



## **Methodology for Historical and Projected City-Level Employment Analysis**

### **Introduction**

City-level employment analysis plays a vital role in understanding localized economic trends, informing policy decisions, and guiding resource allocation. This analysis focuses on the 30 largest cities and towns in Arizona, leveraging the Quarterly Census of Employment and Wages (QCEW) to build a historical employment series and develop forward-looking projections. The QCEW dataset provides reliable, employer-reported employment figures that serve as a robust foundation for analysis. Projections were generated using the Proportional Growth Method, a straightforward and effective approach that aligns city-level forecasts with broader county-level trends while maintaining each city's unique growth trajectory. To meet the Arizona Department of Housing's requirement for a five-year forecast from the current year, adjustments were made to address the typical eight-month lag in QCEW data availability. The base year was forecasted using projected growth rates to ensure the timeliness of the estimates. This methodology underscores the data sources and projection techniques used to produce city-level employment projections.

### **Historical Data**

The historical employment series at the city level was developed using data from the QCEW which provides employment numbers reported directly by businesses. While the dataset is detailed and reliable, some businesses did not supply usable geographic coordinates, leaving 5% of employment data unaccounted for. The remaining 95% of the data, with valid geographic information, formed a strong foundation for analysis. To address the missing portion, employment shares for cities were calculated based on businesses with valid geographic data and then proportionally applied to the county's total employment figures. This approach ensured consistency with county-level totals while accurately reflecting broader employment trends and maintaining the integrity of the historical employment series.

QCEW was chosen over Local Area Unemployment Statistics (LAUS) for city-level employment analysis due to its accuracy, reliability, and suitability for constructing robust historical series and aligning with county-level forecasts. The LAUS program provides monthly estimates of labor force statistics, including employment, unemployment, and the unemployment rate, for states, counties, metropolitan areas, and cities based on



household surveys and statistical modeling. As a dataset directly reported by employers, QCEW offers precision and consistency that broader survey-based estimates from LAUS lack, especially at the city level. The employer-reported nature of QCEW captures employment dynamics within specific city boundaries effectively, providing a stable and actionable basis for analysis. While LAUS includes self-employed and agricultural workers and offers timelier updates, its reliance on estimates and lack of precision made it less suitable for this study. QCEW data estimates employment by place of work, providing a consistent and reliable foundation for city-level employment estimates and projections, while LAUS estimates employment by the home of the employee.

### **Projection Methodology**

For projecting city-level employment, several methods were evaluated to determine the most suitable approach. These included the Weighted Growth Rate and ARIMA forecasting. After careful analysis, the Proportional Growth Method was selected as the primary technique due to its simplicity, accuracy, and alignment with county projections.

The Proportional Growth Method works by calculating each city's share of county employment growth over the past five years. These growth shares are then applied to the county employment projections published for the next five years. This ensures that the city-level projections align with county totals while preserving the unique historical growth patterns of each city. The simplicity of this method, combined with its ability to balance historical trends and future projections, made it the most effective choice for this analysis.

For detailed information regarding the methodology and results of the county-level projections, please refer to the Arizona Office of Economic Opportunity's employment projections page at <https://oeo.az.gov/labor-market/employment-projections>.

### **Conclusion**

By utilizing the QCEW dataset and addressing gaps in geographic data through proportional allocation, the analysis ensures alignment with county-level totals while offering insights into localized trends. The Proportional Growth Method was selected for its balance of simplicity and utility, effectively capturing historical growth patterns and aligning projections with broader regional dynamics. While the approach has inherent limitations, such as the exclusion of self-employed individuals and assumptions about growth continuity, it offers a practical framework for understanding employment trends. Future refinements or complementary analyses may further enhance the accuracy and applicability of the findings.