Revenue Stability among Education Service Districts during the Great Recession: A Comparison of Oregon and Washington

by

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Abstract

Public education in the United States is fundamental to future economic performance. The attention paid to public education institutions generally revolves around school districts, state education agencies, and the role of the federal government. However, an often overlooked cog is the educational service agency. Known in Oregon and Washington as education service districts, these intermediate bodies between state education agencies and local school districts provide crucial services to school districts and receive revenues from a variety of sources. Oregon's districts have the rare ability to generate revenue through the direct taxation of property. This study seeks to determine if this attribute allowed Oregon's districts to experience greater revenue stability in the wake of the Great Recession, using Washington's districts as a comparison group. Using data from academic years 2005-06 through 2010-11, two hypotheses are tested: (1) whether Oregon's education service districts have more diversified revenue structures due to their taxing ability and (2) whether this taxing ability leads to greater revenue stability. Ordinary Least Squares regression results provide no statistical evidence in support of either of these hypotheses, but evidence of diversification's effect on stability is found and is consistent with the literature. This paper contributes to the literature primarily in that it is the first to study education service district budgets across these states, using this policy as the variable of interest.

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This one’s for you, Dad.

Introduction

Public education in the United States generates continued policy debate due to its pivotal role in stimulating future economic growth. Every state in the union has its own public education system in which authority is divided in some way between local education agencies (LEAs) and the state education agency (SEA). However, most states have an intermediate agency that is also of incredible importance due to the behind-the-scenes role it plays in providing adequate education to students. This middle cog is called the educational service agency (ESA). Unfortunately, these institutions go largely unnoticed, and very little research exists on them. This paper will be the first of its kind to examine the revenues of the ESA of two states (Oregon and Washington), with one relatively unknown policy being what differentiates these two groups.

An educational service agency is a governmental agency that provides support services to LEAs (typically school districts). These include payroll, information technology, counseling services, teacher training, transportation services, records/data management services, and other services which individual LEAs are not typically best prepared to handle themselves. Possibly the most significant service that ESAs provide is special education services – services targeted at meeting the educational needs of students with cognitive or physical impairments. This was spawned by a mandate from the 1970s in which all state education systems were required to provide free and adequate educations to resident children regardless of disability. However, children with these special needs often require special curricula and heightened levels of attention from instructors. Having been mandated with new requirements that would raise their costs of operation, LEAs turned to ESAs as a way of providing some of these services. The rationale lies in the ability of an ESA to effectively be a central hub for such services, providing

LEAs with an opportunity to either pool their resources together or pay their own individual shares of the cost of such services, both of which take advantage of the ESA's economy of scale.

As could be implied from the aforementioned description, ESAs are typically of a size greater than LEAs but smaller than the SEA. The size of an ESA's service region (geographical boundaries of component LEAs) varies, as the number of ESAs within a state, the region (metropolitan, rural, etc.), and student population generally dictate how many LEAs are served by an ESA. However, an ESA generally serves at least 3 LEAs, with the maximum number of LEAs exceeding a dozen in some instances. Their purpose and legal position within a state's public education system varies by state. This has led to three different classifications of ESAs (Stephens, 1979). Type "A" ESAs are legally constituted entities designed to provide services to local school districts and the state with regards to public education issues. While they primarily serve LEAs, they also provide reporting services to SEAs and in some instances represent their component LEAs to the SEA. These ESAs were created by either the state or a joint effort of school districts and the state. Type "B" ESAs are regional extensions of the SEA that were implemented to serve the SEA. These ESAs can be best described as regional offices of an SEA, thus falling under the full purview of SEA authority. Type "C" ESAs originated as collaborations between LEAs. Using Massachusetts as an example, these collaborative ESAs were created in response to a 1974 state law requiring that free and adequate education be provided publicly to all students, including those with cognitive disabilities. Due to resource constraints, many LEAs in Massachusetts opted to pool their resources together to address this new requirement, allowing them to provide services at a lower average cost and thus taking advantage of economies of scale. These inter-LEA agreements formed what are now Massachusetts' collaborative ESAs. According to the Association of Educational Service Agencies (the national organization which represents ESAs nationwide), only Maine, Delaware, Tennessee, Oklahoma, and Nevada do not have some type of ESA.

The states of Oregon and Washington both have Type “A” ESAs. In these two states, they are known as Education Service Districts (ESDs – this term will be used exclusively hereafter). These ESDs draw their revenue from a variety of sources, including payments from school districts, state and federal financing, and from other entities which may purchase their services (i.e. other government agencies). In Washington, ESDs receive state support in the form of an allotment from the state’s general fund as well as funding for specific purposes, such as student retention and bilingual education programs. On occasion, a Washington ESD may also receive general purpose or special purpose unassigned funding from the state in addition to their ESD allotment. Oregon’s ESDs receive state general support funding from the State School Fund (SSF), with a total of 4.5% of the SSF being distributed among the ESD (4.75% during this study’s sample period). Some Oregon ESDs also receive funding from state timber revenue and funding for specific purposes. Education Service Districts in both Oregon and Washington receive funding from school districts in compensation for services that are provided by the ESD.

Oregon’s ESDs are unique in that they draw revenue from another source: local taxes. In the state of Oregon, ESDs can collect tax revenue on residential property just as LEAs typically do throughout the country. Oregon Revised Statute (ORS) 334.010 mandates the governance of an ESD by a board of directors, which itself is granted the authority to establish the ESD’s budget and levy taxes under ORS 334.125.

This paper focuses on whether or not the ability of Oregon’s ESDs to directly collect tax revenue from landowners within their service regions allows Oregon’s ESDs to exhibit more stable revenue streams than those of Washington, which does not allow its ESDs to collect revenue from this source. Specifically, two hypotheses are being tested. First, does this ability to tax cause Oregon's ESDs to have more diverse revenue structures? Second, does this ability to tax cause Oregon's ESDs to have a more stable revenue stream. The policy that is being analyzed here is therefore the Oregon statute which permits its ESD to directly levy taxes. The revenue streams of ESDs in Washington and Oregon will be examined in the context of the recession of 2007-09 (the "Great Recession," as it is commonly known), since the recession spawned a series of fiscal crises in state and local governments, including school districts, all over the country. The expectation therefore is that, during these years, state and local governments that typically support the ESDs through various means would see their own budgets shrink, leading to either lower or less stable ESD revenues.

Literature Review

The academic literature is very sparse in regards to research on ESDs. Almost no academic literature exists on ESD finance or budget issues, as the vast majority of ESD research has focused on practices and programs. From the literature that does exist, one set discusses revenue stability with regards to revenue diversification, and the other set discusses the weaknesses and strengths of local property tax with regards to revenue generation and stability.

The applicability of the cliché "don't put all your eggs in one basket" has been tested extensively. Within the recent revenue diversification literature, there is considerable evidence supporting the notion that diversification leads to greater revenue stability. Jordan and Wagner (2008), Carroll (2009), and Yan (2012) each find significant evidence of revenue diversification's positive correlation with revenue stability in state and local governments. Suyderhoud (1994) finds that greater diversification has a weak but positive correlation with bond rating. Similarly, Carroll and Stater (2008) find that revenue diversification increases revenue stability among nonprofit organizations.

However, most of the aforementioned results come with caveats. In a study of municipal government budgets from 1970 to 2002, Carroll (2009) indeed finds that revenue diversification leads to greater revenue stability, but she also finds that this effect is mitigated when the tax structure also becomes more complex. Yan's 2012 study of the budgets of 47 state governments between 1986 and 2004 finds that diversification increases revenue stability in states that are already economically stable but also finds that this effect diminishes as a state's economy becomes more unstable. In an earlier study, Suyderhoud (1994) finds some evidence that higher levels of diversification are positively associated with a higher bond rating. This result suggests that diversification and revenue stability are positively, but not necessarily strongly, correlated in that better revenue stability should be positively correlated with higher bond ratings.

