



## **Cross-State Mobility of the Teacher Workforce: A Descriptive Portrait**

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**ABSTRACT:** Barriers to the cross-state mobility of the teacher workforce can have undesirable effects on the teacher workforce and student outcomes. While a large literature addresses issues related to within-state mobility, very little is known about patterns of cross-state mobility. This paper addresses that research gap. We describe features of Oregon's and Washington's teacher labor markets that impose barriers to mobility and use state administrative data sets to identify teachers who have crossed the state border. Large disparities between levels of within-state and cross-state mobility are evidence of significant barriers to mobility between Oregon and Washington. In fact, teachers are over four times more likely to undertake a within-state move of 250 or more miles than they are to undertake a cross-state move of any distance. Even teachers employed in a district on the state border are at least as likely to move 225 or more miles within their state as they are to move across the border. Observed patterns of cross-state mobility are consistent with some of the variation in costs imposed by licensure procedures, seniority rules, and pension structures. In particular, less experienced teachers are significantly more mobile. However, we observe a similar pattern in regard to *within-state* mobility, suggesting that fewer experienced teachers cross state borders because they are less mobile in general, and not necessarily because they face higher costs to cross-state mobility in particular. More nuanced analyses is required to better understand the mechanisms driving low rates of cross-state mobility.

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*“When you contrast the environment that Oregon educators face with our colleagues in Washington, I think there are some arguments that it's probably better to be on this side of the river” (Tilkin 2005).*

## **1. Introduction**

There are a number of reasons why preventing cross-state mobility of the teacher workforce is undesirable. Limits to locational employment flexibility will decrease the appeal of the teaching profession to prospective entrants to the labor market. Limiting cross-state mobility will also likely lead to a loss of teaching talent when in-service teachers who move out of state opt out of a career in teaching. Finally, cross-state labor market frictions inhibit labor market adjustments, whereby employees flow from areas of relative surplus to relative shortage. In short, barriers to cross-state mobility impose costs on the labor market without serving a clear policy purpose.<sup>1</sup>

There are reasons to expect the cross-state mobility in the teaching profession to be modest, as several features of the teacher labor market make crossing state borders more difficult than moving across districts in the same state. Each state has its own licensure procedures that can be expensive and time consuming for teachers to navigate.<sup>2</sup> A teacher who has completed the licensure process in one state may be reluctant to repeat it in another. Additionally, in most states, a teacher's level of tenure and seniority are used in important personnel decisions, such as lay-offs and who receives priority for within-district transfers. A cross-state move generally results in losing whatever tenure and seniority a teacher has accumulated. Finally, the majority of teachers are enrolled in traditional defined benefit (DB) pension plans, and teachers who split their careers between two (or more) DB plans tend to earn far less retirement income than if they had stayed in one system (Costrell & Podgursky, 2010; Koedel et al., 2011).

Interestingly, public debates about the teaching profession often characterize a situation in which states are competing against one another for teacher labor.<sup>3</sup> Yet while there is a considerable amount of research on the mobility of teachers within states, we know very little about the extent to which teachers move from public schools in one state to another. This is not surprising given data limitations that have historically made it difficult to reliably track individuals from one state to the next.<sup>4</sup> This paper addresses the gap in research on cross-state mobility in the teaching profession by using two administrative data sets to match teacher records between Washington and Oregon. We present a descriptive portrait of teacher mobility between these states and illustrate how features of each states' labor markets may influence mobility.

Oregon and Washington provide fertile grounds for analysis because they share a long border, have different salary levels, and have both instituted reforms related to licensure and pensions during the study period. Our analysis finds a huge disparity between the levels of within-state mobility and between-state mobility, suggesting the state-based institutional constraints create

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<sup>1</sup> For a more comprehensive discussion of these issues in the context of teacher licensure, see Goldhaber (2011).

<sup>2</sup> For more on teacher licensure and its effects, see Goldhaber (2011) and Goldhaber and Brewer (2000).

<sup>3</sup> This notion is exemplified by the quote at the beginning of the paper, which implies a non-trivial amount of cross-state mobility among teachers. More generally, local media coverage tends to cite concerns about some states' lagging behind others in terms of compensation (e.g., Associated Press, 2014; DeJka, 2014; Doney, 2015; Postal, 2014; Way, 2015).

<sup>4</sup> Sandi Jacobs, vice president for state policy at the National Council for Teacher Quality recently noted that the education industry has “very poor capabilities” in regards to tracking teachers across state lines (Way, 2015).

significant barriers to teachers moving across state lines. However, the low overall level of cross-state mobility makes it difficult to determine how particular features of the states' labor markets influence mobility patterns.

The remainder of the paper proceeds as follows: Section 2 discusses the literature on teacher mobility and compares the features of the Oregon and Washington labor markets that are likely to influence cross-state mobility. Section 3 describes the administrative data sets used in the analysis and the process of identifying teachers who cross the state border. Section 4 presents a descriptive analysis of mobility between Oregon and Washington, and Section 5 concludes with a discussion of the policy implications of our findings.

## **2. Background**

This section reviews the existing literature on teacher mobility and attrition and describes the features of Oregon and Washington's teacher labor markets that may influence mobility between the two states.

### **2.1 Literature on Teacher Mobility**

A large body of research identifies a strong relationship between teacher quality and student performance, suggesting that it matters which teachers stay or leave schools (e.g., Aaronson, Barrow, & Sander, 2007; Chetty, Friedman, & Rockoff, 2014; Rivkin, Hanushek, & Kain, 2005). A newer line of research also suggests that teacher mobility or "churn"—independent of the quality of teachers who are entering or leaving a school—also influences student achievement because the transition of teachers in and out of schools is disruptive (Guin, 2004; Ronfeldt et al., 2013) and raises school costs (Barnes et al., 2007).

Given the potential importance of teacher mobility to student achievement, an extensive literature has analyzed patterns of mobility (including movement across schools and districts, and attrition from the profession) to determine why teachers move, and which teachers move. These studies look at how compensation levels, work environment (particularly student demographics at the school), and teacher characteristics influence mobility. This body of work finds that salary and other financial inducements do influence teacher mobility, but the effects of compensation on teacher recruitment and retention tend to be small, and teachers are also heavily influenced by the student body composition of schools (Hanushek et al., 2004; Imazeki, 2005; Jacob, 2007; Clotfelter et al., 2011; Goldhaber et al., 2011; Ronfeldt et al., 2013; Cowan & Goldhaber, 2015). As a consequence, disadvantaged students tend to have less access to highly qualified and effective teachers (Clotfelter et al., 2011; Sass et al., 2012; Isenberg et al., 2013; Goldhaber et al., 2015).<sup>5</sup>

At the national level, Keigher and Cross (2010) describe patterns of teacher mobility using data from the School and Staffing Survey (SASS). They find that 8.0 percent of teachers left the profession during 2008-09 and 7.6 percent moved to a different school. Smaller proportions of elementary school teachers leave the profession (5.6 percent), as well as higher proportions of special education and English teachers (12.3 and 10.5 percent respectively). Age and experience

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<sup>5</sup> Not only do schools serving disadvantaged students have greater difficulty recruiting teachers (Boyd et al., 2013; Engel et al., 2014), they have greater difficulty retaining them (Hanushek et al., 2004; Scafidi et al., 2007; Borman & Dowling, 2008).

also play an important role in decisions to leave a particular school or the entire profession. The probability of exiting the profession is highest amongst teachers with 1–3 years of experience (9.1 percent) and with 20 or more years of experience (11.3 percent). Mobility across schools, however, exhibits a slightly different trend. While the least experienced teachers are again the most likely to switch schools (13.7 percent), those with 20 or more years of experience are the least likely to move (5.0 percent).

For all the evidence on patterns of movement within states, very little is available regarding movement across states. What we do know is mostly descriptive; Rollefson (1993) reports that 10.4 percent of newly hired public school teachers in 1987-1988 were transfers from a different state, suggesting a modest amount of cross-state movement. In North Carolina, a report on teacher turnover by the state's Department of Public Instruction (2014) indicates that 455 teachers (out of approximately 96,000 teachers employed state-wide) listed, "resigning in order to teach in another state" as the reason for turnover in 2012-2013 (about 0.5 percent).

There is reason to believe that licensure and seniority rules might influence cross-state mobility. Coggshall and Sexton (2008) point out that states' licensure rules create both purposeful and artificial barriers to cross-state mobility. Purposeful barriers include knowledge testing and teacher preparation/coursework requirements intended to ensure a minimum level of teacher quality. Artificial barriers include high fees, slow administrative processes, poor communication between agencies in different states, duplicative tests and coursework, and unclear licensure requirements. Regarding teachers' experiences with licensure procedures, Darling-Hammond and Sykes (2003) cite a study by the California Commission on Teacher Credentialing that documents some of the difficulties reported by out-of-state candidates seeking teaching positions in California, including:

*...costs of courses and exams, confusion about how to complete the many and varied requirements, and redundancy with other requirements teachers had already met elsewhere. In a survey of out-of-state teachers who had received an initial permit to teach in California, credential requirements were the leading factor in decisions to leave the state (p. 40).*

The above suggests that a state's licensure procedures can be onerous enough to discourage teachers from seeking a position in a new state, though this issue has not received much empirical attention (Goldhaber, 2011).

Seniority policies also may discourage cross-state mobility given that school districts frequently use seniority in making personnel decisions, and a teacher's seniority level is not typically transferable across state lines.<sup>6</sup> Yet while there is some empirical evidence on how seniority transfer provisions in collective bargaining agreements may affect within and between district mobility (Koski & Horng, 2007; Cohen-Vogel et al., 2013; Anzia & Moe, 2014; Goldhaber et al., 2015), to our knowledge there is no evidence on whether they influence cross-state teacher

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<sup>6</sup> The National Council on Teacher Quality (2014) finds that in most states, seniority plays a prominent role in layoff decisions. And to the extent that districts' collective bargaining agreements (CBAs) give more senior teachers priority in terms of internal transfers and protection from layoffs, the loss of seniority associated with switching states may make it an unattractive proposition.

mobility.<sup>7</sup> Another seniority-related policy that may also play an important role in teacher labor markets is tenure, which essentially provides teachers with “continuing contracts.” These contracts may be revoked only for adequate cause and are earned after accumulating some level of teaching experience. Again, to our knowledge there is no empirical evidence about whether states’ tenure rules influence cross-state mobility.

One inhibitor of cross-state mobility in the teacher labor market that *has* received some empirical attention in the literature is the structure of teacher pensions. Research on teacher pension systems has demonstrated that switching states can result in large reductions in retirement wealth, potentially discouraging cross-state mobility. In most states, a large proportion of teacher compensation is paid as future retirement benefits, typically in the form of defined benefit (DB) pensions that pay a retirement annuity determined by an employee’s final average salary (FAS) and years of service (YOS).<sup>8</sup> As shown by Koedel et al. (2011) and Costrell and Podgursky (2010), teachers who split their careers between separate pension systems will often earn less than half the total retirement benefits that would have been earned had they stayed in one system. Koedel et al. (2011) study the influence of an in-state pension border in Missouri and find that it greatly reduces the mobility of school leaders (such as principals).

## **2.2     *Features of the Oregon and Washington Teacher Labor Markets***

This section describes features of the Oregon and Washington teacher labor markets that may influence cross-state mobility, specifically licensure processes, tenure and seniority rules, compensation levels, and pension system characteristics. Key features of these labor market factors are presented in **Table 1** and described below.

[TABLE 1 ABOUT HERE]

### Teacher Licensure Procedures

Teachers in Oregon and Washington are required to be licensed through state-regulated processes. In both states (as of 2015) there are two tiers of teaching licenses: initial and continuing. Initial licensure requires that a teacher graduate from a recognized teacher preparation program and pass basic skills and subject matter exams. These licenses are valid for a limited period of time, after which a continuing license must be obtained to continue teaching. Depending on the state and hire date, continuing licensure requirements may consist of the accumulation of professional experience, professional development, continuing education, and/or the demonstration of proficiency in areas such as pedagogy and content knowledge.

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<sup>7</sup> While the use of seniority in personnel decisions in the U.S. is well documented (e.g., National Council on Teacher Quality, 2014), to the best of our knowledge there is no documentation of how seniority is calculated. Many states give school districts discretion over how to calculate seniority, and in reviewing the CBAs of a number of large U.S. school districts, we have been unable to find evidence that school districts tend to consider any out-of-district experience when determining seniority. Below, we discuss the seniority policies of Oregon and Washington, but the extent to which they are representative of policies in other states is unclear. The extent to which seniority rules may discourage cross-state mobility more than within-state mobility (i.e., movement across districts) will largely depend on how seniority is calculated. If seniority is determined by in-district experience, the seniority-related costs associated with switching states are essentially the same as the costs associated with switching districts. If seniority is determined by in-state experience, those costs become quite different

<sup>8</sup> For more information on teacher pension systems in the U.S. see National Education Association (2010).

In Oregon, teachers initially licensed prior to 1999 hold Basic and Standard teaching licenses, which can be renewed indefinitely if teachers had required levels of employment and professional development. Since 1999, newly licensed teachers first obtain the Initial Teaching License I (ITL I),<sup>9</sup> and then the ITL II. Obtaining the ITL II, which can be renewed every three years, requires additional graduate-level coursework germane to public education and the teacher's field of instruction. Between 1999 and 2005, Oregon teachers were required to progress to a Continuing Teaching License (CTL). The CTL requires that a teacher satisfy the requirements for ITL II, hold a master's degree or higher, have at least five years of teaching experience, and complete a CTL program of study at an approved college or university. The CTL program culminates in the assembly of a professional portfolio that demonstrates a teacher's proficiency in a series of teaching standards.<sup>10</sup> Since 2005, the CTL has been optional and a teacher may continually renew the ITL II license.

