**THE CALIFORNIA ASSOCIATION OF CLERKS AND ELECTION OFFICIALS (CACEO)**

**ELECTION COSTS PROJECT**

**Research Brief I**

**Election Costs and Labor Cost Indexes**

In this research brief, we explore the relationship of varying labor costs on the cost of Elections. Because California’s fifty-eight counties vary greatly in demographics and cost of living, with the urban coastal counties being among some of the most expensive in the U.S. while some rural inland counties are economically depressed, it is reasonable to assume that these differences will be reflected in the data we collected.

When considering any issue that involves costs among California counties – and in particular costs which rely heavily on local resources – it is impossible to ignore the impacts of differing labor costs. Labor costs affect not only the election costs directly driven by salaries and wages of county employees or contractors, but also the cost of locally produced supplies and rents. Labor costs, as we explore below in more detail, also vary substantially between counties in California, with average reported wages[[1]](#footnote-1) from large Census surveys ranging from less than $42,000 per year in Tulare County to over $102,000 per year in Marin County. In addition to the impact this has on a county’s expense in providing election services, these costs may also affect decisions on the use of labor intensive or time-saving technologies.

For the analyses below, we draw on three external sources of labor costs – the Government Compensation in California (GCC) database[[2]](#footnote-2) produced by the California State Controller’s Office, the Quarterly Census of Employment and Wages (QCEW) database[[3]](#footnote-3) compiled by the U.S. Bureau of Labor Statistics, and the American Community Survey (ACS)[[4]](#footnote-4). The first two sources are based on administrative records. The GCC database contains individual level salary and compensation information for public employees from counties, cities, and a variety of other public entities. Several measures reflecting the level of compensation can be calculated from those data for the years 2009 through 2014. The QCEW data provides quarterly counts of employment and wages reported by employers covering 98 percent of U.S. jobs, available at the county level in total and by sector from 1992 through 2014. Mean annual wages can be constructed from those records. Finally, the ACS provides reported individual wage and salary income at the county level for counties with at least 100,000 in population.

Each of these sources of provides a different insight into labor costs, and has different strengths and weaknesses. The GCC data are focused specifically on costs for public employees, based on extensive administrative records and, because they are provided at the individual employee level, can be used to produce both mean and median[[5]](#footnote-5) wage indicators. The QCEW is based on the largest and most extensive data, covering 98% of non-self-employed jobs, but provides data only in summary form (e.g. total employment, wages, and mean annual earnings for workers in a county). Because of nature of their basis in administrative records, neither the GCC nor the QCEW make it possible to distinguish full- from part-time employment, or full year from partial year employment. The ACS does provide this capability, and is based on self-report from a large sample comprising around 10% of the population, but for confidentiality reasons does not identify the smaller counties and is subject to recall and reporting biases. None of these sources agree in complete detail on the average wages, but for the purposes of ranking counties relative to one another they are quite consistent.

**Descriptive Statistics for Wage Levels**

For each of these sources, individual county wage rates and statewide summaries for relevant employees were calculated, and indexes were created at the county level identifying county wages rates relative to state averages. For the mean and median indexes from the GCC, county values range from around .50 (where employees earn about half the state average) to around 1.23 (where typical compensation is about a quarter above the state average)[[6]](#footnote-6). The QCEW Total Wage index tends toward a more bi-modal distribution (not shown) with some counties skewing higher; this is the only index which contains non-public employees, and likely reflects a relatively small group of extremely well-paid workers in the private sector. The QCEW Local Government Wage Index is quite similar to the GCC versions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | GCC Mean Wage Index | GCC Median Wage Index | QCEW Total Wage Index | QCEW Local Government Wage Index |
| Mean county compensation | 0.84 | 0.89 | 0.79 | 0.87 |
| Median county compensation | 0.83 | 0.88 | 0.71 | 0.86 |
| Minimum county compensation | 0.49 | 0.51 | 0.59 | 0.60 |
| Maximum county compensation | 1.24 | 1.22 | 1.69 | 1.21 |
|  |  |  |  |  |
|  | GCC Mean Wage Index | GCC Median Wage Index | QCEW Total Wage Index | QCEW Local Government Wage Index |
| Ratio of largest to smallest | 2.55 | 2.39 | 2.85 | 2.00 |
| Ratio of Mean/Median | 1.01 | 1.02 | 1.11 | 1.00 |

Simply put, these tables show that, regardless of measure, there is a wide dispersion in wage rates across counties that would reasonably affect election costs. They also indicate that the actual level of dispersion varies depending on the measure used, and that the QCEW total wage index tends to include some high outliers, relative to the other measures.