But the results of a study of the country's largest cities between 1997 and 2008 by Chernick, et al. (2011b) run contrary to the established trend detailed above. Although this study focuses on the effect of revenue diversity on the level of revenue, the authors mention that higher reliance on the property tax, and therefore a lower level of revenue diversification, was shown to help stabilize municipal budgets. This result follows from a parallel study conducted by these authors (Chernick, et al. 2011a) in which they predicted how the housing crisis and Great Recession would impact large cities' expenditures using the same dataset. In this paper, the authors restate the stabilizing effect of the property tax with regards to revenue and they also reconfirm the finding of Lutz (2008) suggesting that there exists a lag between a significant change in housing prices and a significant change in property tax revenues.

In his 2008 study, Lutz finds that the lag between the decline in housing prices and the subsequent decline in property tax revenue is about 3 years. He also finds that the elasticity between the change in housing prices and the change in property tax revenue is approximately 0.4, implying that a 100% increase in property value generates a 40% increase in property tax revenue. Lutz provides multiple rationales for these results, including the notion that assessed values (upon which tax revenues are based) must, by definition, lag behind market values and the fact that many states have restrictions on how frequently a home's value can be reassessed. Lutz' findings are reconfirmed in his subsequent paper (Lutz, et al. 2011), as well as in Alm et al. (2011).

Other studies confirm these results. Reschovsky (2004) finds that local school district property tax revenue continued to climb into the early 2000s despite the 2001 recession, and Dye and Reschovsky (2007) find that, in some states, increases in local property tax revenue significantly helped offset decreases in state funding to local agencies between fiscal years 2000 and 2004. Though the authors in both studies recognize that the increased property tax revenues are partially the product of rapidly rising home values, the reliable stability of the property tax is exemplified in Lutz (2008) and Lutz, et. al (2011).

Finally, Fisher (1997) provides another useful insight as to why the property tax might be so reliable. He argues that the *in rem* nature of the tax, specifically the fact that the tax is against a parcel of property which can be enforced via a lien on the property, allows property taxation to avoid the functional and legal complexities, as well as the distributional problems, that other types of taxes might incur. These characteristics, Fisher argues, are what allow the property tax to be the backbone of most local government revenue streams, since a municipal government can more effectively restrict property actions than personal actions.

Given the aforementioned gap of research on ESD budgets in the literature, this study will contribute by being the first to examine and compare the revenue stability of ESDs between two states with slightly different revenue generating rules. This gap is made larger by the fact that the relevant revenue diversification literature projects diversification as the move *away* from property taxes rather than toward them. Given that Oregon's ESDs have one additional large stream of revenue relative to Washington's ESDs in the form of property tax revenues, this study also contributes by examining the effects of revenue diversification *toward* the inclusion of property tax revenue on revenue stability.

Theory

Two hypotheses are being tested in this paper. Those hypotheses are:

H_1: The ability of Oregon ESDs to directly levy taxes leads to more diversified revenue structures as compared to Washington's ESDs.

H_2: Oregon's ESDs will experience more stable revenue streams than Washington's ESDs due to Oregon's ESDs' ability to directly tax.

Both Oregon's and Washington's ESDs earn or receive revenue from local, state, federal, and miscellaneous sources. The first hypothesis stems from the fact that Oregon's ESDs earn revenue from what could be categorized as a 5th major source: property tax revenue. The expectation is that this 5th source of revenue will cause Oregon's ESDs to have higher levels of revenue diversification. The revenue categories and the measure of diversification will be discussed further in the data section.

The second hypothesis is based on the body of property tax literature as detailed above. Given that Oregon's ESDs are able to use this additional stream of revenue that has been shown in the literature to provide stability even in the face of housing price declines, this suggests that Oregon ESDs' taxing authority will have a positive effect on revenue stability regardless of whether or not the first hypothesis is true.

The merits of revenue diversification with regards to revenue stability have their academic roots in Markowitz's (1952) discussion of portfolio theory. Markowitz argues that the diversification of assets within a portfolio can help mitigate risk for a given level of expected return by minimizing the variance of the expected return. Williams (1997) describes this concept much more simply, "Diversification is shown to reduce overall portfolio volatility" (77). White (1983) applies this theory to public finance by pointing out that financial risk in an asset portfolio is analogous to instability in tax revenue. Thus, variability in tax revenue can be seen as a form of fiscal instability. Gentry and Ladd (1994) provide an example of this application of portfolio theory to public budgets by constructing an efficient frontier of portfolios that maximize growth and stability. However, this all rests on the notion that an entity's various investments or revenue sources are independent of one another.

This study will not attempt to create an optimal portfolio or set of portfolios that maximizes revenues while minimizing volatility. Rather, it will provide an application of the diversity-stability relationship predicted by portfolio theory through the testing of my first hypothesis. Though the theory states that diversity should minimize volatility, Markowitz cautions that diversification cannot fully eliminate variance because all investment carries some measure of risk. Other factors may influence the volatility of a revenue structure. Controls for certain factors will also be discussed in the data section.

Aside from the diversification-stability connection predicted by portfolio theory, this paper may also provide an application of the Tiebout model (Tiebout, 1956). Hypothesis 2 states that the taxing authority of Oregon's ESDs works advantageously toward revenue stability. However, Oregon has a history of political resistance to the property tax, as Measures 5 and 50 – passed in 1990 and 1997, respectively – place limits on the growth and use of property tax revenue.

Tiebout posits that the citizen is a consumer of public goods and pays for those goods through taxes. The citizen has an optimal bundle of public goods and services demanded and an associated willingness to pay for them. Tiebout argues that, in theory, an informed citizen would choose to reside in the locality which provides the closest match to his or her most preferred bundle of goods at his or her preferred price. Given that this result follows rather strong assumptions, Percy and Hawkins (1992) argue that Tiebout's results may be better applied to a metropolitan area, (i.e. the Portland/Vancouver metropolitan area).

The Tiebout model is applicable to this study in that revenue stability among ESDs is crucial to the reliable and continuing provision of educational, technical, and other support services to school districts and their students. Conventional wisdom predicts that homebuyers with young children are likely to factor in the quality of the local schools in their purchasing decision. Given that ESDs play a crucial (if unnoticed) role in education quality, ESD service quality and stability should play a role in the more general caliber of local public education. Therefore, ESDs can have an indirect impact on a person's home buying decision.. Thus, if the Tiebout model is correct, revenue stability among ESDs may be correlated with citizens' decisions to move to or within a certain area.

In the context of this study, this conclusion suggests two things: First, ESDs have an incentive to provide adequate services in one period because (especially in the Portland/Vancouver metropolitan area) failure to do so might result in lower revenues in the next period as citizens may opt to relocate to an area within another ESD's service region, possibly even one in which the citizen no longer contributes to an ESD at all through direct property taxation. Hence, through the mechanics of the Tiebout model's prediction of citizen movement, it is possible for revenue stability within an ESD to exhibit some level of path dependency. Second, it is also possible that citizen self-selection may play a more significant role in the revenue stability of an ESD than the policy in question. Citizens may choose to live in certain regions based on their needs (or lack thereof) for public education, and this selection can impact the revenue stability of an ESD during that period.

Model

The first hypothesis being tested is that ESDs which are able to directly levy taxes should see more diverse revenue structures than those which are not allowed to collect tax revenue. The validity of this hypothesis will be tested in two manners. First, a correlation between the index measuring revenue diversity and the dummy variable representing whether or not an ESD has taxing authority will be calculated to see if a significant relationship exists. Second, regressions of the revenue diversity index on various variables, including the size of the ESD's service region, the various unemployment rates, and the dummy representing taxing authority will be run.

