *** denotes $p < 0.01$, ** denotes $p < 0.05$, and * denotes $p < 0.1$. Regressions control for credentials, teachers' feeling well prepared to teach, and state fixed effects. The number of observations for the model where the main predictor is the satisfaction and frequency of working with the mentor is smaller because it is restricted to teachers who worked with a mentor. For this reason, this index is excluded from the full specification.

Source: 2011–2012 Schools and Staffing Survey (SASS) and 2012–2013 Teacher Follow-up Survey (TFS) microdata from the U.S. Department of Education's National Center for Education Statistics (NCES 2011–2012, 2012–2013).

Economic Policy Institute

Supports, professional development (PD), and influence-related determinants of teachers staying at their school (relative to having quit or having moved to a different school) the year after initial survey

	Supports			PD activities			Satisfaction and hours		
	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty	All	Low-poverty	High-poverty
<i>Supports for PD index</i>	0.017**	-0.005	0.037***						
<i>PD activities index</i>				0.033***	0.027*	0.050***			
<i>Satisfaction and hours in PD index</i>							0.030***	0.018**	0.041***
Constant	0.823***	0.795***	0.857***	0.817***	0.795***	0.845***	0.822***	0.796***	0.852***
N	33,100	8,800	13,000	33,100	8,800	13,000	33,100	8,800	13,000
R-squared	0.023	0.031	0.028	0.024	0.032	0.029	0.026	0.032	0.033

Note: Data are for teachers in public noncharter schools in the 2011–2012 Schools and Staffing Survey (SASS) whose status is known in the 2012–2013 Teacher Follow-up Survey (TFS). A teacher is in a low-poverty school if less than 25% of the student body in his/her classroom is eligible for free or reduced-price lunch programs; a teacher is in a high-poverty school if 50% or more of the student body in his/her classroom is eligible for those programs. For statistical significance, *** denotes $p < 0.01$, ** denotes $p < 0.05$, and * denotes $p < 0.1$. Regressions control for credentials and state fixed effects.

Source: 2011–2012 Schools and Staffing Survey (SASS) and 2012–2013 Teacher Follow-up Survey (TFS) microdata from the U.S. Department of Education's National Center for Education Statistics (NCES 2011–2012, 2012–2013).

Economic Policy Institute

Endnotes

1. According to Sutchter, Darling-Hammond, and Carver-Thomas (2016), the gap between the number of qualified teachers needed in the nation's K–12 schools and the number available for hire in the 2017–2018 school year was about 110,000 teachers, up from 54,000 in school year 2015–2016 and from no shortage earlier in the decade. Carver-Thomas and Darling-Hammond (2017) and the Learning Policy Institute (2017) estimate that filling a vacancy costs \$21,000 on average, and Carroll (2007) estimates the total annual cost of turnover at \$7.3 billion per year. According to Strauss (2017), that estimated annual cost of turnover would exceed \$8 billion at present. A lack of sufficient, qualified teachers threatens students' ability to learn (Darling-Hammond 1999; Ladd and Sorensen 2016). Instability in a school's teacher workforce (i.e., high turnover and/or high attrition) negatively affects student achievement and diminishes teacher effectiveness and quality (Ronfeldt, Loeb, and Wyckoff 2013; Jackson and Bruegmann 2009; Kraft and Papay 2014; Sorensen and Ladd 2020).
2. A teacher is considered to be in a high-poverty school if 50% or more of the students in his/her classroom are eligible for free or reduced-price lunch programs. A teacher is considered to be in a low-poverty school if less than 25% of the students in his/her classroom are eligible for those programs.
3. From the 2011–2012 to the 2015–2016 school year, there were increases in the shares of teachers who were not fully certified (from 8.4% to 8.8%), who had not taken the traditional route into teaching (14.3% to 17.1%), who had five years or less of experience (20.3% to 22.4%), and who did not have an educational background in the subject they were teaching (31.1% to 31.5%). In high-poverty schools, the shares of teachers without these credentials were even higher: 9.9% were not fully certified, 18.9% took an alternative route into teaching, 24.6% had five years or less of experience, and 33.8% didn't have an educational background in the subject they were teaching. See García and Weiss 2019a.
4. As we documented in García and Weiss 2019b, "turnover and attrition have been increasing over time (Goldring, Taie, and Riddles 2014) and are higher for U.S. teachers than among teachers in other countries (Darling-Hammond et al. 2017)." Teachers see much higher attrition than their peers in most occupations: About 30% of college graduates who became teachers were not in the profession five years later, compared with 14% of pharmacists, 16% of engineers, and 19% of nurses and lawyers (Ingersoll 2014). From 2008 to 2016, the number of people enrolled in teacher preparation programs fell 37.8% and the number of people completing teacher preparation programs fell 27.4% (see **Appendix Figure C**).
5. Our research compared factors such as pay, working conditions, and professional supports reported by teachers who stayed in the school with those who quit the profession and found greater shares of leaving teachers reported low pay and negative conditions. In this report we include an examination of these associations using a regression framework in this report. See **Appendix Tables 1–5** for regression analyses of the correlations between these factors and retention in the school (unlike in the previous reports, we now also include information from teachers who left to teach in another school or were on short-term leave and planned to return to the school). Various meta-analyses by other researchers have also reviewed how some of these factors correlate with teacher attrition (Nguyen et al. 2019; Borman and Dowling 2008). More limited information is available regarding how these factors influence potential teachers' decisions to enter into the profession.