Washington has also reformed its continuing licensure procedures, though the details and timing are different from Oregon's changes. Teachers licensed prior to 1987 were issued Standard/Continuing licenses that are valid for life. Starting in 1987, new teachers were issued continuing licenses that must be renewed every five years and require a minimum amount of continuing education study.<sup>11</sup> In 2000, the Professional Certificate was established as the state's continuously renewable teaching license. Similar to the CTL in Oregon, it required completion of a program offered by a college or university and the creation of a professional portfolio demonstrating proficiency in teaching. However, the university program component was made optional in January 2010 and dropped in September 2011 (though many teachers still enroll in various support programs) and the state has adopted the ProTeach Portfolio as the assessment to be passed for professional certification.<sup>12</sup> Renewal rules for the Professional Certificate are essentially the same as those for the post-1987 Continuing Certificate.

### Teacher Tenure and Seniority

Tenure laws in both Oregon and Washington have changed over the last two decades. Oregon ended tenure as it is traditionally understood when it passed Senate Bill 880 in 1997, which mandated that all current and new teacher contracts be renewable two-year contracts. The law also streamlined the appeals process for dismissals and gave districts the authority to use competency criteria rather than seniority alone in making certain personnel decisions.<sup>13</sup> Tenure still exists in Washington, and is earned after the accumulation of three years of experience. Prior to 2010, tenure was awarded after teaching two years. Teachers moving between districts within the state have a one-year probationary period in the new district, after which tenure is reinstated.

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<sup>9</sup> The ITL I is valid for three years and may be renewed twice with the completion of four and a half quarter hours of graduate credit.

<sup>10</sup> In lieu of completing a CTL program a teacher can earn certification from the National Board of Professional Teaching Standards (NBPTS).

<sup>11</sup> Regarding current standards for the renewal of post-1987 certificates, referred to as "Continuing (Clock Hour) Certificates", see <https://www.k12.wa.us/certification/Teacher/ContinuingClockhours.aspx#maintain>.

<sup>12</sup> Like Oregon, Washington accepts certification from the NBPTS in lieu of the professional certification process. See <https://www.k12.wa.us/certification/teacher/procert-program.aspx> for more information on certification under the ProTeach portfolio.

<sup>13</sup> McGuinn (2010) finds that this change and similar reforms in other states did little to alter how teachers are actually dismissed.

Seniority is also determined by level of experience and is used by both states as an important criterion in personnel decisions. For instance, the teacher layoff procedures dictated by state law specify that districts must first compile a list of available positions and qualified staff and then determine the seniority rank of teachers as a determining factor for which personnel are to be retained.<sup>14</sup> Seniority is calculated as experience accumulated since the first day of service with the school district. The law allows districts to retain a teacher with less seniority if there is evidence that the individual exhibits greater competence or merit.

In contrast to Oregon, Washington calculates teacher seniority based on experience accumulated within the state rather than within a particular school district.<sup>15,16</sup> For example, in Federal Way one year of out-of-state experience counts as 0.75 years of in-state experience. State code allows districts to collectively bargain with their teachers' unions to set regulations on whether and how to use seniority in personnel decisions, but the vast majority of school districts use in-state seniority as the primary factor in determining layoffs and decisions related to within-district transfers (Goldhaber et al., 2015). As of 2015, Washington is in the process of adopting a new performance-based teacher evaluation system and will mandate that seniority not be the sole factor considered in teacher layoffs decisions.

### Teacher Salaries

In both Oregon and Washington, teachers' base salaries are determined by salary schedules that account for level of education, years of experience, and number of continuing education credits. Each state pays significantly higher salaries to teachers who have earned credits beyond a bachelor's degree or who have obtained a post-graduate degree. In Portland, Oregon, for example, a teacher with a bachelor's degree and 15 additional credits will earn between \$37,501 and \$55,293 depending on level of experience. With a master's degree, the same teacher would earn between \$44,721 and \$65,722; the pattern in Washington is similar.<sup>17</sup>

An important difference between the two states is that Oregon salary schedules are negotiated through collective bargaining at the *district* level, while in Washington the entire state follows the same base salary schedule.<sup>18</sup> In fact, Oregon has a great deal of variation in salary schedules across school districts. **Figure 1** presents the maximum step in each district's salary schedule for

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<sup>14</sup> See Procedure for Reduction of Teacher Staff Due to Funding or Administrative Reason, Oregon Revised Statute § 324.934.

<sup>15</sup> See Hiring and Discharging of Employees — Written Leave Policies — Seniority and Leave Benefits of Employees Transferring Between School Districts and Other Educational Employers, Revised Code of Washington § 28A.400.300.

<sup>16</sup> However, several districts give at least partial credit for out-of-state experience in determining seniority rankings. For example, in Federal Way one year of out-of-state experience counts toward 0.75 years of in-state experience. The other districts are Centerville, Enumclaw, Pullman, and Woodland. For expanded analysis on reduction in force procedures in Washington see Goldhaber and Theobald (2013).

<sup>17</sup> Information on Oregon teacher salaries can be found at <http://www.osba.org/~media/Files/Resources/Employee%20Management/2013-14%20Salary%20Survey%20Book.pdf>. Information on Washington teacher salaries can be found at <http://www.k12.wa.us/safs/pub/per/salalocschedule.pdf>

<sup>18</sup> The base salary schedule determines the amount of state funding that districts receive for teachers at particular steps on the salary schedule. There are 12 districts that receive slightly higher allocations (between 0.6 and 5 percent) as a result of a policy grandfathering in higher historical salary levels in those districts. While base salaries in Washington do not generally deviate from the state schedule, state regulations do allow districts to exceed base salaries and benefits by separate contracting for additional time, for taking on additional responsibilities, for incentives, or for implementing specific measurable innovative activities (including professional development).

a teacher with a master's degree (see **Figure A1** in the Appendix regarding entry level base salaries). While Oregon has many districts with lower compensation levels than those in Washington, the districts in the state's most populous areas (particularly the Portland metropolitan area) tend to have levels of compensation that are comparable or higher than those in Washington.

[FIGURE 1 ABOUT HERE]

### Teacher Pension Systems

The Oregon Public Employees Retirement System (PERS) currently manages two distinct pension programs that include three specific plans: the Chapter 238 Program (Tier One and Tier Two) and the Oregon Public Service Retirement Plan (OPSRP). Enrollment in these plans is determined by a teacher's date of hire. Within the Chapter 238 Program, teachers hired on or before January 1, 1996 are Tier One members, while Tier Two members were hired between January 1, 1996 and August 28, 2003. Individuals hired after August 28, 2003 are enrolled into the OPSRP program. Each Oregon plan is a hybrid pension plan that includes a defined benefit (DB) that is funded by the employer (i.e., the school district) and a defined contribution (DC) investment account that is funded either by the employee or employer.<sup>19</sup> Each plan has a five-year vesting period, after which a teacher is eligible to receive employer-funded benefits in retirement.

There are several important differences between the Oregon plans. First, employee contributions are placed into separate accounts for each plan. Tier One members can place contributions into a "regular account" that prior to 2000 earned a minimum return of 8 percent (it could earn more under favorable market conditions); since 2000 it has earned the guaranteed return of 8 percent, but not more than that.<sup>20</sup> Tier Two and OPSRP members contribute to accounts that earn market returns on investments, whether positive or negative. Since 2004, all ongoing employee contributions (regardless of pension plan membership) have been placed in the state's Individual Account Program (IAP), which is also subject to market returns. Second, the benefit formulas of the three plans differ. Tier One and Tier Two members earn an annual benefit equal to the maximum of  $0.0167 * YOS * FAS$  and  $Account * AEF * 2$ , where *YOS* is years of service, *FAS* is final average salary,<sup>21</sup> *Account* is the value of the teacher's "regular account", and *AEF* is an actuarial equivalency factor. Tier Two members retain the assets in their IAP account regardless of which two benefit formula is selected but unlike the *account*, IAP assets are not matched by the state. OPSRP members retire with the value of their IAP investment accounts (which can be annuitized based on the AEF) and an annual DB annuity equal to  $0.015 * YOS * FAS$ . Third, retirement eligibility differs for the three plans (see **Table 1**).

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<sup>19</sup> Employees would typically make investment account contributions out of their own salaries, but through collectively bargained agreements, as of 2014, 53 percent of Oregon Employers (covering about 70 percent of employees) cover this cost, which is generally referred to as a PERS "pick up" (Oregon PERS, 2013).

<sup>20</sup> Due to the Oregon pension system's large unfunded liabilities, it is unlikely that "regular account" earnings will ever again exceed the 8 percent minimum. See [http://www.oregon.gov/pers/docs/general\\_information/pers\\_by\\_the\\_numbers.pdf](http://www.oregon.gov/pers/docs/general_information/pers_by_the_numbers.pdf) for funding status and a breakdown of historical earnings on investment account contributions.

<sup>21</sup> Oregon uses the average of a teacher's three highest consecutive years of compensation to determine FAS.

Washington State currently operates three retirement systems that cover teachers: TRS1, TRS2, and TRS3.<sup>22</sup> TRS1 and TRS2 are traditional DB systems in which retirees are paid an annuity formulaically determined by *YOS* and *FAS*. The third system, TRS3, is a hybrid system comprised of a DB component funded by employers and a DC component that places employee contributions into a personal investment account. Employees hired prior to 1977 were enrolled in TRS1. Employees hired between 1977 and 1996 were enrolled in TRS2 and active members have had the option to transfer to TRS3 since 1996. Employees hired between 1996 and 2007 were mandated into TRS3, and those hired since 2007 have been able to choose between TRS2 and TRS3, with TRS3 as the default option.

There are several important differences between the TRS plans. First, the vesting periods are different: five years for TRS1 and TRS2 and ten years for the DB component of TRS3. Second, the annual benefit formulas for TRS1 and TRS2 are  $0.02 * YOS * FAS$ , and  $0.01 * YOS * FAS$  for TRS3.<sup>23</sup> Like OPSRP members in Oregon, TRS3 members receive the value of their investment accounts, regardless of vesting status. Third, employee contributions under TRS2 are variable and depend on the funding status of the pension fund.<sup>24</sup> TRS1 members contribute 6 percent of salary and TRS3 members can choose from among six contribution options ranging between 5 and 15 percent of salary. Fourth, a provision in TRS3 for employees with at least 20 *YOS* increases the value of the employee's DB annuity by approximately 3 percent for each year between separation and retirement. Finally, TRS1 members are eligible for full retirement at age 60 (or age 55 with 25 *YOS*), much earlier than TRS2 and TRS3 members who are eligible for full retirement at age 65 (or age 62 with 30 *YOS*).

### **2.3 *Costs Associated With Moving Across States***

When moving from one state to the other, teachers in Oregon and Washington face a number of potential costs associated with licensure, tenure and seniority, and pensions. The mechanisms driving these costs and how they may vary according to a teacher's career status are described, in brief, below.<sup>25</sup>

Oregon and Washington have their own teacher licensure systems and transferring between these states requires teachers to go through the process of re-establishing licensure in a new state, which may be time consuming and expensive depending on a teacher's standing prior to moving. While initial licenses are not directly transferable, states generally recognize qualifications earned out-of-state (i.e., teacher-training programs and some licensure exams). For teachers holding certain continuing licenses, Oregon and Washington do offer some degree of reciprocity. Specifically, Oregon recognizes Washington's Professional Certificate as being equivalent to its CTL, and Washington recognizes the CTL as being equivalent to its Professional Certificate. To date, neither Oregon nor Washington grant such reciprocity to continuing licenses from any other states. While this reciprocity may appear to make transitions between Oregon and Washington relatively easy, it is important to keep in mind that many teachers in these states do not currently

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<sup>22</sup> For more details about these plans, see Goldhaber et al. (2012).

<sup>23</sup> Under TRS1, *FAS* is equal to the average of an employee's two highest paid years. Under TRS2 and TRS3, *FAS* is equal to a teacher's average salary during his or her five consecutive highest paid years.

<sup>24</sup> Historically, TRS2 employee contribution rates have averaged around 4.5 percent.

<sup>25</sup> A teacher switching states may also face costs (or benefits) due to lower (or higher) compensation, but these are not specific to cross-state movers. Whether a teacher faces costs or benefits in terms of salary will depend on which districts she is leaving and entering.

hold either license. The CTL was only established in 1999 and was made optional in 2005, and the Professional Certificate was established in 2000. Furthermore, both licenses are only available to relatively experienced teachers: the CTL requires at least five years of professional experience, and Washington's initial license is valid during a teacher's first four and a half years of experience. Most teachers crossing the state border without a CTL or Professional Certificate are more or less starting from scratch.