The second hypothesis will then be tested using panel OLS regression using two alternative dependent variables. The first dependent variable is the percent change in an ESD's total revenue between academic years. This method eliminates one period of observations from each panel, resulting in a reduced sample size of 145. The second dependent variable method avoids this problem by measuring stability as the squared residual of the best-fit regression of an ESD's revenue across the sample period. The regression equation for this model is shown below:

$$PCR_i = \beta_0 + \beta_1 Year$$

where PCR_i is the per-capita revenue for the "ith" ESD (total revenue divided by the number of students within an ESD's service region). By incorporating this method, higher values of the squared residual will indicate greater volatility (either positive or negative) around the linear trajectory of an ESD's revenues throughout the years. Thus, the second hypothesis assumes that taxing authority will be negatively correlated with these squared residuals, as the hypothesized greater stability will be represented by lower squared residual values. It should be noted, though, that data are not readily available for years prior to the sample period, meaning that the magnitude of the squared residuals may themselves be biased downward because their respective observations will be dictating the trajectory of the best-fit lines. The first method (year-over-year percent change) may therefore better account for this issue since each observation is dependent upon only the previous year's revenue rather than on the trajectory of revenue across the entire sample period.

Because this study seeks to identify whether or not the collection of property tax revenues further diversifies and therefore stabilizes Oregon ESDs' revenues, this required transforming the raw revenue data into a variable that quantifiably measures revenue diversity. Consistent with much of the literature, a Herfindahl–Hirschman Index (HHI) is used to help determine an ESD's level of revenue diversification. The equation for the HHI is:

$$\sum_{i=1}^{n} s_i^2$$

where “s” is the fraction (represented as a decimal value from .01 to .99) of an ESD’s total revenue that comes from a specific source – Oregon’s ESDs will have 5 sources whereas Washington’s ESDs will only have 4. Thus, the HHI itself only illustrates the level of concentration within an ESD’s revenue stream. To find revenue diversification (*RD*), HHI must then be subtracted from a whole number, such that:

$$RD = 1 - \sum_{i=1}^{n} s_i^2$$

Greater revenue diversification implies more balanced reliance among revenue sources whereas less diversification implies heavier reliance on fewer sources. Each respective share of total revenue coming from one of the broad sources was calculated as the percent of total revenues coming from that share; thus, the sum of the shares should add to 100% for each observation. Since heavier reliance on fewer sources leads to higher values of *s*, this causes the sum of s_i^2 to grow as diversification falls. Thus, diversification is calculated as 1 minus that sum, with values of this measure closer to 1 indicating higher levels of diversification while values closer to 0 indicate less diversification.

Two additional points must be made prior to conducting any analyses. First, the expectation that diversification leads to stability requires that revenue sources are independent of each other and therefore are not correlated. A correlation matrix will be presented which will determine whether or not the various sources of revenue are not significantly correlated with each other. Second, it should be noted that running a regression of the diversity index on the respective proportions of revenue from the four other macro sources is not theoretically correct, as I have defined the revenue diversity index as a function of those factors and therefore any regression in which they are used as controls will provide falsely high significance because of the zero-sum nature of the index. The broad model from which all possible combinations of regressions of the diversity index will be nested is:

$$RD_i = \beta_0 + \beta_1 D_{TA} + \beta_2 Size_i + \beta_3 UN_L + \beta_4 UN_S + \beta_5 UN_N$$

where D_{TA} is the dummy variable representing taxing authority, *Size* is the number of students within the ESD's service region, and UN_L, UN_S, and UN_N are the local (county), state, and national levels of unemployment, respectively. The rationale behind selecting these economic indicators as controls in predicting revenue diversification lies in the notion that unemployment may affect the revenues going into the ESD from state, federal, and local school sources, leaving ESDs more dependent upon the property tax during times of economic crisis. Additionally, larger ESDs typically offer more services than smaller ESDs, suggesting that larger ESDs may generate a higher proportion of their revenue per-pupil from local schools and districts than smaller ESDs which offer fewer services.

The second hypothesis being tested is whether Oregon's ESDs experience more stable revenue streams due to their ability to tax. The formula for the panel regression of the revenue stability of each ESD is defined as:

$$RS_i = \beta_0 + \beta_1 D_{TA} + \beta_2 RD_i$$

where *RS* is an ESD's revenue stability, D_{TA} is the dummy variable representing taxing authority, and *RD* is an ESD's level of revenue diversification. Other controls will be added into this base model as well, including the earlier discussed unemployment variables, the size of the ESD's student population, and a measure of revenue diversification that controls for federal funds that came from the 2009 American Recovery and Reinvestment Act (also known as the "ARRA" or stimulus). The inclusion of unemployment variables as gauges of economic activity is consistent with the academic literature regarding revenue stability.

Data

This study uses panel data of Oregon and Washington ESD revenues from academic years 2005-06 through 2010-11. During this period, Oregon had 20 ESDs and Washington had 9, thus providing 29 panels (one per ESD) and a total sample size of 174. Revenue data for Oregon's ESDs come from the Oregon Department of Education (ODE) website (http://www.ode.state.or.us/home/); data for Washington's ESDs are provided by the Office of the Superintendent of Public Instruction (http://www.k12.wa.us/). These data include total revenues broken down by revenue source as defined by each state's codebook for revenue source classifications. These include sources such as transportation fees, food service fees, and fees for rental of equipment to individual schools or school districts. The classification of these individual revenue sources is much more detailed among Oregon's ESDs than it is among Washington's, and the amount and types of sources from which an ESD generates revenues varies across ESDs and across years. Both states have ESDs which received a significant amount of revenue in the form of long-term debt financing, but these figures have been excluded due to the fact that they do not occur regularly and are thus not reflective of reliable revenue streams. These occurrences may be the result of bond measures or other loans to the ESDs. Additionally, any previous account balances within an ESD's listed revenue for a year are also excluded since they are also unpredictable and are partly a function of the level of an ESD's expenditures in the previous year. Since the variation in ESD services, both across time and across ESDs, makes comparing revenues by individual source impossible, the individual revenue sources were combined into four broad groups: local sources, state sources, federal sources, and miscellaneous sources. In the case of Oregon's ESDs, a fifth broad source was included: direct tax sources.

The data for both states' ESDs were combined into one dataset which also includes headcount figures of all the students registered for public school instruction within each ESD's service region at the beginning of October for each year as provided by Oregon's and Washington's respective state education agencies. This provides a rough estimate of how many students are being served by an ESD and allows me to control for significant disparities in size between ESDs after averaging each ESD's revenue figures by its student headcount. (This is necessary due to the fact that Washington has about half as many ESDs as Oregon). Figure 1 shows the linear trajectory of these per-capita revenues for ESDs in Oregon and Washington.

As can be seen in Figure 1, the trend of per-capita revenue among Oregon's ESDs appears to be more stable trend across the sample period than that of Washington's ESDs, which appears to exhibit a positive but slightly heteroskedastic trend. Oregon's ESDs also have considerably more variance in the level of per-capita revenue than Washington's ESDs.

County, state, and national unemployment data are included to represent the economic situation at the time. Although unemployment figures are lagging indicators of economic vibrancy, they should serve as good proxies for the level of economic activity in this study given the repeated findings of the existence of a lag period between housing price changes and property tax revenue changes. County level unemployment figures are used for two reasons: first, those are the most local-level unemployment data that are provided by the Bureau of Labor Statistics for most of the country. Second, most ESDs' service regions closely follow county lines (as illustrated in the figures 2 and 3), and GDP data at that level are only available for metropolitan areas. For ESDs that serve multiple counties, I calculated the average unemployment rate from those counties and included that as the relevant local unemployment rate. Finally, federal funding to the ESDs that was provided through the ARRA in response to the economic and fiscal crises of the Great Recession has been separated from the total sum of federal funding.