6. Larger shares of teachers in schools serving large shares of poor students turned over or quit, and those remaining thus tend to work in schools with relatively more unstable workforces than teachers in low-poverty schools.
7. Teachers in high-poverty schools work in more challenging environments, are paid less, have less autonomy and influence in their jobs, and receive weaker supports both early in their careers and throughout their careers. These findings are consistent across all factors examined even though the low- and high-poverty schools in our study are not particularly extreme schools, but rather fairly common schools (i.e., low-poverty schools are those with less than 25% of students in poverty and high-poverty schools are those with more than 50% of students in poverty). Moreover, the resulting professional, personal, and material discomfort for teachers affects not only teachers themselves but their students; as such, low-income students' classroom experiences are disproportionately disrupted by staff instability or inadequate preparation.
8. See García and Weiss 2019a, 2019b, 2019c, 2019d, 2019e, and 2020b.
9. The student population has continuously increased since 2008 (by 1.2 million, according to NCES 2019c). While the number of teachers in public schools has also increased between 2000 and 2015—by 210,000—it hasn't done it in a continuous manner. See **Appendix Figure A**. The number of teachers reached its highest point in 2008, and dropped significantly between 2008 and 2010 as a consequence of the recession (Gould 2017; Gould 2019; Berry and Shields 2017).
10. According to national Schools and Staffing Survey data over multiple years on teachers who had stayed in their schools, moved to different schools, or left teaching altogether from one survey year to the next, the rate of teacher retention decreased by 0.6 percentage points between 2001 and 2013, while teacher turnover (teachers moving to different schools) and teacher attrition (teachers leaving teaching) both increased 0.3 percentage points in that period. See **Appendix Figure B**. The decrease in the number of potential new teachers is shown in Appendix Figure C, reproduced from García and Weiss 2019b, Figure A.
11. For example, a common theme documented in our series was that the different factors behind the teacher shortage were systematically more acute in high-poverty schools. If we tackled the underlying system-level problems that create worse problems in high-poverty schools, then we may no longer need additional compensation for teachers in high-poverty schools. Or, if teachers were accorded respect and recognition as the professionals they are, then their salaries would be higher.
12. For example, giving teachers bonuses or a one-time chance to weigh in on how they are evaluated and what kinds of professional development they get are not solutions to the interconnected and systemic problems of low relative teacher pay, lack of teachers' say over working conditions, and inadequate professional development opportunities over the course of a teaching career.
13. For example, educators have shared that policies such as holding teachers accountable for student test scores and the associated excessive focus and pressure on testing, or letting charter schools reject the most difficult to serve students, play a role in making teaching less attractive, but none of the studies or data examined in this report address those factors so we don't discuss them here. Likewise, the experimental evidence on the impacts of specific policies that have been implemented to tackle some of the drivers is limited because the policies might have been tried in a scattered, rather than cohesive, manner, or may have been tried in only a few locations.
14. It is complex to model the individual and interacting behaviors of the roughly 4 million teachers represented in our data, especially given that the factors driving shortages are interrelated and

there may be other factors that are not accounted for in our regression framework. For example, two teachers with very similar characteristics and views may react differently to policy changes for reasons not controlled for in our models.