An additional impediment to reciprocity facilitating cross-state mobility is that the reciprocity agreements between Oregon and Washington may not be seen as easily accessible to those teachers who might wish to switch from one state to another. For instance, on Washington's teacher certification website, clicking the "reciprocity" link opens a webpage with the following statement:

*Certificates or licenses from another state or jurisdiction do not cover employment in Washington. While the interstate agreement facilitates the movement of educators among states and other jurisdictions that are members of the National Association of State Directors of Teacher Education and Certification (NASDTEC), our state rarely uses the provision of the contract for individuals who hold certification in another state.*<sup>26</sup>

It is only by reviewing the requirements for professional certification and clicking on the right link that one learns the CTL is accepted in lieu of the Professional Certificate.<sup>27</sup> The information provided by Oregon is similarly opaque.<sup>28</sup> As noted above, there is evidence that frustration with licensing procedures discourages teachers from staying in the profession when moving to a new state (Darling-hammond & Sykes, 2003; Cogshall & Sexton, 2008), and it is likely that out-of-state teachers entering the Oregon and Washington labor markets would face similar frustrations.

A different licensure option that is recognized by both states as equivalent to the CTL and Professional Certificate is certification by the National Board for Professional Teaching Standards (NBPTS). Very few Oregon teachers hold this license. As of 2010, 0.8 percent (243 teachers) of the Oregon teacher workforce were reported to be NBPTS certified compared to 9.6 percent (5,232) in Washington (Exstrom, 2011). While it would be relatively easy for these Washington teachers to switch states, doing so could be costly. Washington pays a \$5,000 annual bonus to NBPTS certified teachers, and an additional \$5,000 to those who teach in challenging schools.<sup>29</sup> Oregon provides no such financial incentives.

Tenure and seniority rules may also discourage teacher mobility from Washington to Oregon, but are unlikely to discourage movement in the other direction. As noted above, Oregon abandoned its tenure policies in 1997. The primary difference between the seniority rules in Oregon and Washington is the manner in which seniority is calculated. In Oregon, seniority is determined by in-district experience and a cross-state move is no more costly in terms of loss-of-seniority than a

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<sup>26</sup> See, as of January 1, 2015: <https://www.k12.wa.us/certification/Reciprocity.aspx>

<sup>27</sup> See <http://www.k12.wa.us/certification/Teacher/ProCert.aspx>, and follow through to <http://www.k12.wa.us/certification/colleges/equivalentstates.html>.

<sup>28</sup> For instance, see <http://www.oregon.gov/tspc/Pages/Out-of-State-.aspx>.

<sup>29</sup> In 2000, Washington created a bonus equal to 10 percent of base salary paid to NBPTS certified teachers. In 2008, the bonus pay was changed to a flat salary increase of \$5,000, with an additional \$5,000 bonus for NBPTS certified teachers working in high-poverty schools.

within-state move across districts. The situation is quite different in Washington, where seniority is determined by in-state experience and teachers can switch districts without losing seniority. For Washington teachers, crossing the state border is likely to be significantly less appealing than crossing a district border.

Teacher pension systems also impose a significant penalty for teachers who split careers between Oregon and Washington. We discuss this in greater detail in **Appendix B**, but, in short, switching from one pension system to another tends to lower the total value of an employee's DB annuity due to pension vesting rules, the fact that a pension's value is determined by a final average salary that is fixed at a lower rate in the state that you leave (due to both inflation and salary growth), and early retirement rules that reward long tenures. **Figure B1** demonstrates the costs associated with splitting a career between Oregon's OPSRP plan and TRS2 or TRS3 in Washington for a representative teacher with a 35-year career. These costs are dominated by the plans' rules that allow early retirement with the accumulation of 30 YOS.<sup>30</sup> To accumulate 30 YOS in at least one state, the teacher must switch states either very early or very late in her career. The costs can be particularly high (depending on the timing of the switch) when switching to or from TRS2, showing how the incorporation of non-traditional plan features (such as the DC components in OPSRP and TRS3) can ameliorate pension-related barriers to cross-state mobility.

The plots in **Figure B1** also demonstrate that the level of benefits provided by OPSRP is significantly higher than that provided by either TRS2 or TRS3. Hence, switching states is particularly costly in terms of pension wealth for teachers leaving Oregon for Washington. That said, Oregon's two older pension plans, Tier One and Tier Two, are likely to impose significantly lower costs to cross-state mobility. Under the money match provision, they essentially switch between pure DB and pure DC plans depending on how well the PERS investment portfolio performs. This provision makes early and mid-career exits less costly, particularly under favorable market conditions, because the value of the money match account (unlike the DB annuity) keeps growing until retirement even after a mid-career separation.

### 3. Data

This section describes the Oregon and Washington data sets and the process of merging the two data sets to identify teachers who crossed the state border.

#### 3.1 Data Sources

Job assignments held by Oregon teachers are available from a publicly available administrative data set obtained from the Oregon Department of Education. The data span the school years ending between 2001 and 2014 and provide teacher name, ethnicity, highest degree earned, school district, type of position, base salary level, whether contributions to PERS are "picked up" by the school district, years of experience in Oregon, and years of out-of-state experience. The data spanning 2007 to 2014 also include employee birth dates. Teachers employed in at least one year during the 2007 to 2014 time span have a unique identification number. For teachers last observed prior to 2007, identification numbers are generated based on unique combinations of

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<sup>30</sup> An Oregon teacher in OPSRP can retire seven years earlier (at age 58) than a teacher with less than 30 years of service. Washington teachers with 30 years of service can retire with full benefits at age 62 rather 65 (see **Table 1**).

teachers' names and characteristics.<sup>31</sup> Overall, the data provide 419,213 teacher-year observations, and 72,035 unique teacher observations.

Job assignments held by Washington teachers are derived from publicly available administrative data obtained from the state's Office of Superintendent of Public Instruction (OSPI) S-275 personnel reporting system. The data provide identification numbers and information on teacher characteristics, assignment type, location of position, salary, highest degree earned, and experience level. For the purposes of this study, we use data from the school years ending between 1997 and 2014 and restrict the sample to individuals who are identified as holding a classroom teaching position. Overall, the data provide 981,673 teacher-year observations describing the employment of 113,370 unique teachers.

The Washington data is supplemented by other state-level administrative data sets. Teachers who hold a Professional Certification (which is transferable to Oregon) are identified using data from OSPI. Teachers' pension plans are identified using data from the state's Department of Retirement Services (DRS).<sup>32</sup> Lastly, school and district-level characteristics for both Oregon and Washington are obtained from the Common Core of Data (CCD) compiled by the National Center for Education Statistics (NCES). These include information about student demographics, school level, and type of locale (e.g., urban vs. rural).

### **3.2 *Merging Oregon and Washington Data***

To begin the process of identifying teachers that have moved between Oregon and Washington we isolate the subsample of teachers who exited the teacher workforce of Washington or Oregon during the study period or entered the teacher workforce from outside the states. Specifically, we identify 43,906 individuals who the data show exited the Oregon public teacher workforce prior to 2014 and 57,461 who exited the Washington teacher workforce prior to 2014. Teachers in the Oregon sample are identified as entering the Oregon teacher workforce based on having out-of-state experience greater than zero (17,161 individuals), and those in the Washington sample are identified as entering the Washington teacher workforce based on having obtained their licensure credentials through OSPI (16,843 individuals).<sup>33</sup>

Teachers are matched across states using last name, first initial, date of birth, and the criterion that the last-observed employment date in one state precedes the first-observed employment date in the other.<sup>34,35</sup> In some cases, a teacher's name changes over time. Often, this is due to a

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<sup>31</sup> The identification numbers are used to connect teacher observations across different years, but are not valid for matching across state lines.

<sup>32</sup> The DRS data is restricted to teachers who were employed between the 1996 and 2009 school years.

<sup>33</sup> Teachers originally certified in a different state will generally obtain certification through OSPI rather than from one of the state's approved teacher training program institutions (e.g., University of Washington).

<sup>34</sup> While the Washington data used in the analysis is restricted to individuals in classroom teaching positions, we relax this restriction during the merging process to more accurately identify each person's first and last year of employment in the state by only requiring that the individual be in classroom teaching position during at least one year of employment. The data received from Oregon is already restricted to classroom teachers and does not allow us to perform the same adjustment.

<sup>35</sup> Defining the first and last years of employment in this way is intended to avoid identifying individuals as "exiting" a state's workforce when in fact they left only temporarily. Previous research has found that many teachers who exit teaching do in fact return at a later point in time (Beaudin, 1993; Grissom & Reininger, 2012). This sample

teacher being married and adopting a spouse's last name or a hyphenating their name. In other cases, names are simply spelled differently in some years.<sup>36</sup> This is particularly true regarding first names (e.g., "James" in one year and "Jim" in the next), which is the primary reason that we match using first initial rather than first name. To account for various spellings, we keep the first and last-observed first and last names and iteratively match on all possible combinations. Matching on last name, first initial, and date-of-birth yields a small number of duplicate matches, in which case records are inspected to identify the most plausible match. In most cases, the first name clearly indicated the correct match. For teachers without date of birth information, we merge on first and last name (here, using first initial is too imprecise). Each match is inspected to ensure that gender, ethnicity, highest degree, and experience levels and age (as reported in the Washington data) are consistent across the two states. Overall, across all years of our study, we identify 477 teachers as switching from Oregon to Washington and 522 teachers as switching from Washington to Oregon.

The robustness of the primary matching algorithm is assessed by conducting two less restrictive merges. First, we merge on last name and date of birth. Second, we merge on first initial and date of birth. For identifying individuals switching from Oregon to Washington, the last name and date of birth merge identified zero additional matches that appeared likely to be legitimate. The first-initial date-of-birth merge identified only three additional matches considered to be legitimate based on reviewing the teacher's full name, gender, ethnicity, and experience levels. For identifying individuals switching from Washington to Oregon, the last name and date of birth merge yielded zero additional matches and the first initial date of birth merge yielded 7 additional legitimate matches.

While the population of matched teachers appears to be fairly robust to the merging algorithm, we do not know how many teachers we *should* be identifying. When merging two data sets, the researcher typically knows that all the observations in one of the data sets should be found in the other. In contrast, we can only identify people who left their current teaching positions and *may have* moved to a different state, or appear to have teaching experience in a different state that *may* include Oregon or Washington. Credential data from OSPI seems to imply a high rate of movement of out-of-state teachers into Washington,<sup>37</sup> but it does not distinguish between individuals who were merely credentialed out-of-state (which would include those who attended an out-of-state teacher-training program) and those who held an out-of-state classroom teaching position. Furthermore, many teachers who obtain a Washington credential never obtain a teaching position in Washington. Using OSPI credential data from the 2005-2006 school year we identify 1,666 individuals who received their initial licensure credentials through OSPI. Only 50 percent of these individuals later appear in Washington's S-275 administrative data as teachers, and only 28 percent later appear with at least one year of experience in their first year of

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restriction does, however, preclude the matching of teachers who cross the border and later return to their original state during the sample period.

<sup>36</sup> Teacher names were standardized by capitalizing all letters, removing spaces, apostrophes, and hyphens, and removing suffixes such as "JR." or "II", since these tend to be inconsistently used across databases.

<sup>37</sup> For instance, see the state's 2005-2006 annual report on certificates issued at <http://www.k12.wa.us/certification/pubdocs/annrpt0506.pdf>.

employment. Finally, “experience”, as it is reported in the S-275 data, may include experience earned in positions that are not “classroom teaching positions”.<sup>38</sup>

To better understand the rate at which teachers cross state boundaries in the U.S., we examine cross-state mobility patterns from a national sample of teachers. The Schools and Staffing Survey (SASS) provides a nationally representative snapshot of districts, schools, and teachers through periodic surveys of these groups. One feature of the SASS is the Teacher Follow-up Survey (TFS), which is administered to a sample of the teachers who were surveyed by the SASS the previous year. The purpose of the TFS is to determine how many teachers remained at the same school, moved to a different school, or left the profession.

We use the 2000-2001 TFS to calculate the proportion of teachers who are employed as public educators in a different state than in the previous year, and find that 0.91 percent switch states, and 0.43 percent are employed in an adjacent state. National levels of cross-state mobility are likely to be higher than mobility between Oregon and Washington due to the fact that Oregon and Washington are geographically large states and a cross-state move is more likely to entail a long-distance move. For example, limiting the TFS sample to the Rocky Mountain and Western states, we find that 0.56 percent of teachers are teaching in a different state the following year, and 0.29 percent are employed in an adjacent state.<sup>39</sup>

In current the study, we identify 0.07 percent of Oregon teachers and 0.03 percent of Washington teachers as holding a classroom teaching position in the other state in the following year. Considering that Oregon borders four adjacent states, the proportion of teachers moving from Oregon to Washington is fairly consistent with the rates of movement calculated using the TFS data for the Rocky Mountain and Western States. The level of movement from Washington to Oregon, however, is considerably lower than the average levels of cross-state movement implied by the TFS. One potential reason for observing lower rates of movement from Washington to Oregon is that its neighbors are smaller and therefore have less capacity to absorb exports from Washington;<sup>40</sup> in the study sample, the total number of teachers in Washington is over 50 percent greater than in Oregon (113,370 vs. 72,035).

These numbers may seem low compared to other figures on the hiring of “out-of-state” teachers. For instance, Coggshall and Sexton (2008) report that roughly 10 percent of new hires in Georgia are from out-of-state. But, it is worth remembering that figures on out-of-state hiring include teachers who received their training at institutions in a different state, and that many of these individuals may never have been classroom teachers in the state in which they were originally trained. Using OSPI’s certificate and S-275 data from Washington, we identify teachers who are arriving from out-of-state. Among those who later hold a classroom teaching position in

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<sup>38</sup> Regarding the calculation of experience in the S-275 administrative data, see Washington Administrative Code WAC 392-121-280, Section (5).