Results

My first hypothesis claims that Oregon's ESDs have more diversified revenue structures than Washington's ESDs due to the fact that Oregon's ESDs can directly collect tax revenue whereas Washington's ESDs cannot. This would then imply that the characteristics of ESD revenue diversification levels will differ between Washington and Oregon. Revenue diversification is calculated via the formula presented above, and is presented in two forms: one which includes all federal revenue to ESDs and one which only includes federal revenue to ESDs that was no allocated through the federal stimulus of 2009. Tables 3(a) and 3(b) provide summary statistics of the aforementioned revenue diversification index for Oregon and Washington.

. As can be seen from tables 3(a) and 3(b), the level of revenue diversification among Oregon's ESDs does not appear to be much different from that of Washington's ESDs in this sample. However, testing the first hypothesis will require more precision. Table 4 illustrates correlation coefficients of taxing authority and revenue diversification with ARRA funding (RDI-1) and revenue diversification without ARRA funding (RDI-2). The results provide no support for the hypothesis that a significant positive correlation exists between ESDs who can directly levy taxes and revenue diversification. This may be due to the relatively small sample size, but of key interest is the fact that the sign of the correlation changes when I examine the relationship between taxing authority to the baseline index of revenue diversification and taxing authority to the index of diversification that controls for federal stimulus funds. This suggests that we cannot infer anything about the direction of the relationship between property tax revenue collection and revenue diversification in this context.

The regressions of revenue diversification on taxing authority also provide no support for the first hypothesis. Because of the nearly perfect positive correlation between the two measures of revenue diversification, these regressions were only run on the original index which does not control for ARRA funds. The results of these regressions are shown in Table 5.

The results of the regressions and correlation matrix suggest that Oregon's ESD in fact did not have more diversified revenue structures than Washington's during this period. To explore this possibility further, I plotted the histograms of the ESDs' reliance on each of the five major revenue sources (Figure 4). For an Oregon ESD's revenue structure to be perfectly balanced, each of the five sources must contribute 20% toward an ESD's total revenue. Thus, if Oregon's ESDs exhibit more balanced revenue structures overall, they must be more centered around their 20% levels for each funding source than Washington's ESDs are centered around their own 25% per source contribution level as required for them to have perfect revenue diversity. These histograms, comparing Oregon's ESDs and Washington's ESD side-to-side are featured in figure 4.

As can be seen from the histograms, Oregon and Washington trade off in terms of which state has a more optimal percentage of reliance on a given funding source across sources. Oregon ESDs appear to better achieve that optimal level than Washington's for federal and local revenues, whereas Washington appears to be closer to its own optimum level for state and other sources. Of key importance, however, is the fact that the distribution of the reliance on property tax revenues by Oregon's ESDs is skewed rightward and includes a few outliers. However, excluding these from the correlation calculation or the regressions does not change the results.

With all of the aforementioned considered, no evidence is found in support of the hypothesis that the availability of property tax revenue has caused Oregon's ESDs to exhibit more diverse revenue structures.

The regressions used to test the latter hypothesis were all random effects OLS regressions using the discussed panel data. Because one of my independent variables of interest (taxing authority) is represented as a dummy variable, the use of fixed effects would be inappropriate in these regressions because they would be perfectly collinear with this dummy. Thus, a Hausman test to determine whether fixed or random effects are preferable was not conducted because fixed effects are not useful for this study. The data are shown to be stationary via a Fisher unit root test.[1] This is likely due to the fact that the dependent variable is already in the form of first-differenced percentages. A likelihood ratio test found very significant evidence indicating the presence of panel heteroskedasticity[2], and this has been corrected through the inclusion of panel corrected standard errors. Finally, a Wooldridge test revealed mild evidence of first-order serial correlation in one of the models[3], but given the already short amount of time periods in the dataset, lagged terms were not included into the models. However, the models were also run with more rigorous clustered standard errors. Fortunately, serial correlation is not present in most of the models that will be run. The results of these regressions are presented in tables 6 through 9.

The regressions provide no support of the second hypothesis which states that reliance on the property tax helps Oregon's ESDs reap more stable revenues. When using year-over-year percent change as the measure of volatility, an ESD's taxing authority proves to not be significant at all in increasing stability. In fact, the coefficients on the taxing authority variable in these regressions are of the opposite sign of what the second hypothesis predicted, as taxing

[1] Fisher unit-root test provided a p-value of <0.000, indicating that at least one panel is stationary.
[2] $p < 0.000$
[3] $p < 0.10$

authority appears to be correlated (albeit insignificantly) with decreases in per-capita revenue. This phenomenon changes when using the squared residual method (see Table 8) in that the correlation between taxing authority and revenue volatility becomes positive and significant in certain instances (Models 1, 4, 7 and 8). The size of an ESD also proves to be significantly negatively correlated with revenue volatility using this latter method in those same models. Table 10 shows results from these same regressions, but excluding both measures of diversification. As with the results from Table 8, taxing authority is significantly negatively correlated with revenue stability in models which exclude the unemployment variables, and ESD size is significantly positively correlated with revenue stability. However, all of these results lose their significance when ESD-clustered standard errors are used (see Table 9), including the regressions which exclude the diversification indices (not shown).

The results of the pairwise correlation matrix between an ESD's revenue sources are shown in Table 11 (per-capita revenue correlations are shown in Table 12). These results may provide some insight as to why diversification has a statistically significant impact on revenue stability in the models shown in Table 8, but no significant impact in the models shown in Table 6. Although it is very likely that diversification proved to not be significant in the models in Table 6 simply because of the dependent variable was characterized as a percent change which itself does not contain a high amount of variability, it is possible that diversification was also made difficult for some ESDs in some instances, as noted by the high magnitudes of some of the correlations. This set of relationships suggests that revenue stability through diversification may be difficult for an ESD to achieve, especially if certain forms of funding are matched with each other. However, as shown in both Table 6 and Table 8, diversification consistently has a non-negative impact on revenue.

Discussion

The empirical analyses of the data find no evidence in support of either of the two hypotheses in question. However, these results do not necessarily provide support against the diversification hypothesis from portfolio theory. In fact, the direction of the effect of diversification on revenue stability in this study is consistent with what portfolio theory predicts, and the diversification variables proved to be highly significant when using the squared residual method to measure revenue volatility.

These findings do not necessarily rule out the possibility that either hypothesis may be true, however. Severe data limitations exist, as the sample size is small, thus making significance more difficult to find. On a similar note, data were not readily available for Washington's ESDs before 2005. This causes the squared residuals method to suffer from some level of endogeneity in that the magnitudes of the squared residuals were likely biased downward because the linear trend upon which they are based was itself predicted by those same observations. If data for some years prior to 2005 were available, the linear trend upon which to predict the squared residuals would have been found using only the earlier years' data.

Categorizing taxing authority as a binary variable also presents problems. First, this method makes significance harder to find, due to its lack of variation. More importantly, since the policy is a state-fixed effect, this method has the result of hiding any other unobservable state-fixed effects. This can include the effects of the anti-tax Measures 5 and 50 (discussed below). A better method of representing this policy in future quantitative analyses (ideally one that exhibits greater variance) may help resolve this issue.

Furthermore, the perception of Washington's public school system is generally positive, and Washington State's economy is larger than that of Oregon. Though unemployment variables were included to control for this latter phenomenon, it may be the case that Washington's comparatively vibrant economy lends itself to stronger support of the state's ESDs through other unobserved channels, such as donations to schools and districts which then are used toward purchasing ESD services.