Looking at consistency in these measures, the tables below show two sets of correlations: the first table demonstrates correlation for each of these indexed wage measures across recent years, showing the extent of consistency across time, and the second table demonstrates correlation between each of these measures for a composite version based on its average for the period over the last five years. The first table tells us that a county’s wage rate relative to the state as a whole is quite stable over time. This consistency is high not only over shorter periods (plus or minus 2 years), but also as we look over years more distant in time, with correlation coefficients averaging around .93 even for time periods 13-17 years before or after any income year in question.[[7]](#footnote-7) As a result, assigning a wage index based on any particular year or set of years will likely serve well for other year or time periods, but looking to see if counties change their election support methods or technologies in response to changes in wage levels is unlikely to be productive, since those wage levels tend to be quite stable over time.

Consistency in annual county income indexes over time

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pearson Correlations of Annual County Income measures | QCEW - Total | QCEW - Local Govt |  GCC - Mean |  GCC - Median |
| Income in Year with +/- 2 Years | 0.99 | 0.99 | 0.93 | 0.90 |
| Income in Year with +/- 3 to 7 Years | 0.98 | 0.97 | n/a | n/a |
| Income in Year with +/- 8 to 12 Years | 0.96 | 0.95 | n/a | n/a |
| Income in Year with +/- 13-17 Years | 0.93 | 0.94 | n/a | n/a |

Pearson correlation coefficients tell us how consistently the value of one measure is related to the value of another measure. When the sign of the coefficient is positive, the two measures tend to increase or decrease together; when the sign of the coefficient is negative, one measure tends to go up when the other decreases. If the association is perfect (also referred to as *total*) – the second value is always twice as large as the first value, for example – the coefficient is 1.00, and we can always perfectly predict the second value from the first. If larger values for the first value are always proportionally associated with smaller values for the second, the coefficient will be -1.00. Correlations of .50 or higher are usually considered to be strong associations.

Association between wage indexes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pearson Correlations of County Income indexes  |  GCC mean wage index, 2009-2014 | GCC median wage index, 2009-2014 | QCEW total mean wage index, 2009-2014 | QCEW local govt mean wage index, 2009-2014 |
|  GCC mean wage index, 2009-2014 | 1.00 | 0.98 | 0.67 | 0.88 |
| GCC median wage index, 2009-2014 | 0.98 | 1.00 | 0.67 | 0.87 |
| QCEW total mean wage index, 2009-2014 | 0.67 | 0.67 | 1.00 | 0.83 |
| QCEW local govt mean wage index, 2009-2014 | 0.88 | 0.87 | 0.83 | 1.00 |

The second table shows the extent to which these measures of relative wages agree with one another. Although the correlations are not as strong as the association within counties across time shown in the previous table, the association is quite strong. The plot below illustrates this relationship graphically. In short, there is strong agreement between data sources about relative difference between counties in typical wages and these differences are consistent across time.



**Wage Levels and Election Survey Measures**

The Direct Costs Categories survey obtained information on staff salaries and hours associated with providing election support from participating counties. We expect that these measures of labor costs – salaries per registered voter and salaries per hour worked – will also reflect the external measures of county wage rates. This is, however, not completely the case, although there is a positive association. Splitting the counties into quintiles based on wage by our wage index measure, the median reported salary per hour from the Direct Costs Categories survey (for the 2014 General Election) increases from $15.41 for the counties with the lowest wage structure to over $30/hour for most of the other quintiles, but in the highest quintile, the median drops again to around $25/hour. (We use median because it is less influenced by low or high outliers). Nor do the measures of reported cost of salaries or reported hours worked on the election per registered voter move in a consistent trend with wage structure. Similar patterns – or lack of patterns – are found with the 2014 Primary Election.