<sup>39</sup> We do not use the Oregon and Washington TFS data alone because the sample sizes in these states are too small to draw meaningful conclusions. The 2000-2001 TFS surveys only 70 Washington teachers (zero of whom switch to Oregon) and 70 Oregon teachers (less than 10 of whom switch to Washington). Note that the aforementioned figures have been rounded to adhere to NCES policies.

<sup>40</sup> For example, Washington exporting 1 percent of its teachers to Oregon would correspond with Oregon importing 1.85 percent of its teachers from Washington. In the other direction Oregon exporting 1 percent of its teachers to Washington would correspond with Washington importing 0.54 percent of its teachers from Oregon.

Washington, only half have a level of experience in their first year that suggests out-of-state teaching experience.

#### 4. Descriptive Analysis of Patterns of Cross-State Mobility

In this section we present a descriptive analysis of cross-state mobility and the factors that may influence a teacher's propensity to cross the state border. Of particular interest are the following descriptive questions:

- What is the overall level of cross-state mobility between Oregon and Washington, and how does it compare to cross-district mobility?
- Where are teachers who move across the state border from and where do they go?
- What are the characteristics of teachers who cross the state border, and how do they compare to teachers who move within state?

To answer these questions, we look at patterns of cross-state mobility in terms of time-related factors, teacher experience, proximity to the state border, and individual teacher characteristics. In each case, the level of within-state mobility (across districts) provides a baseline for comparison

**Figure 2** shows the departure and arrival locations of teacher transfers in Oregon and Washington, including cross-state (represented by solid lines) and within-state (represented by dashed lines) transfers. Note that the intensity of mobility between two particular districts is not represented in these maps: each line depicts one or more moves between two specific districts. For instance, five teachers moving from the Portland School District to the Seattle School District would be displayed as a single line. **Panel A** represents moves originating in Oregon and **Panel B** represents moves originating in Washington. Three patterns are evident in these mobility maps. First, the vast majority of cross-state moves in both directions occur along the I-5 corridor, which connects the most populous regions of Oregon and Washington. This is not surprising, given that a large proportion of the states' teaching positions are located in these areas. Second, there is a clear disparity between the number of within-state district-to-district connections and the number of cross-state district-to-district connections. Third, many in-state moves traverse long distances.

[FIGURE 2 ABOUT HERE]

##### 4.1 Cross-State Mobility over Time

Cross-state mobility is likely to vary over time due to factors that influence the number of teachers being hired (such as population trends and state budget issues), and changes to state policies that affect the cost of cross-state mobility (e.g. pension policies). **Figure 3** presents rates of within-state (Panel A) and cross-state (Panel B) mobility during 2001–2013.

In both Oregon and Washington, there is a good deal of year-to-year variation in the levels of within-state mobility and cross-state mobility.<sup>41</sup> The annual rate of within-state mobility is highly

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<sup>41</sup> The average rate of within-state mobility (taken across years) is 1.65 percent in Oregon and 1.84 percent in Washington, with standard deviations of 0.46 percent and 0.57 percent respectively. The average rate of cross-state mobility (taken across years) is 0.07 percent in Oregon and 0.03 percent in Washington, with standard deviations of 0.03 percent and 0.02 percent respectively.

correlated between the two states ( $\rho = 0.53$  overall and  $\rho = 0.93$  since 2003) and appears to comport with macro-economic trends.<sup>42</sup> Indeed, there is a positive correlation between the annual rate of within-state mobility and the level of in-state hiring as measured by the number of new teachers entering the workforce in the following year ( $\rho = 0.51$  in Oregon and  $\rho = 0.96$  in Washington).<sup>43</sup> The annual rate of cross-state mobility is also positively correlated between the two states ( $\rho = 0.43$ ). However, while moves originating from Washington appear to correspond with hiring levels in Oregon ( $\rho = 0.73$ ), the relationship between mobility and hiring is less consistent in regard to cross-state moves originating in Oregon ( $\rho = 0.03$  and  $0.24$  since 2003).

[FIGURE 3 ABOUT HERE]

There are several state-level policy changes that might be expected to have influenced cross-state mobility. For instance, in terms of licensure, Oregon's CTL became optional in 2005, which may have made it less costly for Washington teachers to become licensed in Oregon. And in terms of pensions, Oregon replaced its Tier Two pension plan with the OPSRP plan for new hires in 2003, a move that was generally viewed as a large benefit reduction (Oregon Public Employees Retirement System, 2013). On the other hand, Washington re-opened its TRS2 pension system as an option for new hires in the 2008 school year, which may have made employment in Washington more attractive for some teachers.<sup>44</sup> We do not observe clear shifts in patterns of mobility that align with these policy changes. But, given the aforementioned relationship between mobility, hiring rates, and macroeconomic trends, one should be cautious in drawing conclusions because it is difficult to disentangle the influence of these factors on mobility from the influence of any particular state-level policy change.

## 4.2 *Level of Teacher Experience*

As discussed in Section 2.3, the cost of crossing a state border is related to a teacher's level of experience in several ways. First, switching states may be unattractive to more experienced teachers who are reluctant to give up the benefits associated with seniority. Second, as described in Section 2.3, the cost of transferring to a different pension system tends to be higher for mid-career teachers. Finally, more experienced teachers in Oregon and Washington are more likely to hold a continuing license and may be reluctant to repeat the process of obtaining one in a new state.<sup>45</sup> In interpreting the observed relationship between experience and cross-state mobility, it is also important to consider its relationship to *within-state* mobility. Others have found that more experienced teachers are less likely to move across schools and districts (e.g., Hanushek et al., 2004; Keigher & Cross, 2010), and it is possible that more experienced teachers are less mobile in general, and not due to experience-related barriers to cross-state mobility in particular.

[FIGURE 4 ABOUT HERE]

<sup>42</sup> The correlation between the annual rate of within-state mobility and GDP growth is 0.38 in Oregon and 0.31 in Washington.

<sup>43</sup> Newly hired teachers are identified as those who appear in the administrative data for the first time in a particular year.

<sup>44</sup> During the school years ending in 2008 and 2009, approximately 40 percent of newly hired teachers in Washington chose to enroll in TRS2 (Goldhaber & Grout, 2014).

<sup>45</sup> As discussed in Section 2.3, while there is reciprocity between Oregon's CTL and Washington's Professional Certificate, this information is not readily discoverable. Moreover, many teachers in the study sample became licensed prior 1999 (in Oregon) and 2000 (in Washington) and hold continuing licenses that are not transferable between Oregon and Washington.

**Panel A of Figure 4** plots the rates of within-state and cross-state mobility by years of experience for moves originating in Oregon. **Panel B** does the same for moves originating in Washington.<sup>46</sup> Consistent with the expectations outlined above, there is a negative relationship between cross-state mobility and years of accumulated experience. However, it is difficult to say whether the experience-related impediments to cross-state mobility discussed above play an important role in this relationship, because the decline in cross-state mobility that occurs between one and five years is very similar to the decline observed in district mobility. For example, cross-state mobility in Oregon is 55 percent lower in the fifth year than in the first year, while in-state district mobility is 48 percent lower; in Washington cross-state mobility is 50 percent lower and in-state district mobility is 54 percent lower in the fifth year.<sup>47</sup> This simple analysis suggests that experienced teachers may be generally less mobile, and not necessarily because they face greater costs when switching states. The relationship between experience and mobility is further explored in Section 4.4, below.

### 4.3 *Geographic Proximity*

Oregon and Washington are relatively large states and proximity to the border is likely to influence the propensity of teachers to switch states. Here we focus on rates of mobility among teachers employed in districts on the Oregon-Washington border, and among teachers within the Portland-Vancouver-Hillsboro Metropolitan Statistical Area (henceforth referred to as the Portland-Vancouver MSA), which straddles the state line.<sup>48</sup> **Table 2** presents the levels of within-state and cross-state mobility among all districts, border districts, and districts that overlap with the Portland-Vancouver MSA.

[TABLE 2 ABOUT HERE]

The statistics in **Table 2** indicate that, not surprisingly, proximity to the border has a strong influence on cross-state mobility among Washington teachers, and less influence on teachers from Oregon.<sup>49</sup> This asymmetry is likely driven by the population distribution in the two states; there are many more Oregon teachers than Washington teachers in districts near the border.<sup>50</sup> Hence, proximity to the border is closely related to mobility provided that there is a density of opportunities near to the border on the other side. This is demonstrated by the figures in **Table 3** as well: teachers in districts near the border are over-represented among cross-state movers (relative to within-state movers), and dramatically so in the Washington-to-Oregon direction. For instance, 3 percent of within-state movers in Washington are from districts in the Portland-Vancouver MSA, but 31 percent of cross-state movers from Washington come from those districts.

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<sup>46</sup> Washington teachers hired prior 1986 are excluded from these figures because we cannot calculate the accumulation of experience during those years.

<sup>47</sup> After ten years of experience, the rates of within-state and cross-state mobility in Oregon fall 61 and 85 percent respectively, and 72 and 75 percent in Washington.

<sup>48</sup> The geographic definition of the regional labor market was obtained from the Bureau of Labor Statistics. For more information, see <http://www.bls.gov/lau/lmadir.pdf>.

<sup>49</sup> The proportion of Oregon teachers in border districts who switch states is significantly higher than the overall proportion (0.10 vs. 0.07), but the disparity between teachers in border districts and teachers overall is quite small compared to what is observed in Washington.

<sup>50</sup> In Oregon, 18 percent of the observations in the study sample are located in border districts (69,830) and 33 percent are in the Portland Vancouver MSA (129,485). In Washington, only 4 percent of observations are in located in border districts (34,209) and 5 percent in the Portland-Vancouver MSA (49,521).

By focusing on teachers near the border, we can examine the extent to which there are barriers to cross-state mobility independent of geographical distance. Looking at Washington teachers in school districts near the border, we find strong evidence of barriers to cross-state mobility. Rates of cross-state mobility in these areas is many times lower than rates of within-state mobility, in spite of the fact that teachers in those districts are proximate to a large proportion of the teaching positions in Oregon. In Washington border districts, the rate of within-state mobility is 10 times higher than the rate of cross-state mobility, and it is 7 times higher in the Portland-Vancouver MSA districts. When we look only at teachers with less than five years of experience, these disparities are smaller (within-state mobility is 7 and 6 times higher in border and Portland-Vancouver MSA districts, respectively), but still dramatic.

Another way to account for the extent to which the disparity between within-state and cross-state mobility is driven by the “localness” of the teacher labor market is to look at how many teachers make long-distance within-state moves. In both states, most within-state moves are fairly local: 56 percent of district-to-district moves are less than 50 miles in Oregon and 73 percent of moves are less than 50 miles in Washington. Yet, teachers are significantly more likely to move a long distance within their states than to move across the Oregon-Washington border. **Figure 5** presents the ratio of the proportion of teachers who make a within-state move of a particular distance to the proportion of teachers who make a cross-state move. Teachers are approximately 10-20 times more likely to make a within-state move of 50 or more miles than they are to cross the Oregon-Washington border, and over 4 times more likely to make a within-state move of 250 or more miles.

[FIGURE 5 ABOUT HERE]

#### ***4.4 Teacher Characteristics***

Here we analyze the characteristics of teachers crossing the state border and examine if these characteristics are consistent with the barriers to cross-state mobility outlined in Section 2.2. **Table 3** presents mean characteristics of teachers observed moving across districts within-state and teachers observed moving across states, and tests the differences between these means. The left-hand panel presents teacher moves originating in Oregon, and the right-hand panel teacher moves originating in Washington.

[TABLE 3 ABOUT HERE]

Among Oregon teachers, the mobility patterns associated with age and experience are fairly consistent with incentives related to licensure, seniority, and pensions. As discussed in Section 4.2, these factors would lead us to expect higher cross-state mobility among less experienced and younger teachers. Indeed, the least experienced and youngest teachers in Oregon comprise significantly larger proportions of cross-state movers than within-state movers. For instance, 30 percent of the teachers who move across districts within Oregon have less than two years of teaching experience as compared to 37 percent of the teachers who move from Oregon to a Washington school district. By contrast, in Washington, there is little difference in the experience distribution of within-state movers and teachers who move from Washington to an Oregon school district. The Washington findings are surprising given that the state’s seniority and tenure rules make it relatively costly for younger teachers to leave the state, especially relative to the rules in Oregon (see Section 2.3).

In Section 4.2, we speculated that teachers who hold a continuing license may be reluctant to repeat the process of obtaining one in a new state, and hence less likely to cross the state border. Indeed, we find that Washington teachers who hold a Professional Certificate are significantly under-represented among cross-state movers in spite of the reciprocity between the Professional Certificate and Oregon's CTL. They comprise 18 percent of teachers switching districts, but only 8 percent of teachers switching states. This result also suggests that many teachers are unaware of the licensure reciprocity between Oregon and Washington and that poor communication of these rules is creating a barrier to mobility.

The average year-to-year changes in the base salaries of mobile teachers are inconsistent with salary being a primary motivation for making a cross-state move.<sup>51</sup> While cross-state movers earn a higher base salary in the next year, it is less than the increase observed for in-state movers. The mobility of teachers with advanced degrees does, however, suggest that some teachers may be seeking higher compensation. As shown in **Figure 1**, compensation for teachers with master's degrees is higher in many Oregon school districts than in Washington; we find advanced degree holders are significantly over-represented among movers from Washington to Oregon and significantly under-represented for Oregon to Washington movers.