15. For example, state governments would likely have a much larger role in those states that have a larger attrition rate than others. As another example, the role of teachers unions may be larger under certain circumstances. The literature on the role teachers unions play emphasizes their positive contribution to teachers' pay, working conditions, school climates, and in elevating teachers' voices (Allegretto and Tojerow 2014; Allegretto and Mishel 2019; Han 2019; Moore-Johnson et al. 2007; Jones, Bettini, and Brownell 2016; Lyon 2020; NEA 2012). As such, we would plan to explore the role unions and bargaining play in the teacher shortage more in depth in future research.
16. Research finds that 24 states—including half of the states with over a million enrolled students—still spend less on education per student than they were spending prior to the recession a decade ago (Leachman and Figueroa 2019). In most states, high-poverty districts receive either the same amount of funding or less than low-poverty districts, showing a glaring lack of progressivity in the schools' funding formulae. With respect to how much states would have to spend in order to achieve national average test scores, a majority of states spend only a fraction of estimated requirements especially in the highest-poverty districts, again revealing sharp inadequacies (Baker, Di Carlo, and Weber 2019; Morgan and Amerikaner 2018; Chingos and Blagg 2017; Urban Institute 2017).
17. **Appendix Figure D**, reproduced from Baker, Di Carlo, and Weber 2019, shows the degree to which states and districts are allocating resources so that districts can achieve national average test scores, by level of poverty in the school districts. In moderate- and higher-poverty districts, the gaps between what is spent and what would be required to achieve at the national level are significant and increase with the level of poverty. In the middle group, districts are spending \$1,300 per student less than what would be required (about 88%). In the highest-poverty quintile, the gap exceeds \$6,600. This means that, on average, the highest-poverty districts are spending fully one-third less than what they need to in order to deliver a sound education to their students.
18. A recent meta-analysis widens the examination of the drivers of attrition to include principals' autonomy and comprehensive school reform, among others, but no category representing teachers' influence, autonomy, etc., appeared in the widened framework (Nguyen et al. 2019). The authors classify the determinants under personal correlates, school correlates, and external correlates (which include broader categories such as teacher evaluation systems, teacher merit pay, school accountability, principal effectiveness, teacher-principal race/gender matching, teacher-student race matching, comprehensive school reform, and research-practice partnership, not explored in earlier studies). See Borman and Dowling 2008 for an earlier meta-analysis focused on teacher characteristics and school characteristics. This reflects how research has overlooked most of these factors, due to lack of data but also lack of acknowledgment of their relevance. See more information in García and Weiss 2020a.
19. As we wrote in the first report in the series and pointed out earlier, "The teacher shortage has serious consequences. A lack of sufficient, qualified teachers threatens students' ability to learn (Darling-Hammond 1999; Ladd and Sorensen 2016). Instability in a school's teacher workforce (i.e., high turnover and/or high attrition) negatively affects student achievement and diminishes teacher effectiveness and quality (Ronfeldt, Loeb, and Wyckoff 2013; Jackson and Bruegmann 2009; Kraft and Papay 2014; Sorensen and Ladd 2020). And high teacher turnover consumes economic resources (i.e., through costs of recruiting and training new teachers) that could be better deployed elsewhere. Filling a vacancy costs \$21,000 on average (Carver-Thomas and Darling-

Hammond 2017; Learning Policy Institute 2017) and Carroll (2007) estimated that the total annual cost of turnover was \$7.3 billion per year, a cost that would exceed \$8 billion at present (note that this is an estimate of the cost of turnover/attrition, not an estimate of the cost of the shortage). The teacher shortage also makes it more difficult to build a solid reputation for teaching and to professionalize it, further perpetuating the shortage” (García and Weiss, 2019a).