|  |  |
| --- | --- |
|   |  2014 General Election |
| Median |
| Reported Salaries / Reported Hours | Reported Hours per Registered Voter | Reported Salary per Registered Voter |
| Very Low Wage Structure | $15.41 | .0785 | $2.74 |
| Low Wage Structure | $33.76 | .0146 | $1.12 |
| Median Wage Structure |  -- |  -- | $1.83 |
| High Wage Structure | $35.91 | .0575 | $2.67 |
| Very High Wage Structure | $25.55 | .0467 | $1.56 |

|  |  |
| --- | --- |
|   | 2014 Primary Election |
| Median |
| Reported Salaries / Reported Hours | Reported Hours per Registered Voter | Reported Salary per Registered Voter |
| Very Low Wage Structure | $15.83 | .0608 | $2.01 |
| Low Wage Structure | $18.99 | .0251 | $0.75 |
| Median Wage Structure | -- | -- | $1.48 |
| High Wage Structure | $31.67 | .0379 | $1.88 |
| Very High Wage Structure | $24.70 | .0560 | $1.43 |

Looking instead at the cost composition and standardized costs measures, the table below shows the association between the indexes based on local government wage costs and the composition of the total costs of the elections and standardized costs measures. All three indexes tell a similar story regarding labor costs and standardized total costs: those costs are strongly associated for costs per ballot cast and costs per vote opportunity, and weakly associated with costs per capita and costs per registered voter. These results suggest a role for labor costs in overall election costs, but also suggest that some of the county-level association may be driven by other factors associated with the larger, more electorally complex counties, and not solely as a direct result of labor costs.

|  |  |
| --- | --- |
|   2014 General Election | Correlation |
| GCC Mean Wage Index | GCC Median Wage Index | QCEW Local Government Wage Index |
| Canvass Cost Percent | .354 | .315 | .224 |
|  Pollworker Cost Percent | .055 | .037 | -.012 |
|  Polling Place Cost Percent | .097 | .081 | .324 |
|  Postage Cost Percent | -.141 | -.127 | -.114 |
| Ballot Printing Cost Percent | -.324 | -.247 | -.336 |
| Multilingual Cost Percent | .358 | .369 | .347 |
| Provisional Ballot Processing Cost % | .350 | .299 | .198 |
|   |   |   |   |
| Total Costs Per Capita  | .202 | .208 | .230 |
| Total Costs Per Registered Voter | .265 | .250 | .242 |
| Total Costs Per Ballot Cast | .467 | .423 | .509 |
| **Total Costs Per Voting Opportunity** | .470 | .411 | .589 |

This story is reinforced by the association of the indexes with the composition of costs: positive associations exist between labor indexes and multi-lingual, provisional ballot processing, and canvassing components, but a negative association with ballot printing costs, and no association with pollworker costs. It may be that the former are more labor intensive, or influenced by such costs – but the lack of association with the pollworker component argues against a purely labor cost driven explanation.

**Wage Levels and Other Factors Affecting Election Costs**

Given the somewhat weak associations between wage, our external measures of wage structure, and the Direct Costs Categories survey's measures of staff costs, staff costs per registered voter, and cost composition, we might also expect that wage structure would be weakly associated with measures of jurisdictional complexity (size, density, number of cities), electoral complexity (languages), ballot complexity, or voting technology and use of vote-by-mail ballots. However, these associations are actually quite strong: typical wage levels are higher in highly populated, dense counties with multiple cities and towns; they are also higher in counties with diverse language groups and larger fractions of the population that speak English less than well; and are associated with complex ballots with many candidates - and especially many measures - on the ballot. Wage levels do not seem to be associated with wider use of VBM or any mix of voting technologies, however. While the results shown consider only the 2014 General Election, these general patterns also hold when looking at the 2014 Primary Election and the 2012 General and Primary Elections.