Washington also has fewer than half of Oregon's ESDs (9 for Washington as compared to 20 from Oregon in this sample) while having nearly twice as many students. Thus, Washington's ESDs are, on average, considerably larger than those of Oregon in terms of the number of students that are served (see Tables 1 and 2). Tables 1 and 2 also show that although Oregon's ESDs averaged a higher amount of total revenue, Washington's ESDs exhibited a higher median in total revenue, suggesting that Oregon's ESDs may, on the whole, have some outliers which are skewing their average upward.

As Table 13 illustrates, Oregon indeed does have the largest three ESDs in terms of average yearly revenue, but Oregon also has the nine smallest ESDs using that same metric while Washington's ESDs are more clustered around the median of the distribution as a whole. As Carroll and Stater (2008) find, larger nonprofits are likely to have more stable revenue streams. If this can be applied to ESDs, it may partly explain why the availability of property tax revenue did not necessarily cause Oregon's ESDs to have more stable revenues than Washington's ESDs, as Oregon had 9 of the smallest ESDs in the sample as measured by total revenue This suggests that Oregon's ESDs may achieve greater levels of revenue stability if some of the smaller ESDs consolidate with one another, thus increasing their overall size.

Finally, it is entirely possible that Oregon's ESDs did not experience more stable revenue due to their property tax revenue simply because Oregon Measures 5 and 50 place restrictions on property tax revenue. Thus, it is possible that ESD property taxes either crowded-out local school district property tax revenue to an extent (some of which would have been used toward the purchase of ESD services anyway), or that Measure 5's restriction on the amount of property tax dedicated to school funding restricted the amount of revenue that school districts could redirect to ESDs in return for services. However, the relationship between ESD property taxes and other local government property taxes is beyond the scope of this study. It should also be noted that the higher reliance on local funding sources among Oregon's ESDs relative to that of Washington's suggests that this crowding-out may not actually happen, as Oregon's ESDs appear to still get about 50% of their funding from local sources and their property tax revenues combined, and that this heavy reliance on local and property tax sources might be even larger in the absence of Measure 5.

Any implications regarding this policy should come from a subsequent study that uses more data from more years and which is better able to capture any state-fixed effects which were unobserved in this study. One possible direction for future research could be to include data for all states which have Type "A" ESDs, comparing their revenue streams to those of Oregon and Michigan – the two states whose systems allow all of their ESDs to directly levy taxes. For now, it is suffice to say that no evidence was found of this policy's impact in terms of revenue stability relative to Washington's ESDs as it was currently represented without also raising the possibility of omitted variable bias.

Additionally, the evidence of diversification's significantly positive effect on stability when using the squared residual method may justify efforts by ESDs to find ways to diversify their revenue streams, The limited evidence of a significantly negative correlation between size and volatility suggests that ESDs may also benefit (in the form of additional revenue stability) from consolidating with each other.

Conclusion

This study has examined the effect of the ability of Oregon's ESDs to directly levy taxes on their revenue diversification and stability before, during, and in the wake of the Great Recession. This comparison is made possible by the fact that both Oregon's and Washington's ESDs are of the same governing structure with regards to their relationships to local education agencies and the state education agency. This study contributes to the literature in that there is almost no academic research on education service districts' financial practices or attributes, and none comparing these two states. Furthermore, the literature on revenue diversification generally focuses on diversification *away* from property taxes; this study works under the premise that diversification can be furthered by moving *toward* property taxes.

The literature is in general agreement on the merits of the property tax's reliability as a form of revenue stability, but the evidence of how diversification affects stability comes with caveats. Two hypotheses were tested: first, do Oregon's ESDs experience more diversified revenue streams due to their ability to tax, and second, does this ability to tax lead to more stable revenue? No support was found for either of these hypotheses, but this may be due in large part to data and modeling limitations. Because of the lackluster statistical findings and the known data shortcomings, any policy implications about ESD taxing authority drawn from this study should be made with caution, as further research using more data, and possibly more states, should be conducted to better determine the merits of this policy.

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Appendix 1 – Tables

Table 1: Oregon Educational Service Districts Summary Statistics[1]

	Mean	Median	Standard Deviation	Min	Max	n
Service Area Enrollment	30265.7	13065	34880.13	704	111074	120
Total Revenue	$26718.48	$15799.21	29944598.62	$1437.51	$120926.28	120
Federal Sources	$3355.36	$2461.56	3789483.14	$63.03	$23270.38	120
Federal Sources (non-ARRA)	$3315.64	$2461.56	3747819.23	$63.03	$23270.38	120
State Sources	$9468.80	$2909.75	10955798.33	$0	$42314.56	120
Local Sources	$6011.05	$3854.20	6245000.80	$65.16	$27307.75	120
Other Sources	$3452.14	$351.50	9697348.19	$0	$47028.33	120
Direct Tax	$4431.13	$2466.55	5295508.33	$225.83	$25097.99	120

1: Dollar figures are presented in thousands of dollars.

Table 2: Washington Educational Service Districts Summary Statistics[1]

	Mean	Median	Standard Deviation	Min	Max	n
Service Area Enrollment	113932.50	72659.50	100929.34	36562.00	410519.00	54
Total Revenue	$24885.71	$17537.29	16181924.48	$7277.22	$62883.58	54
Federal Sources	$8332.93	$5352.21	6793396.46	$2010.20	$29682.42	54
Federal Sources (non-ARRA)	$7986.24	$4910.33	6461107.12	$1783.84	$26859.99	54
State Sources	$5534.72	$3576.57	5273541.39	$1479.47	$22087.68	54
Local Sources	$2115.96	$1706.99	1377752.13	$597.73	$5826.89	54
Other Sources	$8902.10	$6326.08	6831579.24	$1341.34	$34042.54	54

1: Dollar figures are presented in thousands of dollars.

Table 3(a) Revenue Diversification Index Summary Statistics: Oregon and Washington[1]

State	Mean	Median	Min.	Max.	St. Dev.	N
Oregon	.67	.69	.41	.78	.073	120
Washington	.68	.68	.53	.76	.046	54

1. Excluding ARRA funding.

Table 3(b) Revenue Diversification Index Summary Statistics: Oregon and Washington[1]

State	Mean	Median	Min.	Max.	St. Dev.	N
Oregon	.67	.69	.41	.78	.07	120
Washington	.67	.68	.53	.72	.04	54

1. Not excluding ARRA funding

Table 4: Correlation Coefficients – Taxing Authority and Revenue Diversification

	Taxing Authority	RDI-1	RDI-2
Taxing Authority	1.00		
Diversification Index	0.02 (0.768)	1.00	
Diversification Index[2]	-0.03 (0.654)	0.99 (< 0.01)	1.00

1. Correlation coefficients are presented, with associated p-values in parentheses.
2. RDI-2 excluded ARRA funding.

Table 5: Regression results of Revenue Diversification on Taxing Authority[1 2]

	Model 1	Model 2	Model 3
Taxing Authority	0.01	< -0.01	0.01
	(0.02)	(0.02)	(0.02)
Size	0.00		< 0.01
	(< 0.01)		(<0.01)
Local Unemployment		< -0.01	< -0.01
		(0.01)	(0.01)
State Unemployment		0.01	0.01
		(0.01)	(0.01)
National Unemployment		< -0.01	-0.01
		(0.01)	(0.01)
Constant	0.66	0.68	0.67
	(0.02)	(0.02)	(0.03)
R-squared	0.010	0.004	0.011
N	174	174	174
F	0.52	0.15	0.37

1. Beta coefficients are presented with standard errors in parentheses.
2. ESD-clustered standard errors are used because panel corrected standard errors produced inexplicably high significance.