20. The analysis accounted for education, experience, and other factors known to affect earnings. The pay compares weekly compensation, which avoids measurement issues regarding differences in annual weeks worked and thus accounts for summers “off.” For some explanations of some of the reasons why the teaching wage penalty exists (historically low pay, pink-collar occupation, etc.), see Allegretto and Mishel 2019, and Folbre and Smith 2017.
21. In most states, mid-career teachers who head families of four or more are eligible for government subsidies such as subsidized children’s health insurance or free or reduced-price school meals (Boser and Straus 2014).
22. See Erasmus 2019; Long 2019; Nieto 2019; Reilly 2018; Talley et al. 2018; Zdanowicz 2019.
23. We remind the reader that a teacher is in a high-poverty school if 50% or more of the student body in his or her classroom is eligible for free or reduced-price lunch programs.
24. The relative qualifications of the teaching workforce refer to the credentials of teachers in the teaching workforce.
25. The research indicates that fewer people are willing to make the choice to be in a profession that puts them at a financial disadvantage, a disadvantage that is known as raising the opportunity cost to be (stay or become) a teacher (see Loeb and Page 2000 and Murnane and Olsen 1989, and summary in García and Han 2019). In general, lower salaries correlate with more attrition and higher salaries correlate with retention and with more interest in becoming teachers (see Podolsky et al. 2019 and Katz 2018 for higher rates of turnover in schools with lower salaries, across a number of contexts). García and Weiss (2019c) compared characteristics of teachers who quit their jobs with teachers who stayed at their schools and found that the quitting teachers had received, on average, lower salaries, participated less in the kinds of paid extracurricular activities that complement professional development (activities like coaching students or mentoring teachers), and engaged more in working options outside the school system than did teachers who stayed. A broad consensus has emerged around the evidence that higher pay should be part of the solution to problems in the teaching profession and labor markets (see Podolsky et al. 2016; Espinoza et al. 2018; PDK 2018; Croft, Guffy, and Vitale 2018; García and Weiss 2019b).
26. Existing research finds higher rates of turnover in schools with lower salaries, across a number of contexts (see summaries in Podolsky et al. 2019 and Katz 2018). In general, lower salaries correlate with more attrition and higher salaries correlate with more interest in becoming teachers. Recent research using international data shows that countries that pay teachers more “tend to draw their teachers from higher parts of the college skill distribution” (Hanushek, Piopiunik, and Wiederhold 2019). Research also indicates that when states have raised and equalized salaries (at the same time as they have raised standards for preparation), they have increased quality and retention as well (Podolsky et al. 2016).
27. The problem of low diversity in the teaching profession, both by gender and by race, and its potential connection to the teacher shortage is an increasingly dominant part of education policy discussions (Ingersoll 2015; Ingersoll and May 2011; Ingersoll, Merrill, and Stuckey 2014; Carver-Thomas 2018). A recent study explains that the teaching pay penalty represents a particular barrier for teacher candidates of color because they are more likely to have student loan debt

upon graduating and are less likely to pursue lower-salary public interest jobs (Fiddiman, Campbell, and Partelow 2019; see also Darling-Hammond 2019). It is argued that changes in the racial and ethnic composition of the teacher workforce are not keeping pace with changes in the demographic makeup of the student population. The share of K–12 teachers who are Black, Hispanic, Asian, American Indian, or other nonwhite groups increased from 12.4% to 17.3% from 1987–1988 to 2011–2012, while the share of students in those groups increased from 27.3% in 1987–1988 to 44.1% in 2011–2012 (Ingersoll 2015). The argument that students’ learning improves when they are taught by teachers of their same race/ethnicity (see Figlio 2017) is used to advocate for increasing the diversity of the teacher workforce at public schools. Also, increasing the share of Latino teachers could boost the share of teachers with the proper qualifications—such as English Language Learner (ELL) training—to meet the needs of the nation’s growing share of students who are Hispanic (Carnoy and García 2017; NASEM 2017; WHIEEH 2015).

