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The Labor Market for Teachers under Different Pay Schemes

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Teachers are one of the most important inputs in the production of student achievement, and their impact persists throughout adulthood. Attracting and retaining high-quality teachers to the profession is thus a policy issue of highest importance. More attractive compensation packages are often proposed as a possible tool to achieve this goal. In most U.S. public school districts, however, teacher pay is set using rigid schedules based solely on seniority and education, with no financial rewards for effectiveness in the classroom. If allowed to set pay in a more flexible way, could school districts improve the quality of the teaching workforce? My research addresses this question by taking advantage of a reform to the collective-bargaining process for teachers in Wisconsin.

Understanding teacher supply and demand is key for the design of a number of education policies, including school finance equalization, school accountability, teacher training, and, most importantly, teacher selection. In spite of this, empirical studies of this labor market are usually challenging to

perform due to a dearth in variation in pay practices among public school districts. The vast majority of districts pay teachers according to similar lockstep schedules. Under this regime all teachers with the same education degree and years of experience are paid exactly the same amount regardless of their effectiveness, their skills, or the demand for their labor. These schedules are often very similar across all districts within a state, owing to pattern bargaining facilitated by the state's teachers' union. With salaries set in this rigid way, identifying labor supply and demand is very difficult.

I exploit a rare source of variation in teacher pay in order to study the market for public school teachers. In 2011, the Wisconsin legislature passed Act 10, a law that discontinued collective bargaining over teachers' salary schedules and limited negotiations to base pay. Before the passage of Act 10, Wisconsin had been a state with strict adherence to lockstep schedules, which were negotiated between each school district and its teachers' union. Act 10 gave districts full autonomy to unilaterally decide on compensation and allowed

them to negotiate salaries with individual teachers using any criteria the two sides deemed useful.

Districts used the flexibility introduced by Act 10 in different ways. I begin by documenting cross-district differences in pay schemes in the aftermath of the reform. I then study the effects of these changes on teachers' movements across districts and exits from the labor market, as well as on the composition of the teaching workforce. I also investigate the effects that changes in teacher salaries have on their effort. Lastly, I use the post-Act 10 variation in salaries across districts, together with teachers' movements and exits, to estimate a structural model of the teachers' labor market. This model helps explain how teachers value different job attributes and how districts value different teacher characteristics. In addition, the model allows me to study the effects of alternative salary schemes on the composition of the teaching workforce.

To investigate how districts used their autonomy, I collected information on post-Act 10 pay schemes from employee handbooks, which list district-specific workplace policies and procedures. This information indicates that approximately half the districts took advantage of their newfound discretion and replaced seniority-based schedules with flexible salary schemes, which allowed for pay differences among teachers with similar seniority. I refer to these districts as flexible pay (FP). The other half, which I refer to as seniority pay (SP), continued to calculate salaries using their pre-Act 10 schedules.

Act 10 triggered significant differences in salaries among teachers in FP districts who would have been paid exactly the same amount under the pre-Act 10 regime. Individual-level salary information, combined with student-level test scores, reveals that salaries rose more for teachers with higher value-added (defined as an individual teacher's contribution to achievement growth). This is an important finding in itself: school districts do not calculate value-added nor do they explicitly use it to evaluate teachers, yet they choose to reward it when given the chance.

The differences in teacher salaries that arose among Wisconsin districts after the passage of Act 10 could change teachers' incentives to work in a given district, and in turn affect each district's workforce composition. A simple model predicts that high value-added teachers would flow from SP to FP districts, and low value-added teachers would flow in the opposite direction or exit teaching altogether. I test these predictions by comparing movements and exits of high- and low value-added teachers in FP and SP districts before and after Act 10.