|  |
| --- |
| **2014 General Election** |
|   | Pearson Correlation | Sig. (2-tailed) |
| GCC mean wage index, 2009-2014 | GCC median wage index, 2009-2014 | QCEW local govt mean wage index, 2009-2014 | GCC mean wage index, 2009-2014 | GCC median wage index, 2009-2014 | QCEW local govt mean wage index, 2009-2014 |
|   |   |   |   |   |   |   |
| Population Density (per sq. mile) | .528 | .488 | .667 | .000 | .001 | .000 |
| Total Population | .448 | .346 | .450 | .002 | .020 | .003 |
| Number of cities or towns in county | .445 | .341 | .487 | .002 | .022 | .001 |
|   |   |   |   |   |   |   |
| Pct of Precincts with Non-English | .534 | .492 | .636 | .000 | .001 | .000 |
| Count of Languages | .672 | .583 | .783 | .000 | .000 | .000 |
| % of Pop Speaking English less Than Very Well | .470 | .388 | .521 | .001 | .009 | .000 |
|   |   |   |   |   |   |   |
| Number of Ballot Types | .180 | .102 | .236 | .261 | .524 | .148 |
| Number of Candidates on the Ballot | .330 | .231 | .344 | .043 | .163 | .040 |
| Number of Measures on the Ballot | .541 | .471 | .597 | .000 | .002 | .000 |
| % of Total Vote opportunities sub-county | .318 | .327 | .360 | .052 | .045 | .031 |
|  |   |   |   |   |   |   |
| VBM as Percent of Cast Ballots | -.020 | .057 | .020 | .905 | .727 | .906 |
| # Different Hardware Types in Polling Places | .086 | .089 | .178 | .587 | .574 | .272 |

The 2-tailed Significance Test indicates how likely an association is to occur by chance. The closer an association is to 0.00, there is an extreme likelihood that it occurred by chance. Any association above .5 is considered statistically significant and acknowledges a correlation unlikely to be chance-based.

**Additional Thoughts**

In general, the results with county costs structures have both heartening and puzzling aspects. External sources to identify general wage levels for the counties were available, consistent over time, and consistent with one another. They did not match internal reports of salaries and wage rates from the Direct Costs Categories surveys, however, which may reflect difficulties in the accurate reporting of labor costs and staff hours spent working on the election or greater variability in such costs due to factors beyond typical wage levels for a county. These may also affect the association of wage levels with other election costs, although the association with costs per ballot or vote opportunity indicates a role for labor costs beyond simply staff time and salary-related costs. Moreover, wage rates are certainly part of a bundle of characteristics at the county level which include size and jurisdictional complexity, diversity among the electorate, and ballot complexity - so disentangling each of these effects will rely on additional data collection and evaluation.

Summary Conclusion:

In this research brief, we explored the relationship of labor cost on the cost of elections. We compared the data collected in the survey against external sources of wage levels and found that these sources are consistent over time and are consistent with each other. However, we found that these sources are not necessarily consistent with wages reported in the survey.We found significant correlation between an external wage index and the cost per ballot and cost per voting opportunity, meaning that as costs per ballot and per voting opportunity increase, so do wages. High wages are also associated with other factors not collected in the survey; these include, but are not limited to, complexity of ballot types, county size, and population density within counties.

1. Based on the mean wage for reported in the American Community Survey for the 2010-2014 combined samples, expressed in 2014 constant dollars for wage and salary workers working 30 or more hours per week for 48 or more weeks in the previous year. [↑](#footnote-ref-1)
2. See <http://publicpay.ca.gov/> Only employment identified as county employment was included, with the exception of San Francisco, where the county and city are coterminous, and no county employment was found. For San Francisco, city employment was used instead. [↑](#footnote-ref-2)
3. See http://www.bls.gov/cew/ [↑](#footnote-ref-3)
4. See https://www.census.gov/programs-surveys/acs/ [↑](#footnote-ref-4)
5. In a set of numbers, the mean is computed by adding all the numbers and dividing them by the amount of numbers in the set (e.g. 12+4+6+8+10=40/5=8). The median is the middle number in the set (6) with half of the numbers falling above and half below the middle. Both the mean and median are widely used indicators of the central tendency of a distribution e.g. for the average, typical or “middle” value for a measure like income. For income distributions, which tend to have a few high outliers, the mean may to be a misleading indicator of “typical” income levels, and the median is often considered to be a more stable and preferable statistic. [↑](#footnote-ref-5)
6. The mean county index is less than 1.0 in all cases, because the state average is across all employees, and more employees are found in the large, higher paying counties. When considered at the county level, this increases the relative influence of the smaller counties with lower wage structures on the overall mean. [↑](#footnote-ref-6)
7. These correlations were calculated by taking the correlation for income measures between each year of available data, and averaging those coefficients for gradually widening bands of adjacent years. For example, the average correlation coefficient in a +/- two year time band includes the correlation for county income in 1995 with that in 1993, 1994, 1996, and 1997; the correlation for county income in 1996 with income in 1994, 1995, 1997 and 1998; the correlation in 1997 with 1995, 1996, 1998 and 1999; and so on. [↑](#footnote-ref-7)