Table 6: Regression results for Revenue Stability (Year-over-Year Percent Change) on Taxing Authority[1 2]

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Taxing Authority	-0.02	-0.03	-0.03	-0.02	-0.03	-0.03	-0.03	-0.03
	(0.04)	(0.05)	(0.06)	(0.04)	(0.05)	(0.06)	(0.05)	(0.05)
Diversification	0.21	0.21	0.21				0.22	
Index	(0.19)	(0.19)	(0.20)				(0.20)	
Local		<0.01	<0.01		<0.01	<0.01		
Unemployment		(0.01)	(0.01)		(0.01)	(0.01)		
State		<0.01	<0.01		<0.01	<0.01		
Unemployment		(0.04)	(0.04)		(0.04)	(0.04)		
National		-0.02	-0.02		-0.02	-0.02		
Unemployment		(0.05)	(0.05)		(0.05)	(0.05)		
Size			<-0.01			<-0.01	-0.00	-0.00
			(<0.01)			(<0.01)	(0.00)	(0.00)
Diversification				0.17	0.18	0.19		0.17
Index[3]				(0.18)	(0.18)	(0.18)		(0.19)
Constant	-0.10	-0.02	-0.01	-0.07	0.00	0.01	-0.10	-0.07
	(0.12)	(0.14)	(0.14)	(0.12)	(0.13)	(0.13)	(0.12)	(0.12)
R-squared	0.010	0.026	0.026	0.008	0.025	0.025	0.010	0.008
N	145	145	145	145	145	145	145	145

1. Panel random effects OLS regression with panel corrected standard errors is the technique used here. Beta coefficients are presented with standard errors in parentheses.
2. *: p ≤ 0.10; **: p ≤ 0.05; ***: p ≤ 0.01
3. This is the diversification index that controls for ARRA funds.

Table 7: Regression results for Revenue Stability (Year-over-Year Percent Change) on Taxing Authority[1 2]

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Taxing Authority	-0.02 (0.01)*	-0.03 (0.04)	-0.03 (0.04)	-0.02 (0.01)*	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.02)*	-0.03 (0.01)*
Diversification Index	0.21 (0.26)	0.21 (0.28)	0.21 (0.28)				0.22 (0.26)	
Local Unemployment		<0.01 (0.01)	<0.01 (0.01)		<0.01 (0.01)	<0.01 (0.01)		
State Unemployment		<0.01 (0.04)	<0.01 (0.04)		<0.01 (0.04)	<0.01 (0.04)		
National Unemployment		-0.02 (0.06)	-0.02 (0.06)		-0.02 (0.06)	-0.02 (0.06)		
Size			<-0.01 (<0.01)			<-0.01 (<0.01)	-0.00 (<0.01)	-0.00 (<0.01)
Diversification Index[3]				0.17 (0.25)	0.18 (0.28)	0.19 (0.28)		0.17 (0.25)
Constant	-0.10 (0.18)	-0.02 (0.18)	-0.01 (0.18)	-0.07 (0.17)	0.00 (0.17)	0.01 (0.17)	-0.10 (0.18)	-0.07 (0.17)
R-squared	0.010	0.026	0.026	0.008	0.025	0.025	0.010	0.008
N	145	145	145	145	145	145	145	145
F	1.77	1.24	1.05	1.78	1.29	1.07	1.33	1.29

1. Panel random effects OLS regression with ESD-clustered standard errors is the technique used here. Beta coefficients are presented with standard errors in parentheses.
2. *: $p \leq 0.10$; **: $p \leq 0.05$; ***: $p \leq 0.01$
3. This is the diversification index that controls for ARRA funds.

Table 8: Regression results for Revenue Stability (Squared Residuals) on Taxing Authority[1 2 3]

	Model 1	Model 2	Model 3	Model 4
Taxing Authority	142.27 (37.75)***	57.22 (65.37)	41.99 (66.17)	133.66 (33.65)***
Diversification Index	-1099.87 (429.23)***	-1030.89 (428.88)**	-1015.70 (428.34)**	
Local Unemployment		59.02 (28.28)**	56.73 (28.61)**	
State Unemployment		19.67 (76.66)	21.65 (76.88)	
National Unemployment		-90.04 (96.05)	-89.60 (95.83)	
Size[4]			-0.19 (0.15)	
Diversification Index[5]				-1066.39 (416.23)***
Constant	735.30 (286.49)***	672.87 (309.12)**	685.42 (311.33)**	721.70 (281.95)***
R-squared	0.034	0.068	0.069	0.033
N	174	174	174	174

Table 8: (Continued)

	Model 5	Model 6	Model 7	Model 8
Taxing Authority	54.28 (64.53)	39.23 (65.48)	94.45 (24.02)***	86.51 (20.07)***
Diversification Index			-1046.60 (429.84)**	
Local Unemployment	58.73 (28.25)**	56.47 (28.62)**		
State Unemployment	14.19 (76.36)	16.23 (76.61)		
National Unemployment	-79.82 (96.01)	-79.53 (95.81)		
Size[4]		-0.19 (0.15)	-0.57 (0.18)***	-0.57 (0.18)***
Diversification Index[5]	-1009.47 (414.84)**	-994.31 (414.02)**		-1012.07 (416.00)**
Constant	643.40 (292.44)**	655.99 (294.33)**	764.61 (290.52)***	749.55 (285.04)***
R-squared	0.068	0.069	0.038	0.038
N	174	174	174	174

1. Panel random effects OLS regression with panel corrected standard errors is the technique used here. Beta coefficients are presented with standard errors in parentheses.
2. *: p ≤ 0.10; **: p ≤ 0.05; ***: p ≤ 0.01
3. Figures presented in thousands except where stated otherwise.
4. Figure not presented in thousands.
5. This is the diversification index that controls for ARRA funds

Table 9: Regression results for Revenue Stability (Squared Residuals) on Taxing Authority[1 2 3]

	Model 1	Model 2	Model 3	Model 4
Taxing Authority	142.27	57.22	41.99	133.66
	(115.04)	(40.85)	(40.96)	(107.61)
Diversification	-1099.87	-1030.89	-1015.70	
Index	(1069.34)	(1054.32)	(1055.14)	
Local		59.02	56.73	
Unemployment		(60.08)	(60.10)	
State		19.67	21.65	
Unemployment		(26.54)	(26.71)	
National		-90.04	-89.60	
Unemployment		(88.34)	(88.44)	
Size[4]			-0.19	
			(.29)	
Diversification				-1066.39
Index[5]				(1033.10)
Constant	735.30	672.87	685.42	721.70
	(714.60)	(683.62)	(685.74)	(698.89)
R-squared	0.034	0.068	0.069	0.033
N	174	174	174	174
F	0.79	0.43	0.37	0.79

Table 9: (Continued)

	Model 5	Model 6	Model 7	Model 8
Taxing Authority	54.28	39.23	94.45	86.51
	(38.94)	(39.86)	(81.36)	(74.56)
Diversification			-1046.60	
Index			(1037.50)	
Local	58.73	56.47		
Unemployment	(59.91)	(59.95)		
State	14.19	16.23		
Unemployment	(23.53)	(23.74)		
National	-79.82	-79.53		
Unemployment	(80.17)	(80.23)		
Size[4]		-0.19	-0.57	-0.57
		(0.31)	(0.57)	(0.57)
Diversification	-1009.47	-994.31		-1012.07
Index[5]	(1029.79)	(1030.64)		(999.63)
Constant	643.40	655.99	764.61	749.55
	(651.52)	(653.38)	(735.64)	(718.56)
R-squared	0.068	0.069	0.038	0.038
N	174	174	174	174
F	0.43	0.36	0.52	0.51

1. Panel random effects OLS regression with ESD-clustered standard errors is the technique used here. Beta coefficients are presented with standard errors in parentheses.
2. *: $p \leq 0.10$; **: $p \leq 0.05$; ***: $p \leq 0.01$
3. Figures presented in thousands except where stated otherwise.
4. Figure not presented in thousands.
5. This is the diversification index that controls for ARRA funds

Table 10: Regression results for Revenue Stability (Squared Residuals) on Taxing Authority, Excluding Diversification Indices[1 2 3]

	Model 1	Model 2	Model 3	Model 4
Taxing Authority	138.82	57.28	34.78	82.59
	(35.16)***	(63.73)	(64.30)	(20.00)***
Local Unemployment		61.37	57.95	
		(27.80)**	(28.16)**	
State Unemployment		12.89	15.97	
		(75.27)	(75.46)	
National Unemployment		-83.38	-82.87	
		(93.87)	(93.64)	
Size[4]			-0.28	-0.67
			(0.17)*	(0.18)***
Constant	0.76	-28.32	5.50	77.33
	(0.28)***	(137.99)	(141.17)	(21.83)***
R-squared	0.015	0.052	0.053	0.022
N	174	174	174	174

1. Panel random effects OLS regression with panel corrected standard errors is the technique used here. Beta coefficients are presented with standard errors in parentheses.
2. *: p ≤ 0.10; **: p ≤ 0.05; ***: p ≤ 0.01
3. Figures presented in thousands except where stated otherwise.
4. Figure not presented in thousands.