28. Though the cost of some of these increases hasn’t been calculated as it is a function of numerous variables, it is reasonable to estimate that the total investment for an across-the-board, significant, salary increase would exceed the investment required to give targeted raises. Still the targeted raises may have significant costs too: Dee and Goldhaber (2017) note that “it might be necessary to offer quite large monetary incentives to induce teachers to take positions in hard-to-staff schools.”
29. The literature sometimes argues that shortages are not *general* or *universal* but that they particularly affect some subjects/specialties, schools, groups of teachers, or even states (see Dee and Goldhaber 2017). For example, shortages are reported worse for STEM (science, technology, engineering, and math) and special education teachers (Ingersoll, Merrill, and Stuckey 2014; Dee and Goldhaber 2017; U.S. Department of Education 2017c, 2019). Shortages are also reported worse for so-called hard-to-staff schools, mainly high-poverty, high-minority, and rural schools. Sources discussing worse shortages for teachers at high-poverty schools include Sutchter, Darling-Hammond, and Carver-Thomas 2016; Podolsky et al. 2016, Loeb, Darling-Hammond, and Luczak 2005, Ingersoll, Merrill, and Stuckey 2014; Darling-Hammond 2010; Simon and Johnson 2015; Loeb, Darling-Hammond, and Luczak 2005; Sutchter et al. 2016; Podolski et al. 2016. Sources discussing urban teachers’ retention include Papay et al. 2017; while Ingersoll 2015; Ingersoll and May 2011; and Carver-Thomas 2018 discuss shortages for minority teachers. Levin et al. (2015) find teacher surpluses in Massachusetts; Berg-Jacobson and Levin (2015) find teacher deficits in Oklahoma; Keefe (2018) notes teacher shortages in Pennsylvania. Officially, the Department of Education occasionally publishes the “States’ Reports of Teacher Shortage Areas” (TSAs) (U.S. Department of Education 2017c, 2019). A summary of different direct and indirect metrics used to measure a shortage of teachers is available upon request. See also Behrstock-Sherratt 2017; Ingersoll 2015; Guarino, Santibáñez, and Daley 2006; Ingersoll 2004; Sutchter, Darling-Hammond, and Carver-Thomas 2016; Podolsky et al. 2016; Loeb, Darling-Hammond, and Luczak 2005; Ingersoll 2001; Moore-Johnson, Kraft, and Papay 2012; Viadero 2002.
30. Merit pay raises, i.e., raises based on some selected (and often incomplete) measure of teacher contribution to student learning) are not recommended for the goals discussed in our series. Importantly, by design, they are only offered temporarily and to subgroups of teachers, failing to meet the foundational principle that the teacher shortage is a problem in need of multifaceted, long-term solutions. Research indicates that the effects of merit pay for teachers based on student performance fade once the incentives end (Glazerman and Seifullah 2012). Also merit pay is based on promoting “competition” among teachers as a strategy to boost their productivity, which can induce perverse incentives by diminishing collaboration and peer supports (Gius 2013 etc.). Finally the effectiveness of merit pay relies on strict assumptions about its components and functioning (Imberman 2015).

31. Teacher pensions account for a larger share of total expenditures in education now than they did in the past, not because of their increased generosity but because of two negative trends that make them relatively strong: salaries have been decreasing and the costs of health care have spiked (Baker 2018). Startz (2016) also challenges the idea that pensions are as high or generous as argued given that not all teachers will become eligible for a pension and that a large share of teachers are not covered by Social Security. Salaries and benefits combined have accounted for about the same share, or a slightly smaller share, of total expenditures for public elementary and secondary education and other related programs as was the case in the 1990s (NCES 2017).
32. Care must be taken when comparing the costs and benefits of service incentives to ensure that resources are not redirected to those who are not making long-term commitments to the profession.
33. According to Feng and Sass (2015), loan forgiveness and service scholarship programs date back to 1958, when the National Defense Education Act created National Defense Student Loans. Since then, the federal government and more than 40 states have at various points offered loan forgiveness and/or service scholarship programs to individuals interested in teaching. While the student debt problem is not unique to teachers, research focused on the overwhelming weight of student loans suggests that teachers who receive loan forgiveness are more likely to remain in the profession (see Podolsky et al. 2019, citing Feng and Sass 2015). Podolsky et al. (2019) also highlight the role of these programs in increasing their overall compensation.
34. Other federal student financial aid programs are available for those teaching in a TSA. See Strauss 2017 and U.S. Department of Education 2017c.
35. In 2019, a news report found that the program's opaque administrative requirements caused a large number of teachers who should have benefited from the aid to, instead, see their grants converted into loans, some with high interest rates, compounded by extensive red tape (Arnold and Turner 2019). Implementing the best practices of effective program models is thus key for such programs. Overall, close to 270,000 grant recipients have benefited since the program was launched (AACTE 2017).
36. Adjusted for inflation to 2018 dollars, according to the NCES 2011–2012 Schools and Staffing Survey (SASS). This figure does not include the dollars teachers spend that are reimbursed by their school districts. The \$459-per-teacher average is for all teachers, including the small (4.9%) share who do not spend any of their own money on school supplies.
37. We construct an “Influence index” that captures the degree of influence teachers report having over a range of 11 factors, from establishing the curriculum at the school to selecting textbooks and other instructional materials. An increase of one standard deviation in this index is associated with a 4.3 percentage-point increase in the probability the teacher is still in the same school the following year after the teacher reported their level of influence on the factors. The 11 factors are establishing curriculum; setting performance standards for students; determining the content of in-service professional development programs; setting discipline policy; hiring new full-time teachers; evaluating teachers; determining the amount of homework to be assigned; evaluating and grading students; disciplining students; selecting contents, topics, and skills to be taught; and selecting textbooks and other instructional materials.
38. All data are from NCES 2015–2016 except for the share of teachers who are not sure they would become teachers if they could start over again, which is from NCES 2011–2012.
39. We build a “Cooperation and support index” that captures the degree to which teachers believe that their school environment matches the attributes of a cooperative and supportive environment.