Interpreting the results of an FP-SP districts comparison

as the causal effect of changes in pay requires assuming that the two groups would have been comparable in the absence of Act 10. Post-Act 10 pay schemes, however, were not randomly determined across districts, but rather chosen by district administrators. This assumption could therefore be violated if this choice were correlated with teachers' labor supply decisions. In addition, Act 10 introduced other changes in public-sector employment, such as increases in employee contributions to pensions and health care. Albeit uniform across districts and unrelated to pay, these changes may have triggered district-specific shocks that confound the effects of changes in pay. As a piece of evidence in favor of my assumptions, I first show that the two groups of districts are observationally similar *ex ante* and that the choice of pay schemes does not appear to be driven by factors that could directly affect teachers. Second, I control for an array of district observables related to the (possibly) different district-level responses to other provisions of the Act in all my specifications. I also show that FP and SP districts were on similar trends before Act 10 with respect to all outcome variables. Lastly, I complement results on the full sample of FP and SP districts with findings based on a matched sample of FP and SP districts, which is based on pre-Act 10 observables.

Comparing movements and exits of high- and low value-added teachers in FP and SP districts before and after Act 10 indicates that, after Act 10, teachers with *ex ante* higher value-added (measured using pre-Act 10 test scores) were 1.13 times more likely to move from SP to FP districts compared with lower value-added teachers and 44 percent less likely to exit. These movements and exits produced a 0.05–0.07 standard deviations increase in average teacher quality in FP relative to SP districts. These results confirm the predictions of the model and indicate that the teachers' labor market appears to function like other labor markets. They also demonstrate—partly in contrast with previous studies—that higher pay does attract teachers.

The introduction of a pay scheme that rewards workers' effectiveness could impact not only the composition of the teaching workforce, but also teachers' efforts. To test this hypothesis, I allow value-added to vary before and after Act 10 for each teacher, and I estimate the FP-SP difference in this time-varying measure after Act 10 compared with before. I find that, overall, value-added increased by 0.11 standard deviations in FP districts relative to SP. Approximately 54 percent of this increase is due to changes in teachers' efforts, whereas the remaining 46 percent is due to changes in workforce composition.

My findings show that the introduction of flexible salaries

in a subset of Wisconsin districts led to an improvement, albeit small, in the composition of the teaching workforce in these districts compared with the rest of the state. Since movements and exits are rare events, this compositional change could become more pronounced over time as more low-quality teachers exit FP and more high-quality teachers get hired. This, however, assumes that SP districts stick with seniority pay in the medium and long run. What would happen if the same pay scheme were introduced in all districts instead? The sorting and exiting patterns outlined so far are the combination of both demand and supply forces; it is therefore difficult to answer this question by simply extrapolating from these partial-equilibrium results.

To address the limitations of a reduced-form approach, I build and estimate a structural model of the teachers' labor market. Simulations show that the introduction of quality pay in all districts is associated with a much smaller increase in workforce quality compared with an increase in quality pay in one district: When all districts reward seniority at the same rate, teachers have lower incentives to move across districts, and any compositional improvement is entirely driven by exits of low-quality teachers.

This exercise helps us understand what would happen if all districts switched to flexible pay, a scenario that could

arise as districts start competing with each other for the best teachers. It also shows that the observed improvement in the composition of the teaching workforce and the increase in effort experienced by FP districts might be short-lived, resulting in smaller long-term effects of a statewide change in pay schemes.

A caveat applies to these conclusions: The model does not explicitly account for workers' decisions to enter the teaching profession and implicitly assumes that the quality of new teachers is constant over time and unaffected by the Act. In the medium run, a change in teacher pay could fundamentally alter the selection of new teachers in FP and SP districts in ways that could differ from the sorting patterns observed for incumbent teachers. A simple analysis of the selectivity of college degrees for new teachers (as a proxy for teaching quality) does not show evidence of changes in the composition of new teachers after 2011. A full-blown analysis of the effects of Act 10 on this margin, however, is left to future research.

NOTE:

This research brief is based on Barbara Biasi, "The Labor Market for Teachers under Different Pay Schemes," NBER Working Paper no. 24813, July 2018, <http://www.nber.org/papers/w24813>.