Table 11: Correlation Matrix between ESD Revenue Sources

	Federal Sources	Federal (non-ARRA)	State Sources	Local Sources	Other Sources	Direct Tax Sources	Total Revenue
Federal Sources	1.00						
Federal (non-ARRA)	1.00 (<0.01)	1.00					
State Sources	0.55 (<0.01)	0.56 (<0.01)	1.00				
Local Sources	0.28 (<0.01)	0.29 (<0.01)	0.73 (<0.01)	1.00			
Other Sources	0.55 (<0.01)	0.55 (<0.01)	0.50 (<0.01)	0.23 (<0.01)	1.00		
Direct Tax Sources	0.11 (0.13)	0.12 (0.10)	0.62 (<0.01)	0.77 (<0.01)	0.08 (0.27)	1.00	
Total Revenue	0.68 (<0.01)	0.69 (<0.01)	0.92 (<0.01)	0.76 (<0.01)	0.71 (<0.01)	0.62 (<0.01)	1.00

1. Correlation coefficients are presented, with associated p-values in parentheses

Table 12: Correlation Matrix between Per-Capita ESD Revenue Sources

	Federal Sources	Federal (non-ARRA)	State Sources	Local Sources	Other Sources	Direct Tax Sources	Total Revenue
Federal Sources	1.00						
Federal (non-ARRA)	1.00 (<0.01)	1.00					
State Sources	-0.07 (0.33)	-0.07 (0.33)	1.00				
Local Sources	0.68 (<0.01)	0.69 (<0.01)	0.22 (<0.01)	1.00			
Other Sources	0.21 (<0.01)	0.21 (<0.01)	0.08 (0.31)	0.25 (<0.01)	1.00		
Direct Tax Sources	0.53 (<0.01)	0.54 (<0.01)	-0.07 (0.36)	0.71 (<0.01)	0.38 (<0.01)	1.00	
Total Revenue	0.75 (<0.01)	0.75 (<0.01)	0.21 (<0.01)	0.91 (<0.01)	0.45 (<0.01)	0.88 (<0.01)	1.00

1. Correlation coefficients are presented, with associated p-values in parentheses.

Table 13: List of ESDs by Total Revenue (Largest to Smallest)[1]

ESD	Total Revenue Per Year[1]	State	Size Rank
Northwest Regional ESD	$112,032,028.17	Oregon	1
Willamette ESD	$76,361,864.17	Oregon	2
Multnomah ESD	$75,865,306.67	Oregon	3
ESD 121 (Puget Sound/Renton)	$55,806,526.48	Washington	4
ESD 112 (Vancouver)	$49,737,498.06	Washington	5
Clackamas ESD	$43,440,546.50	Oregon	6
Linn-Benton-Lincoln ESD	$34,247,343.33	Oregon	7
Lane ESD	$32,699,725.83	Oregon	8
High Desert ESD	$31,675,290.83	Oregon	9
Southern Oregon ESD	$30,743,382.33	Oregon	10
Umatilla-Morrow ESD	$28,485,869.00	Oregon	11
ESD 113 (Olympia)	$27,361,200.73	Washington	12
Douglas ESD	$23,043,625.83	Oregon	13
ESD 189 (Northwest/Anacortes)	$20,084,779.37	Washington	14
ESD 105 (Yakima)	$17,569,010.11	Washington	15
ESD 101 (Spokane)	$17,226,234.78	Washington	16
ESD 114 (Olympic/Bremerton)	$14,177,583.11	Washington	17
ESD 171 (North Central/Wenatchee)	$13,714,270.83	Washington	18
South Coast ESD	$13,169,946.67	Oregon	19
ESD 123 (Pasco)	$8,294,258.84	Washington	20
Columbia-Gorge ESD	$5,021,340.33	Oregon	21
Grant ESD	$4,617,532.67	Oregon	22
Malheur ESD	$4,481,928.33	Oregon	23
Wallowa ESD	$4,403,184.83	Oregon	24
Union-Baker ESD	$4,372,894.33	Oregon	25
Harney ESD	$3,367,614.83	Oregon	26
North Central ESD	$2,996,972.17	Oregon	27
Jefferson ESD	$1,841,764.33	Oregon	28
Lake ESD	$1,501,361.17	Oregon	29

1: Sum of each year's Total Revenues (*not* per-capita revenues) for an ESD averaged by the number of years in the sample period (6).

Appendix 2 – Figures and Graphs

Figure 1: Per-Capita Revenue over Time for Oregon and Washington ESDs

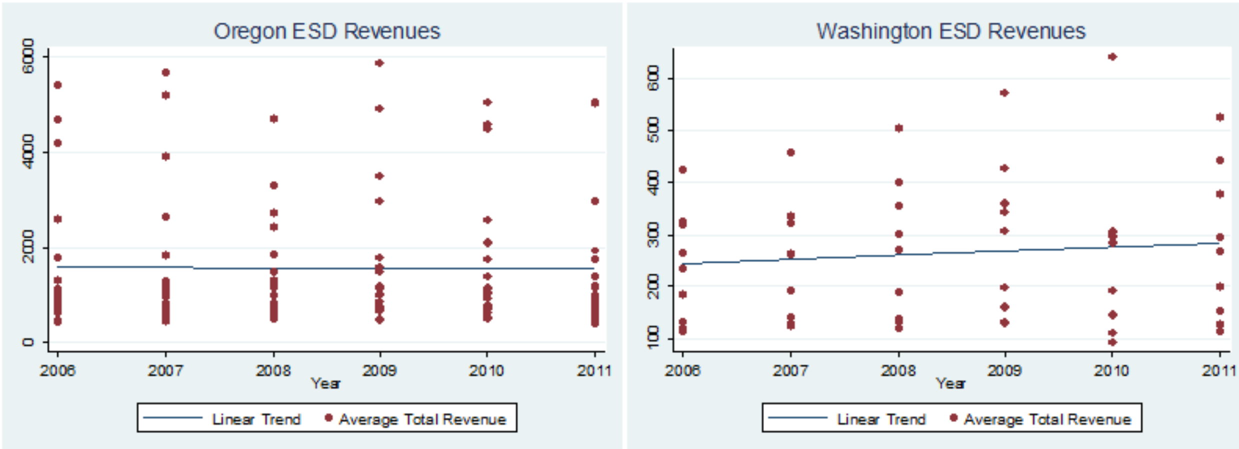


Figure 2: Oregon County Boundaries (Left) and ESD Service Regions (Right)