An increase of one standard deviation in this index is associated with a 4.4 percentage-point increase in the probability the teacher is still in the same school the following year after the teacher reported their level of agreement with the factors. The seven statements teachers were asked to agree or disagree with were: “The principal knows what kind of school he or she wants and has communicated it to the staff,” “School administration’s behavior is supportive and encouraging,” “I make a conscious effort to coordinate the content of my courses with that of other teachers,” “There is a great deal of cooperative effort among the staff members,” “Most of my colleagues share my beliefs and values about what the central mission of the school should be,” “In this school, staff members are recognized for a job well done,” and “I receive a great deal of support from parents for the work I do.”

40. In some cases, schools are suffering because administrators, superintendents, and boards of education are not enforcing existing codes of conduct, and are dismissing educators’ and other staff members’ inputs and consensus regarding improving school working conditions.
41. Working environments are also shaped by a troubling lack of teacher influence over school policy and over what and how they teach in their classrooms (see below for this point).
42. As the shares of low-income students and of minority students have increased substantially, school districts have not adopted a response sufficient to lift up these new students (NCES 2019a and 2019b).
43. Larger shares of these teachers had reported in the year before they left teaching that they faced significant barriers to teaching than was true among teachers who stayed at their schools. More of the quitting teachers reported feeling stressed (the share of teachers who quit who felt that stress at work was not worth it was 3.5 times greater than among those who stayed). And while teachers who stay are happier than those who leave, the numbers above do not paint a pretty picture about the morale of the current teaching workforce either. Even among those who stayed, over half had reported planning to leave teaching at some point, and nearly half reported being dissatisfied with their jobs. Over a quarter had students who were not prepared to learn, and nearly as many were frustrated by the challenge of engaging their students’ parents (see Figure D in García and Weiss 2019d).
44. Weiss and Reville (2019) explore a dozen diverse communities across the United States that have built comprehensive school-community partnerships to enable supportive, enriching school environments. As they show, such investments pay off in substantial improvements to student achievement, behavior, and well-being; in narrowed achievement gaps; and in improved school climate and morale.
45. For example, under the professional learning communities model groups of administrators, teachers, and staff are dedicated to improving the school culture. See DuFour 2004. For teachers’ training on these different aspects, see Blitz, Yull, and Clauhs 2020; Gay 2002; McInerney and McKlindon 2014; Thomas, Crosby, and Vanderharr 2019; among others).
46. As shown in the regression analyses included in **Appendix Table 3**, a greater value in the “Barriers to teaching and learning index” (the greater the value, the more barriers the teacher perceives) is associated with a decrease in the probability that a teacher stays at his or her school. The coefficient is higher in high-poverty schools (it is actually not statistically significant in low-poverty schools). The “Barriers to teaching and learning index” is composed by combining the information on variables measuring whether teachers saw certain barriers as causing problems in their schools, based on their responses to the question, “To what extent is each of the following a problem in this school?” The potential responses were “serious problem,” “moderate problem,” “minor problem,” and “not a problem.” The barriers were: student tardiness, student absenteeism,

student class cutting, student apathy, lack of parental involvement, poverty, students come to school unprepared to learn, poor student health.