For teachers in each pension plan (except TRS1), the proportion of within-state movers is significantly different from the proportion of cross-state movers. Unfortunately, in this simple analysis we cannot determine the extent to which this mobility may be driven by the features of the pension plans because teachers are generally enrolled in pension plans according to their hire date, and therefore enrollment is highly correlated with a teacher's age and experience. For instance, OPSRP teachers are over-represented among cross-state movers, but the plan only came into existence in 2003 and its members are relatively young and inexperienced. One pension plan feature that is not related to age and experience is the "PERS pickup", under which many school districts pay teachers' contributions to the pension plan on their behalf (effectively increasing take-home pay by six percent). Teachers in these districts are significantly under-represented among cross-state movers, suggesting that this benefit is highly valued.

## 5. Discussion and Conclusion

Mobility in the teaching profession is of considerable policy interest, but there is little empirical evidence on the degree to which public school teachers cross state borders. This paper explores patterns of cross-state mobility between Oregon and Washington and the degree to which features typical of the public teacher labor market may influence mobility. To our knowledge, this is the first paper to track teacher mobility across a state border by merging two state-level administrative data sets.

We identify a number of potential barriers to cross-state mobility between Oregon and Washington, including licensure requirements, rules related to tenure and seniority, and the structure of teacher pension systems. Consistent with these barriers, we observe few teachers crossing the Oregon-Washington border to teach in the other state. In any given year, less than a 10<sup>th</sup> of a percent of Oregon teachers are identified as teaching in Washington the following year,

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<sup>51</sup> Teaching is a second income in many households and decisions to move are likely to be household decisions (Frank, 1978). In an online survey, Coggs and Sexton (2008) ask teachers to list reasons for moving to another state. The most frequently cited reason is following a partner or spouse to another state (50 percent).

and less than one 20<sup>th</sup> of a percent are identified as moving in the other direction. These rates of cross-state mobility are many times lower than observed rates of *within-state* mobility, indicating significant barriers to cross-state mobility. The evidence is particularly strong when we focus on districts near the state border. Among Washington school districts in the Portland-Vancouver MSA, the rate of within-state mobility is seven times higher than the rate of cross-state mobility in spite of the fact that the majority of the teaching jobs in that regional labor market are on the Oregon side of the border. And in both states, the proportion of teachers making a within-state move of 250 or more miles is over four times higher than the proportion making a cross-state move.

While we find clear evidence of barriers to cross-state mobility, the evidence on which features of the teacher labor market may be imposing such barriers is less conclusive. The analysis of the costs associated with cross-state mobility in Section 2.3 suggests that younger and less experienced teachers should be more likely to switch states because they face lower costs associated with cross-state moves. We do indeed observe this pattern, but find that less experienced teachers are also more mobile *within* states. And while younger and more experienced teachers from Oregon are significantly over-represented among cross-state movers, those in Washington are not (see **Table 3**). These results do not imply that the costs imposed by licensure, seniority, and pension structures are not discouraging cross-state mobility, but do suggest that teachers are not necessarily sensitive to the ways these costs vary with age, experience, and licensure status. Hence, marginal modifications to these labor market features might be expected to have relatively little impact on cross-state mobility. More nuanced statistical analyses that control for confounding factors can shed more light on the relationship between features of the states' teacher labor markets and the level of cross-state mobility.

That we find evidence of significant barriers to cross-state mobility should be of interest to policy-makers for a number of reasons. First, prospective teachers may be discouraged from entering the profession if they anticipate that high costs will be associated with future inter-state moves. Second, the high cost of becoming fully licensed in new state is likely to increase attrition among teachers who otherwise would have stayed in the profession. Third, barriers to mobility inhibit the ability of the teacher workforce to flow to states where teachers are in high demand. Strategies to address teacher shortages by increasing out-of-state recruitment are likely to be hindered by the high costs facing those teachers, and teachers in states with a surplus of labor may abandon the profession rather than consider teaching in a different state.

As pointed out by Coggs and Sexton (2008), many of the barriers to cross-state mobility associated with licensure rules are artificial and do not serve any policy purpose (e.g., high fees, slow administrative processes, and duplicative testing and coursework). Lowering those artificial barriers could save both states and teachers time and money. For instance, providing better information about licensure reciprocity between Oregon and Washington could lower a barrier to mobility at virtually no cost. Some features of teacher pension systems may also create “artificial” barriers to mobility. For instance, it is not clear that pension structures that award significantly higher retirement benefits once teachers reach 30 years of service serve a clear policy purpose. To the extent that pension systems are intended to provide retirement security to employees, this type of rule fails the majority of the teacher workforce, over 70 percent of whom leave within 20 years (Mcgee & Winters, 2015).

One aspect of the interaction between barriers to mobility and the teacher labor market that our data do not address is the extent to which teachers *do* cross the state border, but choose not to re-enter the teacher labor market in their new state (we only observe those who do re-enter the teacher labor market). There is at least anecdotal evidence that this does in fact describe the experience of many teachers (Darling-Hammond & Sykes, 2003; Coggshall & Sexton, 2008). Improving the retention of such teachers may be relatively low hanging fruit for states seeking to address shortages of highly qualified teachers in chronically under-staffed areas such as STEM and special education.

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## Tables

**Table 1. Key features of the Oregon and Washington teacher pension plans**

OREGON			WASHINGTON			
Panel A - Teacher Licensure						
Initial Licensure	Graduate from recognized teacher preparation program, pass basic skills and subject matter exams.		Graduate from recognized teacher preparation program, pass basic skills and subject matter exams.			
Continuing Licensure	<i>Standard Teaching License</i>		<i>Standard Teaching License</i>			
	Licensed prior to 1999; can be renewed indefinitely given required levels of employment and professional development.		Licensed prior to 1987; valid for life.			
	<i>Initial Teaching License II</i>		<i>Continuing Teaching License</i>			
	Licensed since 1999; requires additional graduate-level coursework; renewable every 3 years.		Licensed during 1987-2000; requires continuing education; renewable every 5 years.			
	<i>Continuing Teaching License</i>		<i>Professional Certificate</i>			
	Required during 1999-2005; optional since 2005; requires 5 years experience, completion of master's degree and assembly of portfolio demonstrating proficiency.		Licensed since 2000; requires completion of certification course (course optional since 2010) and assembly of portfolio demonstrating proficiency.			
Panel B - Teacher Tenure and Seniority						
Time to Tenure	No tenure.		Prior to 2010: two years. Since 2010: 3 years			
Seniority Calculation	In-district experience.		In-state experience.			
Use of seniority in lay-off decisions?	Yes. Districts may also consider competency as a factor.		Yes, at district's discretion (great majority use seniority as a primary criterion)			
Panel C - Teacher Pension Systems						
	Tier One	Tier Two	OPSRP	TRS1	TRS2	TRS3
Membership dates (hired)	pre-1996	1996-2003	2003-pres.	pre-1977	1977-1996; 2007-Pres.	1997 transfer from TR2; 1996-Pres.
Type	Hybrid	Hybrid	Hybrid	DB	DB	Hybrid
Vesting	5 years	5 years	5 years	5 years	5 years	10 years
Normal retirement age	58 or 30 YOS	60 or 30 YOS	65 or 58 with 30 YOS	60 or 55 with 25 YOS	65 or 62 with 30 YOS	65 or 62 with 30 YOS
Annual Defined Benefit	0.0167 * FAS * YOS or Account * AEF * 2		0.015 * FAS * YOS	0.02 * FAS * YOS	0.02 * FAS * YOS	0.01 * FAS * YOS
Investment account at retirement?	No	No	Yes	No	No	Yes

**Table 2. Percentages of Teachers Moving near the Oregon-Washington Border**

	Teachers from Oregon			Teachers from Washington		
	All	Border	PDX-VAN	All	Border	PDX-VAN
<b>All Observations</b>						
Switch District	1.65	1.21	1.33	1.92	1.15	1.12
Switch State (in next year.)	0.07	0.10	0.07	0.03	0.12	0.16
Switch State (in any year.)	0.12	0.17	0.13	0.06	0.22	0.28
Observations	391,084	69,830	129,485	925,764	34,209	49,521
<b>Teachers with Less than 5 Years Experience</b>						
Switch District	3.10	2.39	2.73	3.95	2.30	2.03
Switch State (in next year)	0.16	0.24	0.17	0.06	0.32	0.35
Switch State (in any year)	0.28	0.38	0.30	0.14	0.51	0.60
Observations	111,892	18,979	37,046	212,445	8,177	12,898

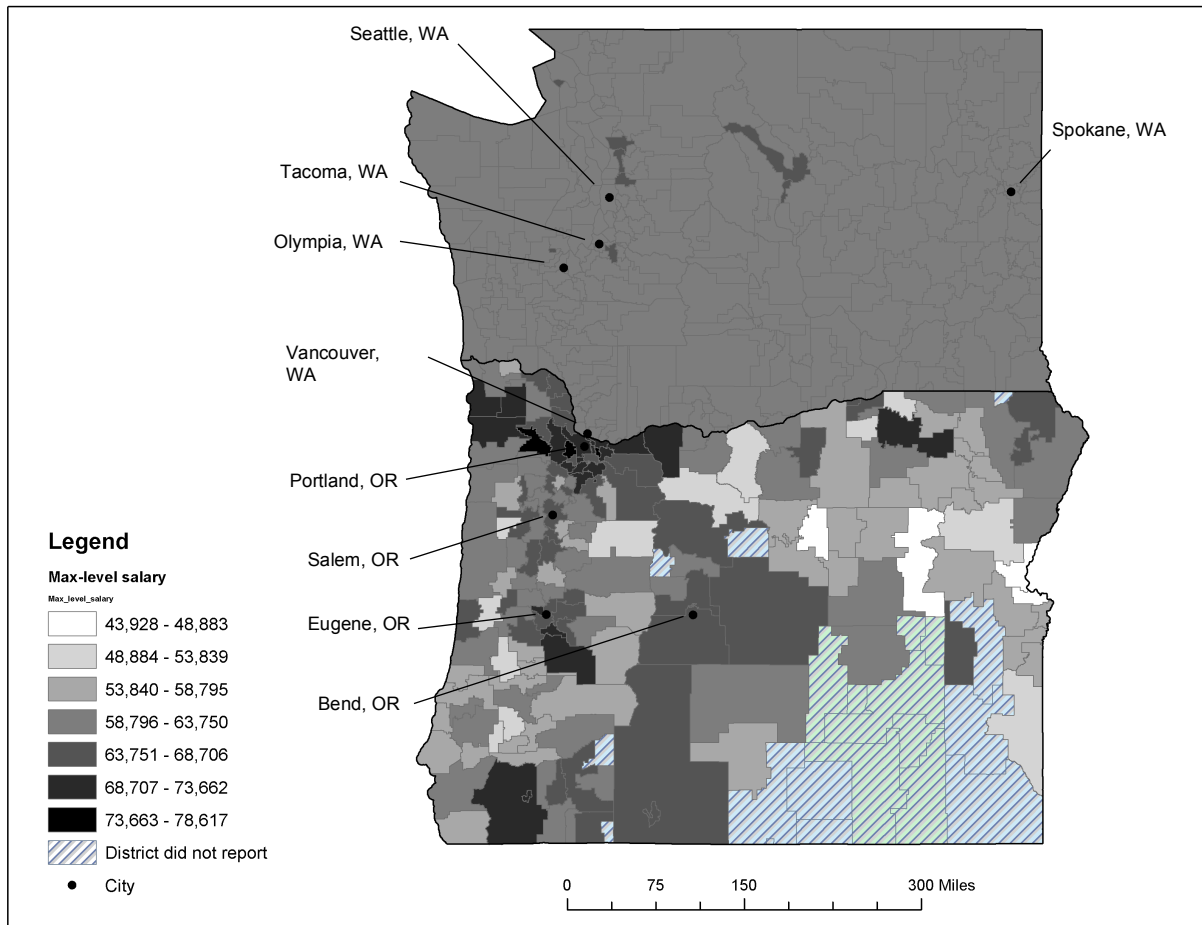
**Table 3. Characteristics of “Stayers” and “Cross-state Movers”**