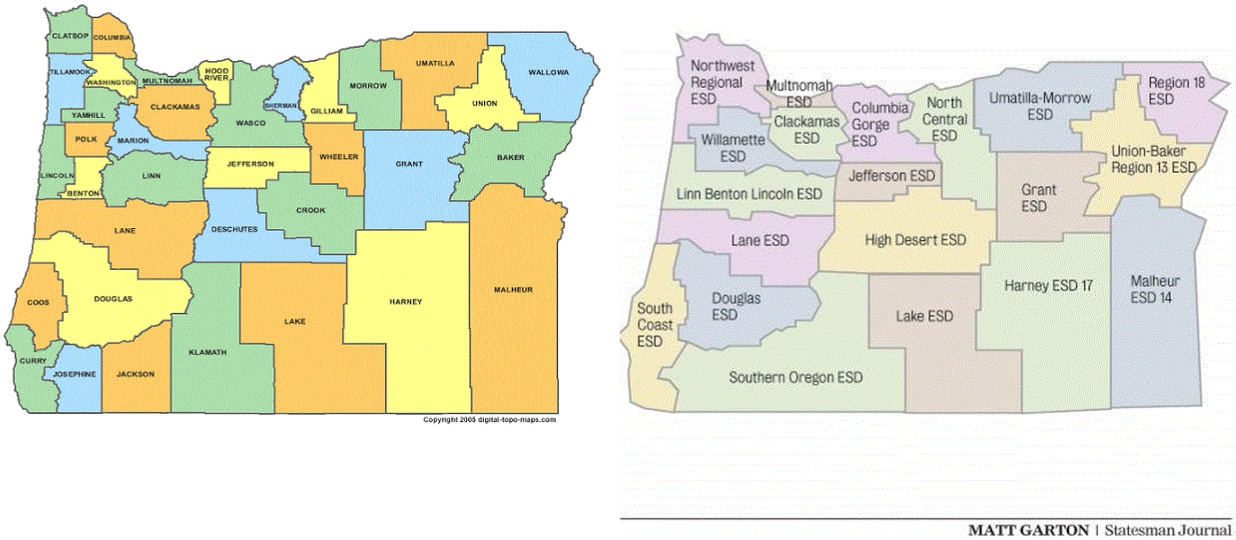
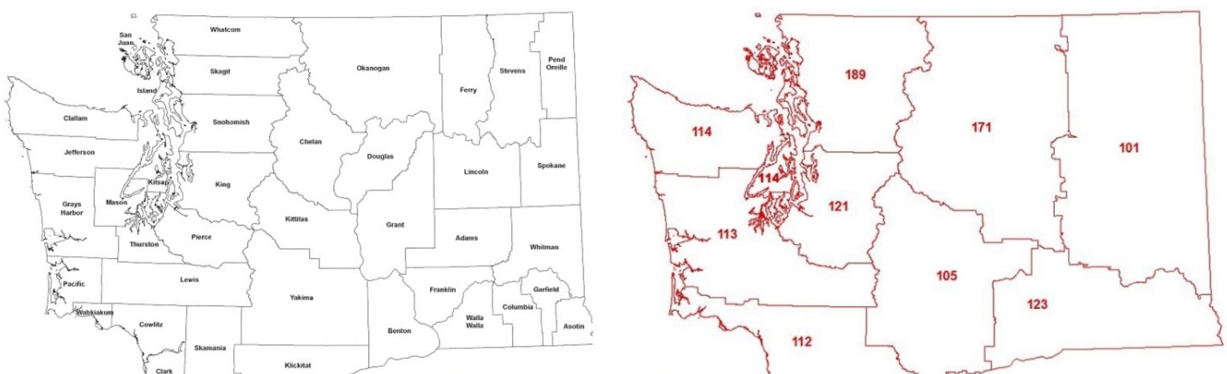


Figure 3: Washington County Boundaries (Left) and ESD Service Regions (Right)



Source: http://www.k12.wa.us/maps/Maps.aspx

Figure 4: Histograms of Percentage of Total Revenue by Source for Oregon (left) and Washington (right) ESDs

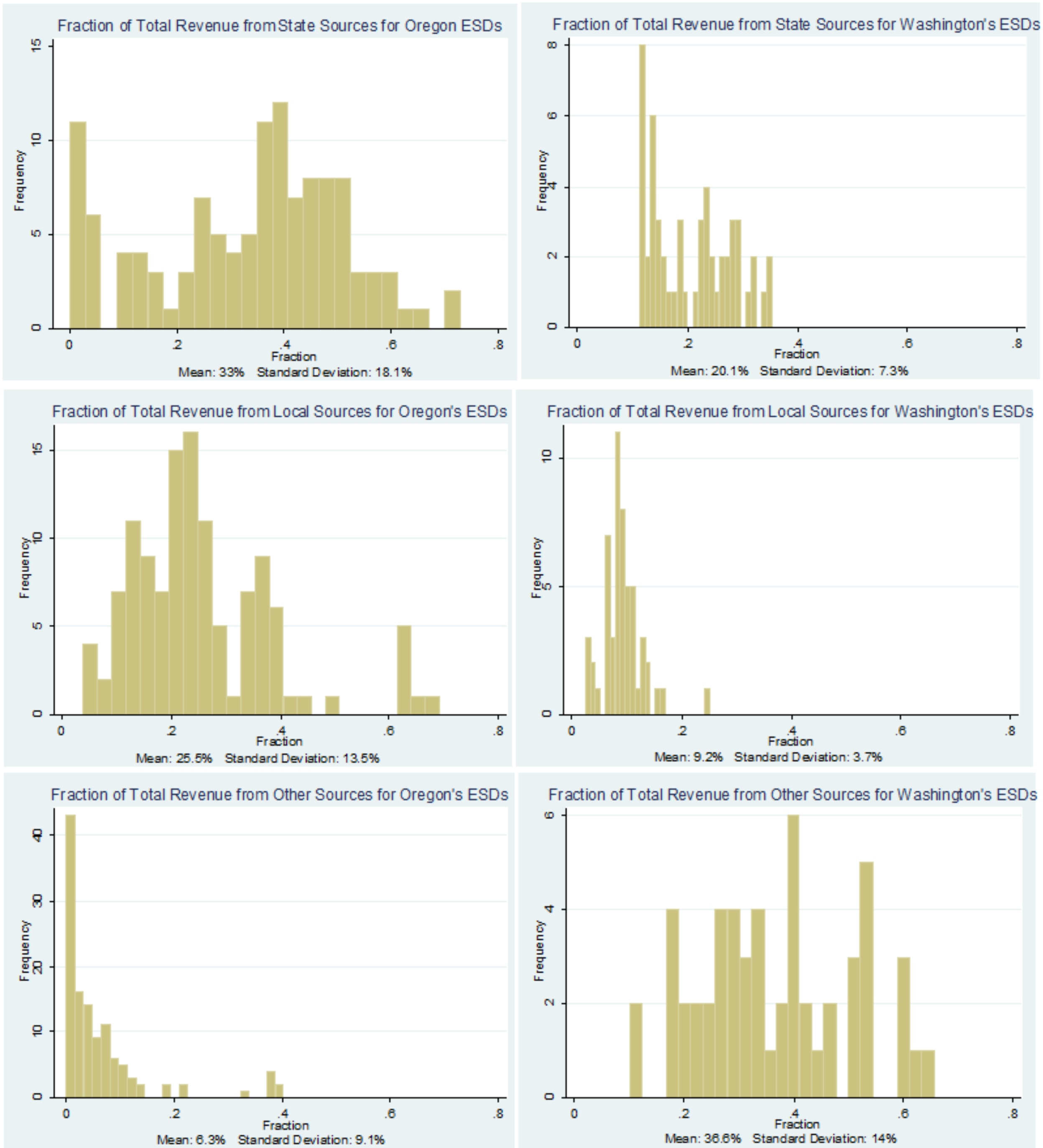


Figure 4: (continued)