47. The “Stress and safety index” is calculated using four variables measuring the share of teachers who are asked to rate their agreement or disagreements with two statements: “The stress and disappointments involved in teaching at this school aren’t really worth it” and “The level of student misbehavior in this school (such as noise, horseplay or fighting in the halls, cafeteria, or student lounge) interferes with my teaching.” The index also relies on the share of teachers who reported that they had ever been threatened or physically attacked by a student from their school.
48. For the statistics in these paragraphs, the data for first-year teachers come from NCES 2015–2016; the data for all teachers come from NCES 2011–2012.
49. Although the link between professional supports and the teacher staffing crisis is less direct than the link between other factors such as school climates and the teacher shortage, these supports are nonetheless critical aspects of the teaching profession. Our data suggest a relationship between the system of professional supports and teacher retention. When we compare teachers who stayed in their school with those who quit teaching, we observe that larger shares of staying teachers had received early support in the form of an assigned mentor (77.0% vs. 69.2%), had found their subject-specific professional development activities very useful (27.4% vs. 19.5%), and had worked in highly cooperative environments (38.7% vs. 33.9%) (García and Weiss 2019e). Strengthened systems of supports have the potential to help teachers do their jobs better, progress in their profession, and gain satisfaction with and a sense of ownership of their careers. These supports are essential to guaranteeing the quality of the teaching workforce and to professionalizing teaching.
50. Large shares of novice teachers report that key aspects of their adaptation to teaching were problematic. For example, at least one in four teachers did not participate in teacher mentoring or induction programs, and only about one in three said that working with the mentor improved their first year teaching by “a lot.”
51. Typically, “residents simultaneously complete credential coursework that is tightly integrated with their clinical placement. Residents are paid a stipend and/or receive tuition remission to enable them to devote the full year to their preparation, and in exchange commit to teach for three to five years in the districts’ schools” (Podolsky et al. 2019). As Podolsky et al. (2019) point out in their report, “studies of the longest-standing teacher residency programs have found higher retention rates of residency graduates” (the studies referenced are Guha, Hyler, and Darling-Hammond 2016; Papay et al. 2012; and Silva et al. 2014). Residencies hold “promise for both recruiting diverse individuals and retaining effective teachers” (Podolsky et al. 2019). As Podolsky et al. (2019) explain, work by Ingersoll, Merrill, and May 2014 using prior SASS data concluded that “new recruits who had a semester or more of practice teaching prior to employment were more than three times less likely to leave teaching after a year than those who had no practice teaching.” Podolsky et al. (2019) continue, “Further analysis found that beginning teachers who had received comprehensive preparation (i.e., observing others teaching; student teaching a full semester; receiving feedback; taking courses in teaching methods, learning theory and selecting instructional materials) were two-and-a-half times less likely to leave teaching after a year in the profession than teachers with little or no pedagogical training. About 37% of first-year teachers had received comprehensive preparation, while about 15% received little or no pedagogical training before entry in 2004-05. Moreover, this research shows that, having courses in teaching methods in addition to student teaching reduced attrition, and, regardless of the coursework package, teachers who received at least one semester of practice teaching were half as likely to leave teaching than those who had not received such training.”

52. Mentoring and induction programs normally entail a “hierarchical relationship in which the mentor is more experienced than the mentee and has useful knowledge and skills that can be conveyed to the mentee through role modeling, feedback, and support” (Goldhaber, Krieg, and Theobald 2018b), and are “designed to support inexperienced teachers in their early years, and to keep those who have potential from leaving the school or the profession before they have a chance to master the art of teaching” (Sorensen and Ladd 2020; Ingersoll and Strong 2011).
53. In producing these estimates we control for a variable that measures how well prepared teachers felt to perform different classroom activities, see **Appendix Table 4**. The influence of these early supports is larger in low-poverty schools, which in part could be linked to the greater availability of these supports in these schools or to the intensity or quality of these programs in these schools (Goldhaber, Krieg, and Theobald 2018b).
54. This influence is largely driven by mentors who are “highly effective” in the first place. Goldhaber, Krieg, and Theobald (2018a) explain that in the process of mentoring, the mentor is given the possibility to reflect on her own practices in ways that lead to “self-improvement” and that “peer-learning” can induce improvements in both the mentor and mentee. Goldhaber, Krieg, and Theobald (2018b) emphasize that the effectiveness of the mentee is also driven by the effectiveness of the mentor (as measured by value-added), and that the influence is particularly large in math.
55. Papay et al. (2012) find that graduates of the Boston Teacher Residency program are more likely to remain in teaching in the district in the first five years, rapidly improve their effectiveness, and are more racially diverse.
56. Data examining the first six cohorts of the program showed that graduates were more likely to remain in teaching roles in Denver Public Schools and more likely than other teachers who started at the same time to remain in Title I schools and received slightly higher ratings of their teaching in their first year (Eisner et al. 2015).
57. As discussed in García and Weiss 2019e, while there is a clear understanding that continuous professional supports are incredibly important (indeed, the highest-performing systems in the world provide professional development as part of the regular daily and weekly experience of teaching and continuous training, which are “inextricably linked together,” as noted in Darling-Hammond et al. 2017), there are no universal benchmarks for what an optimal set of professional development activities looks like, and a lot of flexibility may be required.
58. According to Croft et al. (2010), job-embedded professional development “refers to teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers’ content-specific instructional practices with the intent of improving student learning” (Croft et al. 2010, citing work by Darling-Hammond and McLaughlin 1995 and Hirsh 2009).
59. The research by Kraft, Blazar, and Hogan (2018) to identify these features of effective professional development builds on Darling-Hammond et al. 2009; Desimone 2009; Desimone and Garet 2015; Garet et al. 2001; and Hill 2007. Darling-Hammond et al. (2017) review the availability of supports in other contexts.
60. As mentioned above, to help ensure that teachers have access to these opportunities, they must be provided with the necessary resources, which include time off for scheduled professional development and reimbursements for time, travel, and other expenses.
61. As cited earlier, just 11.1% of teachers report having a great deal of influence in determining the content of professional development programs (García and Weiss 2019e).