	Oregon Teachers					Washington Teachers				
	Within-State		Cross-State		Diff. in Means:	Within-State		Cross-State		Diff. in Means:
	District Move		Move to WA			District Move		Move to OR		
	Mean	Obs.	Mean	Obs.	P-value	Mean	Obs.	Mean	Obs.	P-value
<b>Teacher Characteristics</b>										
Experience: < 2	0.30	6,483	0.37	276	0.023	0.18	17,734	0.20	251	0.386
Experience: 2-5	0.24	6,483	0.29	276	0.041	0.29	17,734	0.33	251	0.159
Experience: 5-10	0.22	6,483	0.19	276	0.252	0.25	17,734	0.28	251	0.365
Experience: 10-20	0.17	6,483	0.11	276	0.000	0.17	17,734	0.11	251	0.003
Experience: 20-30	0.07	6,483	0.03	276	0.000	0.01	17,734	0.01	251	0.974
Has Professional Certificate	-	-	-	-		0.18	17,674	0.08	251	0.000
Has Advanced Degree	0.65	6,483	0.59	276	0.065	0.54	17,734	0.65	251	0.000
Salary: Base Compensation	40,699	6,483	39,314	276	0.045	37,664	17,734	39,616	251	0.003
Salary: Next Year – Current Year	2,616	6,483	1,218	276	0.028	2,356	17,734	1,174	251	0.096
Pension: Tier One or Tier 2 (OR)	0.70	6,483	0.62	276	0.008					
Pension: OPSRP (OR)	0.30	6,483	0.38	276	0.008					
Pension: PERS “Pickup” (OR)	0.62	6,483	0.53	276	0.004					
Pension: TRS1 (WA)	-	-	-	-	-	0.06	16,629	0.06	231	0.738
Pension: TRS2 (WA)	-	-	-	-	-	0.12	16,629	0.07	231	0.001
Pension: TRS3 (WA)	-	-	-	-	-	0.81	16,629	0.87	231	0.007
Border District	0.13	6,483	0.25	276	0.000	0.02	17,734	0.17	251	0.000
Portland-Vancouver MSA	0.27	6,483	0.34	276	0.009	0.03	17,734	0.31	251	0.000
Distance Moved (miles)	59	5,572	110	266	0.000	54	17,498	104	242	0.000

*Note: Teacher characteristics are defined as of the last year a teacher was observed in a particular district or state before moving to a different district or state in the following year. The number of observations are smaller for some characteristics because that data is unavailable for a subset of teachers. For instance, school characteristics are matched to the teacher-level data using district and building identification numbers that exclude teachers who work at a district’s headquarters or work for an Educational Service District (ESD). ESDs are regional districts that provide cooperative services to multiple school districts. Washington has 9 ESDs and Oregon has 19.*

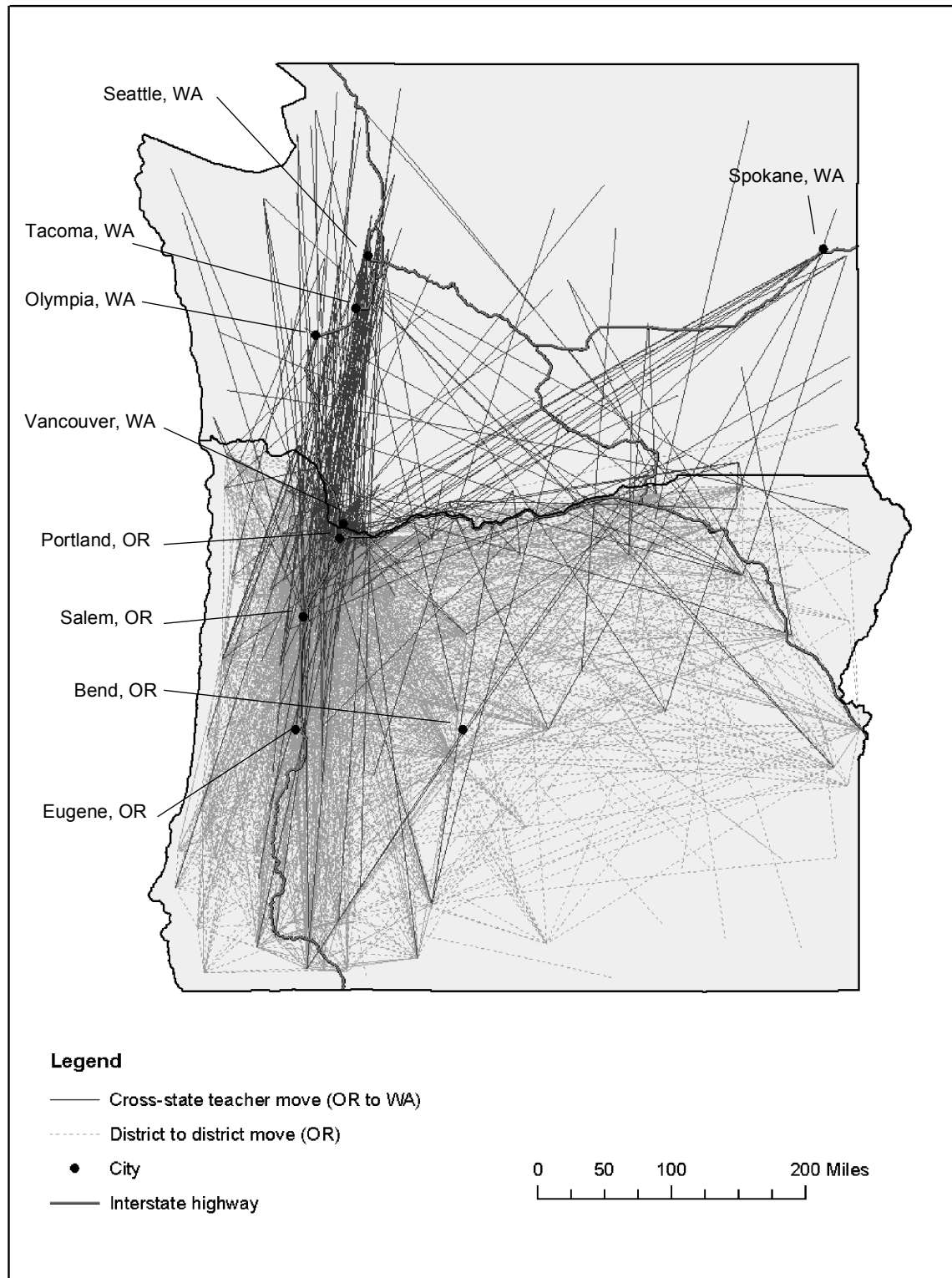
## Figures

**Figure 1. Maximum Base Salary Step for Teachers with a Master's Degree (2013)**



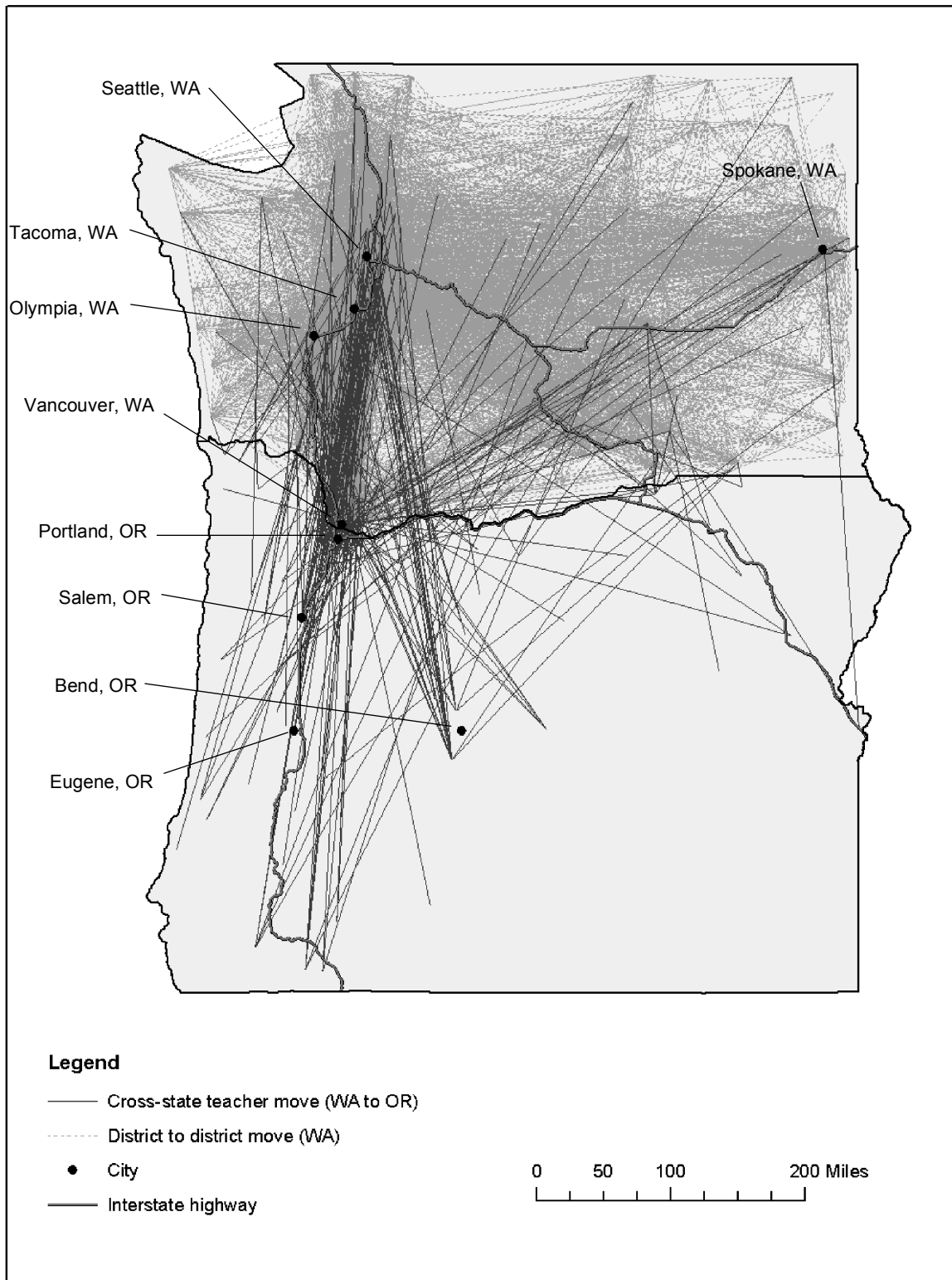
*Note: The data in Figure 1 are derived from the 2013 Washington State salary schedule and the 2013 salary schedules reported by districts to the Oregon School Boards Association. Not all districts in Oregon report salary schedules, and where possible we infer values using reports from the surrounding years.*

**Figure 2. Within-State and Cross-State Movements between Oregon and Washington**  
**Panel A – Moves Originating in Oregon**



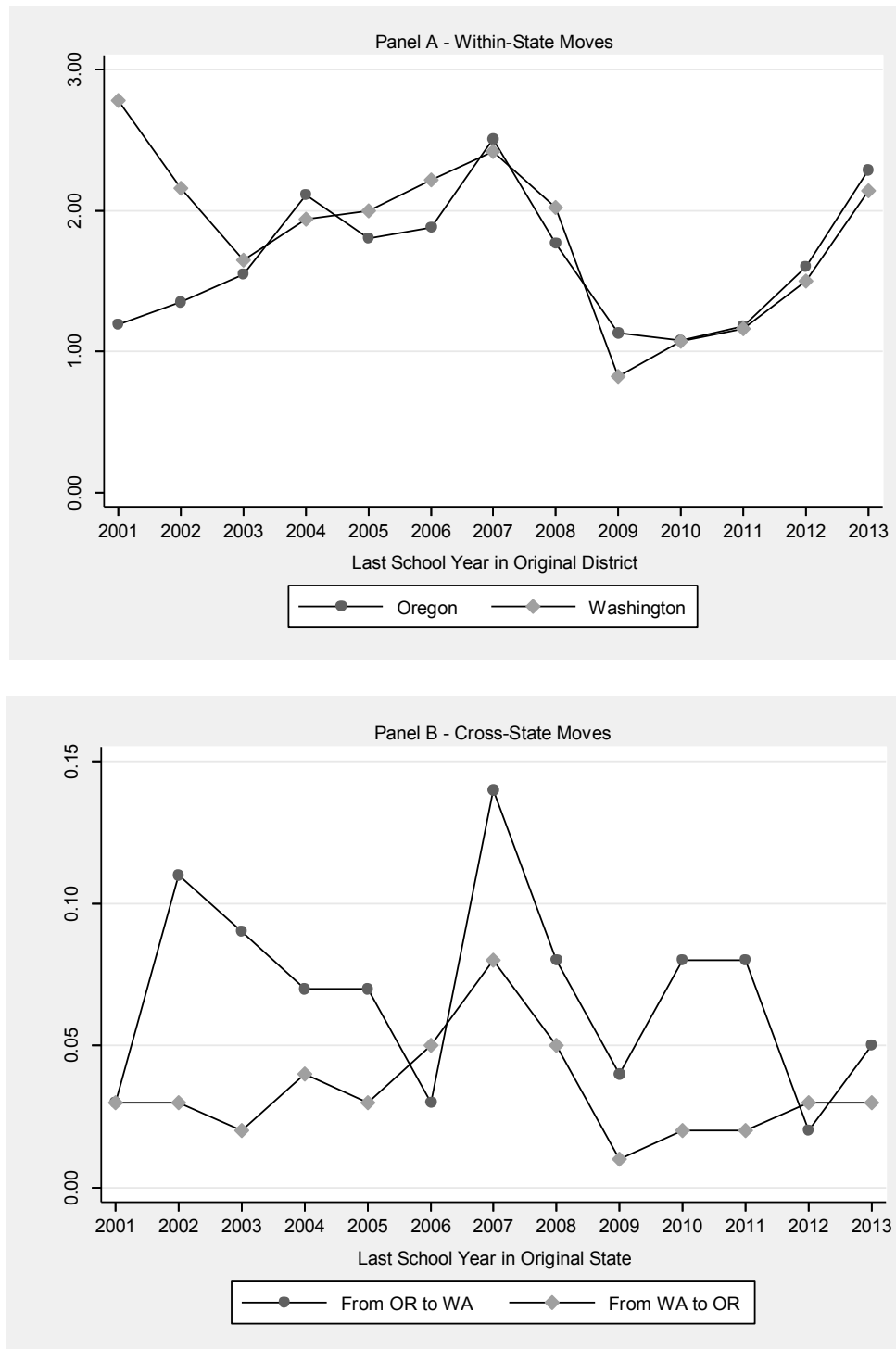
*Note: Dashed lines indicate mobility between one district and another within the state of Oregon. Solid lines indicate mobility from an Oregon district to a Washington district.*

**Panel B – Moves Originating in Washington**



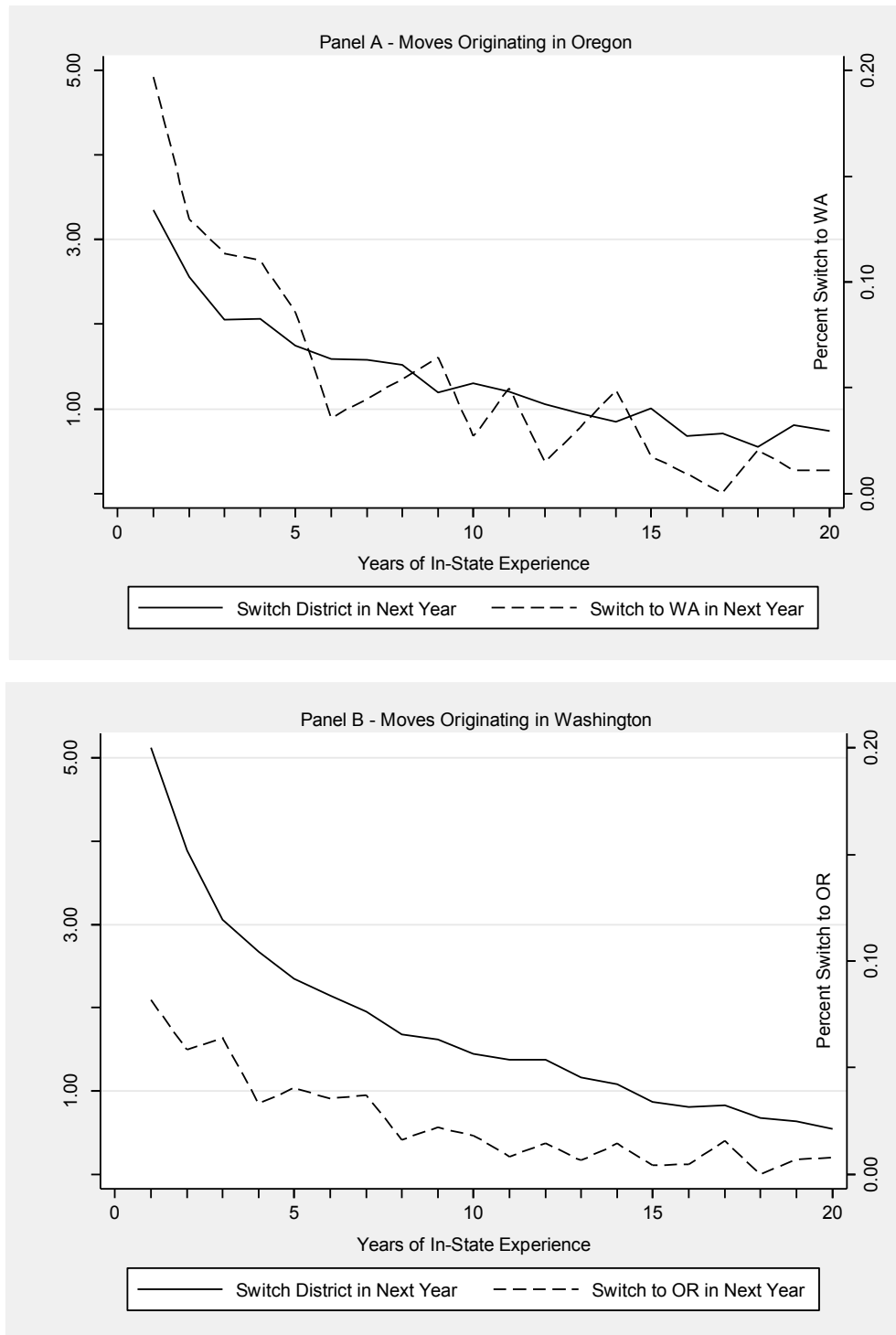
*Note: Dashed lines indicate mobility between one district and another within the state of Washington. Solid lines indicate mobility from a Washington district to an Oregon district.*

**Figure 3. With-in State and Cross-state Mobility by School Year**



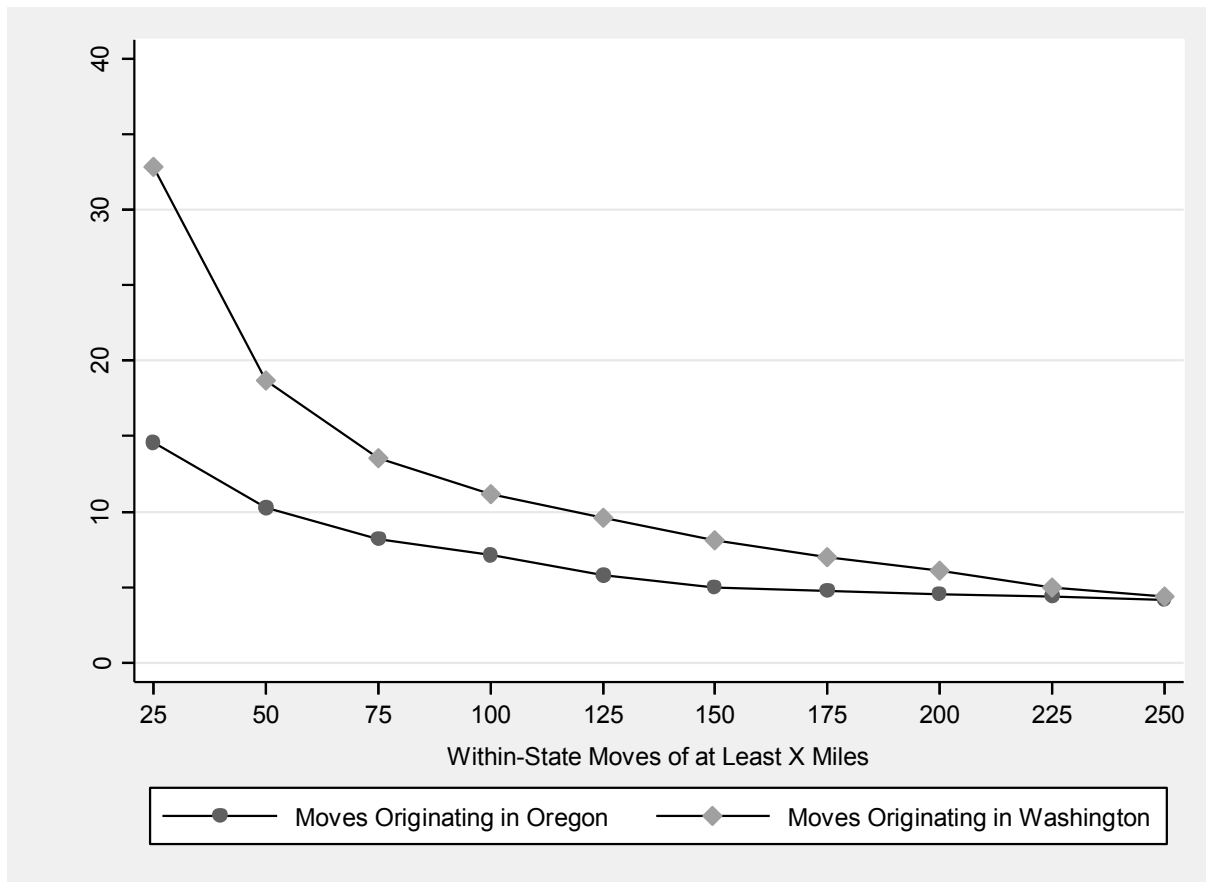
*Note: The vertical axis in Panel A is the percentage of teachers (out of all teachers in the state) who are teaching in a different district in the following year. The vertical axis in Panel B is the percentage of teachers (out of all teachers in the state) who are teaching in the other state (OR or WA) in the following year.*

**Figure 4. Level of Mobility by Experience and State**



*Note: The left-hand axis in each plot is the percentage of teachers (out of all teachers in the state) who are teaching in a different district. The right-hand axis in each plot is the percentage of teachers who are teaching in the other state (Oregon or Washington) in the following year.*

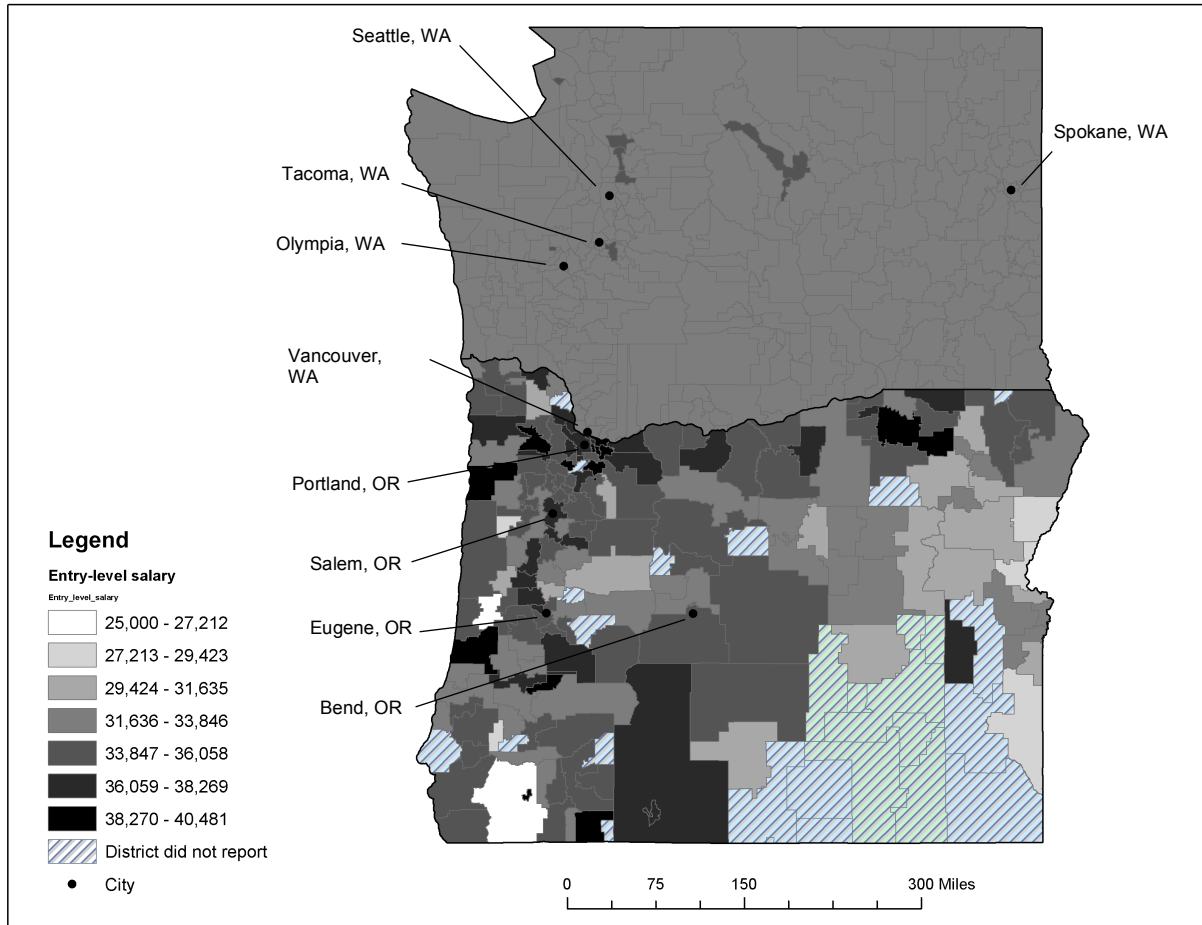
**Figure 5. Ratio of Within-State Moves to Cross-State Moves by Within-State Distance**



*Note: Each point represents the ratio  $P_{cs}/P_{ws}$  where  $P_{cs}$  is the proportion of teachers who are teaching across the state border in the following year, and  $P_{ws}$  is the proportion of teachers who are teaching in a different district in the following year that is at least 25, 50, ..., 250 miles from the original district. The distance between two districts is calculated as the radian connecting the centroids of the districts.*

## Appendix A

**Figure A1. Entry Level Salaries for Teachers with a Bachelor's Degree (2013)**



*Note: The data in Figure A1 are derived from the 2013 Washington State salary schedule and the 2013 salary schedules reported by districts to the Oregon School Boards Association. Not all districts in Oregon report salary schedules, and where possible we infer values using reports from the surrounding years.*

## Appendix B: Pension Wealth in Oregon and Washington

Each of the pension plans currently operated by Oregon and Washington have a DB component, which provides employees with a retirement annuity defined by *FAS* (final average salary) and *YOS* (years of service),<sup>52</sup> and there are several reasons why splitting a career between two DB systems will tend to generate a significantly lower level of pension wealth than staying in one system. The first reason is related to vesting rules: teachers who separate from a pension system before becoming vested are not entitled to any defined benefit.<sup>53</sup> Teachers who split time between two pension systems are less likely to become fully vested than a teacher who stays in one plan. And teachers with shorter careers (e.g. less than 10 or 15 years) who would have become vested within one pension system may fail to become eligible for retirement benefits in either plan.