62. Appendix Table 5 presents the relationship between staying in the school and the different supports teachers receive. There are three indices: the “Supports for professional development index”; the “Professional development activities index”; and the “Satisfaction and hours in professional development index.” They are defined as follows:

The “Supports for professional development index” is built using the responses of teachers who received the following types of supports: scheduled time in the contract year for professional development, released time from teaching, reimbursement for conference or workshop fees, stipend for professional development activities that took place outside regular work hours, reimbursement for travel and/or daily expenses, full or partial reimbursement of college tuition, and credits toward re-certification or advanced certification in their main teaching assignment or other teaching field(s).

The “Professional development activities index” is built using information on professional development activities the teacher participated in during the last 12 months. Among the options, there are four standard types of professional development: workshops, conferences, or training sessions where the teacher was not the presenter; workshops, conferences, or training sessions where the teacher was the presenter; university courses related to teaching; and observational visits to other schools. There were also five types of professional development focused on a specific area: content of the subject(s) they teach, use of computers for instruction, student discipline and management in the classroom, how to teach students with disabilities, and how to teach English language learners (ELL). There were three other activities that offer professional development opportunities, in which teachers were asked whether they engaged in research on a topic of interest to them professionally; participated in regularly scheduled collaboration with other teachers on issues of instruction (excluding administrative meetings), and observed, or were observed by, other teachers in their classrooms.

Finally, the “Satisfaction and hours in professional development index” is built using the underlying responses about how useful were the following different professional development activities: offerings that were specific to the subject the teacher teaches, offerings that involve using computers for instruction, offerings that address student discipline and management in the classroom, and offerings that help teachers teach students with disabilities and ELL students. The index also incorporates total hours in specific professional development activities.

The results indicate that an increase of one standard deviation in the supports index is associated with a 1.7 to 3.7 percentage-point increase in the probability that a teacher stays at the school (the increase was not statistically significant in low-poverty schools). An increase of one standard deviation in the professional development activities index is associated with a 2.7 to 5.0 percentage-point increase in the probability that a teacher stays in the school. And being more satisfied with the professional development opportunities also positively correlates with both staying at the school and in the profession (an increase of one standard deviation in the satisfaction and hours in professional development index is associated with a 1.8 to 4.1 percentage-point increase in the probability that a teacher stays in the school).

63. In García and Weiss 2019c, we discussed positive and the negative repercussions of teachers working multiple jobs—or moonlighting in and out of the school system during the school year. We distinguished between teachers who may choose to take on a second job voluntarily versus those who do so due to financial stress, and between moonlighting activities that are career-building opportunities that increase teachers’ sense of belonging and lead to learning communities and moonlighting activities that do not offer these benefits.

64. When too many of the school’s teachers are novices, there are too few veterans available to serve as mentors or to help with induction and avert turnover (Jackson and Bruegmann 2009;

Sorensen and Ladd 2020; García and Weiss 2019b).

65. Working in the school system increases the probability that a teacher stays at the same school by 3.6 percentage points, on average, with a larger association in high-poverty schools than in low-poverty schools (4.0 percentage points versus 3.1 percentage points respectively). Indeed, test-based bonuses, which do serve to substitute for salary increases, negatively correlate with teacher retention, as do jobs working outside the school system, in all schools and low-poverty schools; note that none of these associations are statistically significant.
66. Available upon request, we have also examined the significance of teachers' satisfaction and motivation with retention. Unsurprisingly, teachers who have higher satisfaction and motivation are more likely to stay in their schools. The association is higher for teachers in high-poverty schools. Because satisfaction and motivation can be the reflection of multiple other factors besides the main channels described in this report, we do not include those results in the appendix.

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