A second cost associated with splitting time between two DB plans is that it tends to leave the value of the initial plan vulnerable to inflation. When a teacher leaves a DB plan before retirement, the *nominal value* of her DB annuity stays fixed. Therefore, the *real value* of that annuity will be eroded by inflation until the teacher begins retirement.<sup>54</sup> For example, under 2.5 percent inflation, a \$20,000 annuity as defined by a teacher's *FAS* and *YOS* upon separating in the year 2000 would have a real value of less than \$14,000 if retirement began fifteen years later in 2015.<sup>55</sup> In contrast, the teacher's end-of-career salary (which will have kept pace with inflation) will determine the value of the teacher's second DB plan.

The third reason that switching pension systems tends to be costly is because retirement eligibility rules in many DB plans allow employees to retire at younger ages after crossing some years-of-service threshold (e.g. 30 *YOS*). Crossing that threshold tends to dramatically increase an employee's total pension wealth. Consider a teacher who has earned a \$40,000 retirement annuity and for the sake of simplicity, assume zero inflation. If the normal retirement age is 65 and she lives until age 85, she collects a total of  $\$40,000 \times 20 \text{ years} = \$800,000$  in retirement benefits. Now suppose that she has accumulated 30 *YOS* and can retire early at age 60; she will collect her annuity for five additional years, increasing total nominal pension wealth by 25 percent (to \$1 million). Teachers who split time between two DB plans are less likely to be eligible for early retirement in one of those plans. Leaving one plan after 10 years, for example, would require 40 total years of service in public education to reach the 30 *YOS* threshold in the second plan. At that point, a teacher would likely be of normal retirement age and eligibility for early retirement would be irrelevant.

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<sup>52</sup> While we focus here on DB plans, note that two plans (Oregon's OPSRP and Washington's TRS3) also have defined contribution (DC) components, and Oregon's Tier One and Tier Two plans essentially switch between pure DB and DC plans depending on which provides the largest retirement benefit (see Section 2.2. and Table 1).

<sup>53</sup> Employees who leave a DB plan prior to becoming vested can typically withdraw their own contributions to the plan, plus interest. This is true of Oregon's Tier One and Tier Two plans and Washington's TRS1 and TRS2 plans. Employees do not contribute to the DB components of OPSRP and TRS3, but to the DC components of those plans, which are not subject to vesting rules.

<sup>54</sup> Most plans provide cost of living adjustments (COLAs) once an employee has begun retirement, but not before. An exception to this is TRS3 teachers with 20 or more , for whom the DB component increases by approximately 3 percent each year between separation and retirement, up to age 65.

<sup>55</sup> The real value in 2015 is calculated as follows: .

Here we look at pension wealth accrual under Oregon's and Washington's pension plans. We focus on cross-state movement between the three pension plans that are still enrolling new hires (OPSRP, TRS2, and TRS3) and present the case of a representative teacher who begins her career at age 25 and works for a total of 35 years, until age 60. In particular, we calculate the total pension wealth earned after 35 years when the teacher switches between Oregon and Washington at different points in her career.

**Figure B2** presents the present value of total pension wealth that is accumulated over the 35-year career of the representative teacher if she switches states after accumulating 1-34 years of experience. **Panel A** represents cross-state moves from Oregon (OPSRP) to Washington (TRS2 or TRS3), and **Panel B** represents movement in the other direction. Pension wealth is represented on the vertical axis and, the years of service accumulated in the teacher's initial pension plan before making the cross-state move is represented on the horizontal axis. The points above 20 years of service in **Panel A**, for example, represent total pension wealth given 20 years of service in OPSRP and 15 years of service in TRS2 or TRS3.

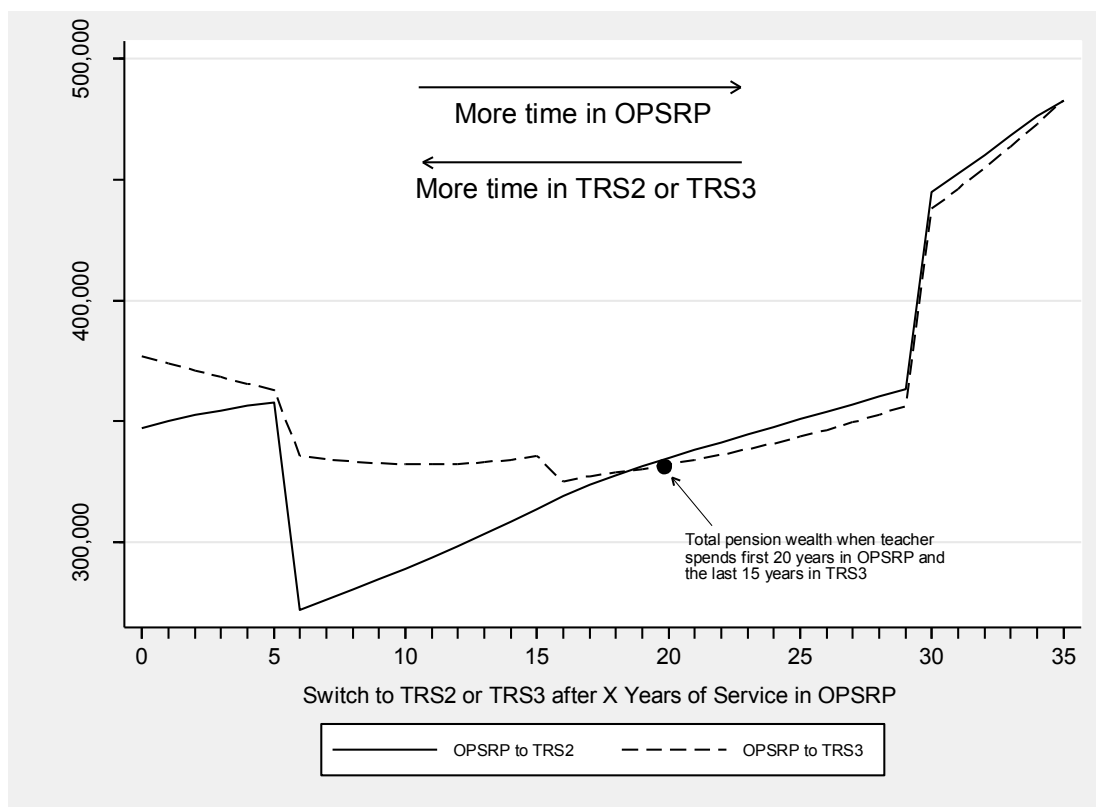
Let us first consider switching from Oregon to Washington (Panel A). Because the level of benefits provided by the Oregon plan is greater, pension wealth is highest when the teacher stays in the Oregon plan for 30 or more years. If switching to Washington with less than 30 YOS, the teacher is best-off switching with 5 or less YOS in Oregon, which allows her to reach the 30-YOS threshold in TRS2 or TRS3. Switching to Washington after accumulating between 6 and 29 YOS generally results in lower pension wealth. Pension wealth under a switch to TRS3 is less sensitive to the timing of the switch than under a switch to TRS2. This is primarily due to three features of TRS3: 1) The size of the DB component is smaller, 2) With 20 YOS, the size of the DB increase by 3 percent each year between separation and retirement (5 years in the case of the representative teacher), and 3) Like OPSRP, TRS3 includes a DC component which is not sensitive to the timing of switching states. In the case of switching from Washington to Oregon (Panel B), the teacher again receives the greatest pension wealth by crossing the 30-YOS threshold in OPSRP – this time by switching states early in her career with between 1 and 5 YOS. As before, the next best option is to accumulate at least 30 YOS in TRS2 or TRS3. Switching plans with between 6 and 29 YOS generally produces lower pension wealth, and TRS3 is less sensitive to the timing of the switch for the reasons discussed above.

These plots demonstrate the potentially high pension wealth costs associated with splitting one's career between two states. In the case of the representative teacher with a 35-year career, these costs are dominated by the plans' rules that allow early retirement with the accumulation of 30 YOS. The costs can be particularly high (depending on the timing of the switch) when switching to or from TRS2, showing how the incorporation of non-traditional plan features (such as those in OPSRP and TRS3) can ameliorate pension-related barriers to cross-state mobility.

While we have not presented the case of Oregon's Tier One and Tier Two plans here, the pension wealth patterns observed in **Panel A** can provide insight into how switching from one of those plans into TRS2 or TRS3 might influence total pension wealth. Like OPSRP, Tier One and Tier Two allow teachers with 30 or more years of experience to retire at younger ages. Therefore, as in **Panel A**, we would see large discontinuities in pension wealth for teachers who fail to reach the 30-year threshold in either plan. An important difference with OPSRP is that Tier One and Tier Two do not have the same type of DC component. Rather, under the money

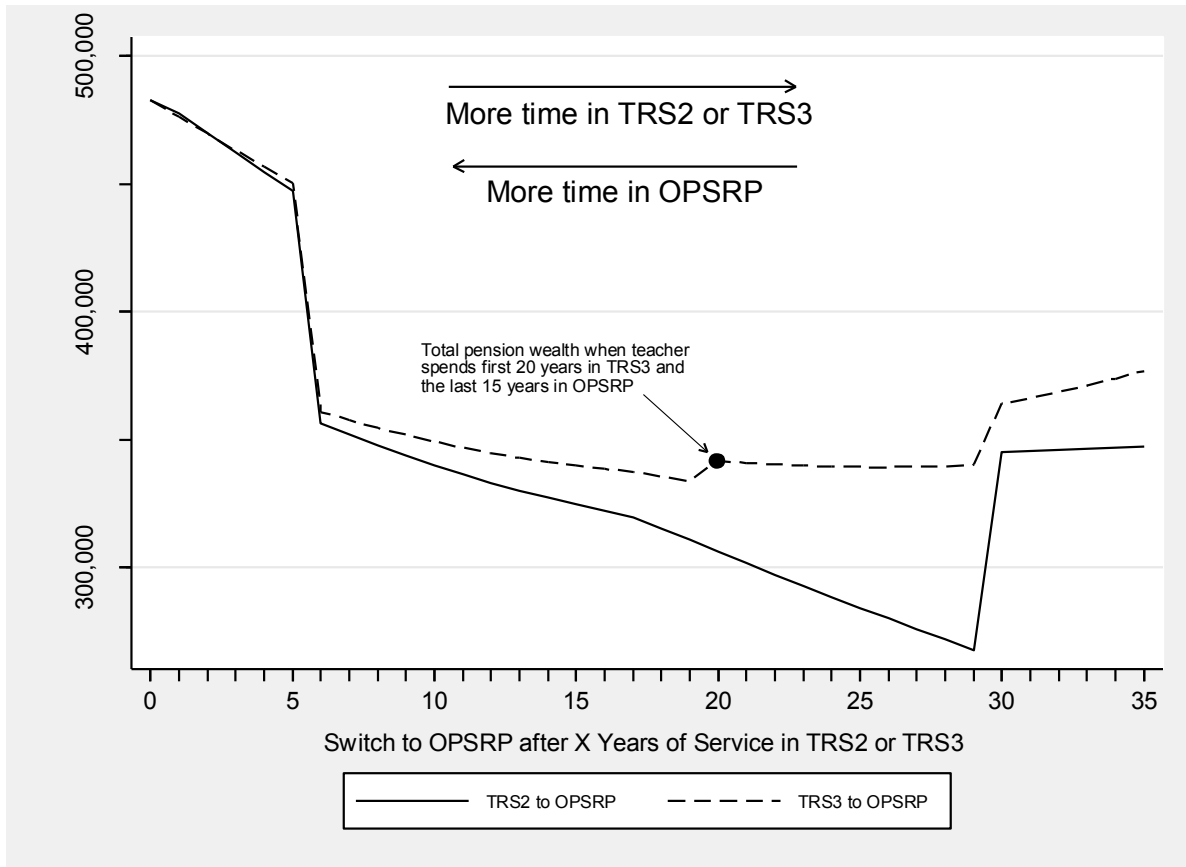
match provision, they essentially switch between pure DB and pure DC plans depending on how well the PERS investment portfolio performs. This would make early and mid-career exits less costly, particularly under favorable market conditions, because the value of the money match account (unlike the DB annuity) keeps growing until retirement even after a mid-career separation.<sup>56</sup>

**Figure B2. Total Pension Wealth when Splitting a 35-Year Career  
between Oregon and Washington  
Panel A. Switching from Oregon to Washington**



<sup>56</sup> Teachers hired since the early 1990's are unlikely to retire under the money match provision because their investment accounts were relatively small when the market was performing well, and since 2000 nominal returns have not exceeded 8 percent (and are unlikely to do so in the future). Furthermore, post-2004 contributions have been placed in the IAP account which is not incorporated into the money match formula.

**Panel B. Switching from Washington to Oregon**



*Note: These plots represent the total career pension wealth accumulated by a female teacher with a master's degree who begins her career at age 25 and works until age 60. In making these calculations we assume a 4 percent discount rate, two percent inflation, and 8 percent nominal returns on investments. The teacher maintains her current levels of salary and salary growth when transferring, and for retirement plans with DC accounts, we assume the teacher contributes 6 percent of her salary. We evaluate the present value of the full balance of the DC account as a lump sum at the commencement of retirement.*