Analyzing Automation Impacts in Oregon Job Vacancies

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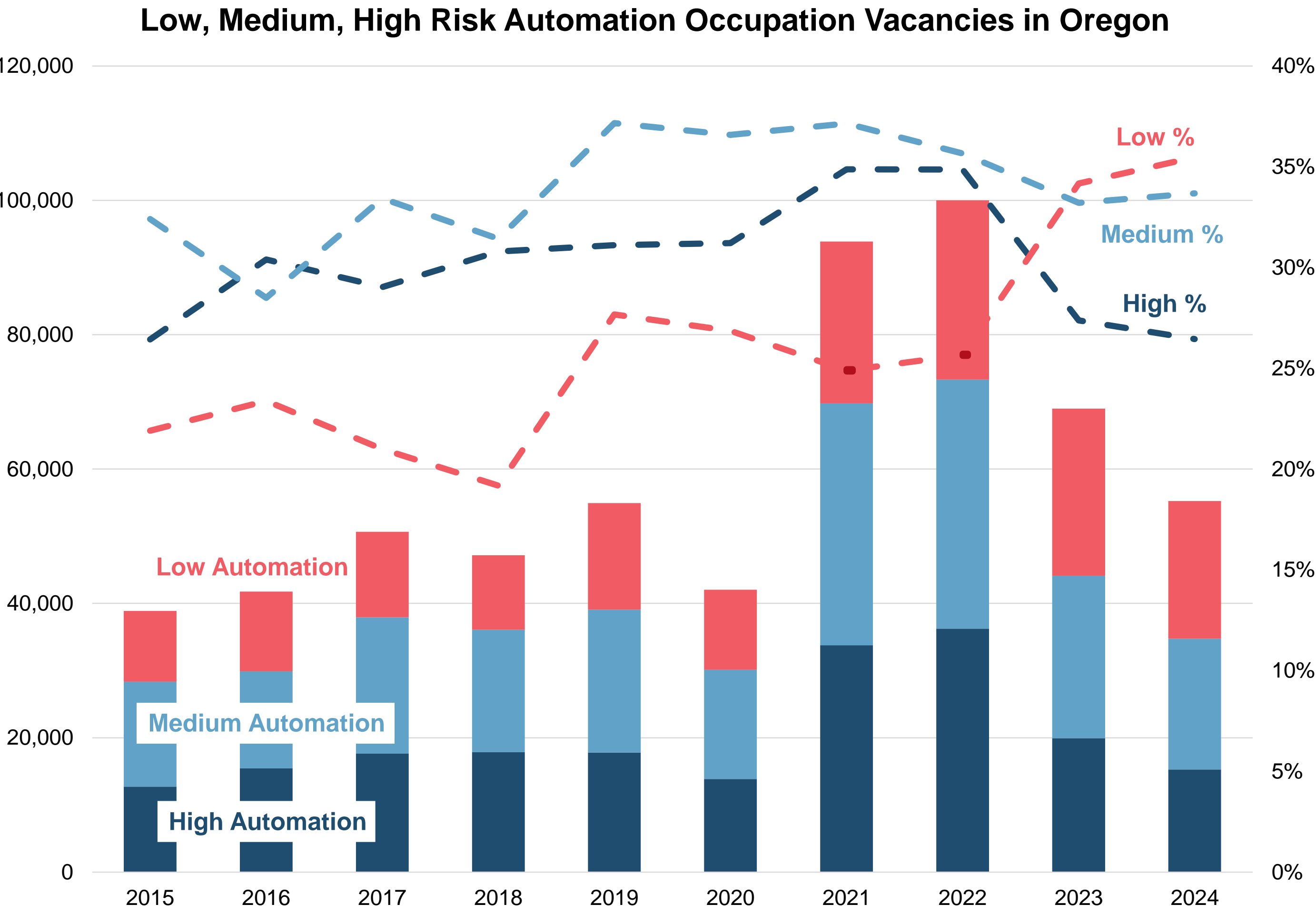
What is Oregon's Job Vacancy Survey?

Throughout the year, the Oregon Employment Department surveys private employers from all industries and areas of the state to ask about job vacancies they are actively trying to fill. For each vacancy, the employer provides the job title, starting wage, and education and experience requirements for the job. They also specify whether their vacancies are for full- or part-time positions, and permanent or seasonal jobs. If they face challenges with vacancies, employers also write in the primary reason for difficulty filling their job openings.

Defining Automation – O*NET

One research approach developed by Burning Glass Technologies: Labor Insight leveraged O*NET information to develop automation probability levels that group occupations with a similar predicted probability of having parts of the job transition to computer-controlled equipment or software in the next 20 years.[1,2]
- High: Occupations in the upper quartile of automation probability.
- Medium: Occupations in the third quartile of automation probability.
- Low: Occupations in the bottom half of automation probability.

Low, Medium, High Risk Automation Occupation Vacancies in Oregon

Source: Oregon Employment Department, Job Vacancy Survey

- The share of job vacancies that fell into the high risk of automation broadly increased from 2015 to 2022, then decreased through 2024.
- The share of job vacancies that fell into the medium risk of automation bounced around, increasing through 2021, and then declined slightly.
- The share of job vacancies that fell into the low risk of automation increased from 2015 through 2024, surpassing the share of high and medium risk vacancies in 2023.

Occupation Groups with the Greatest Share of Vacancies at High Risk of Automation
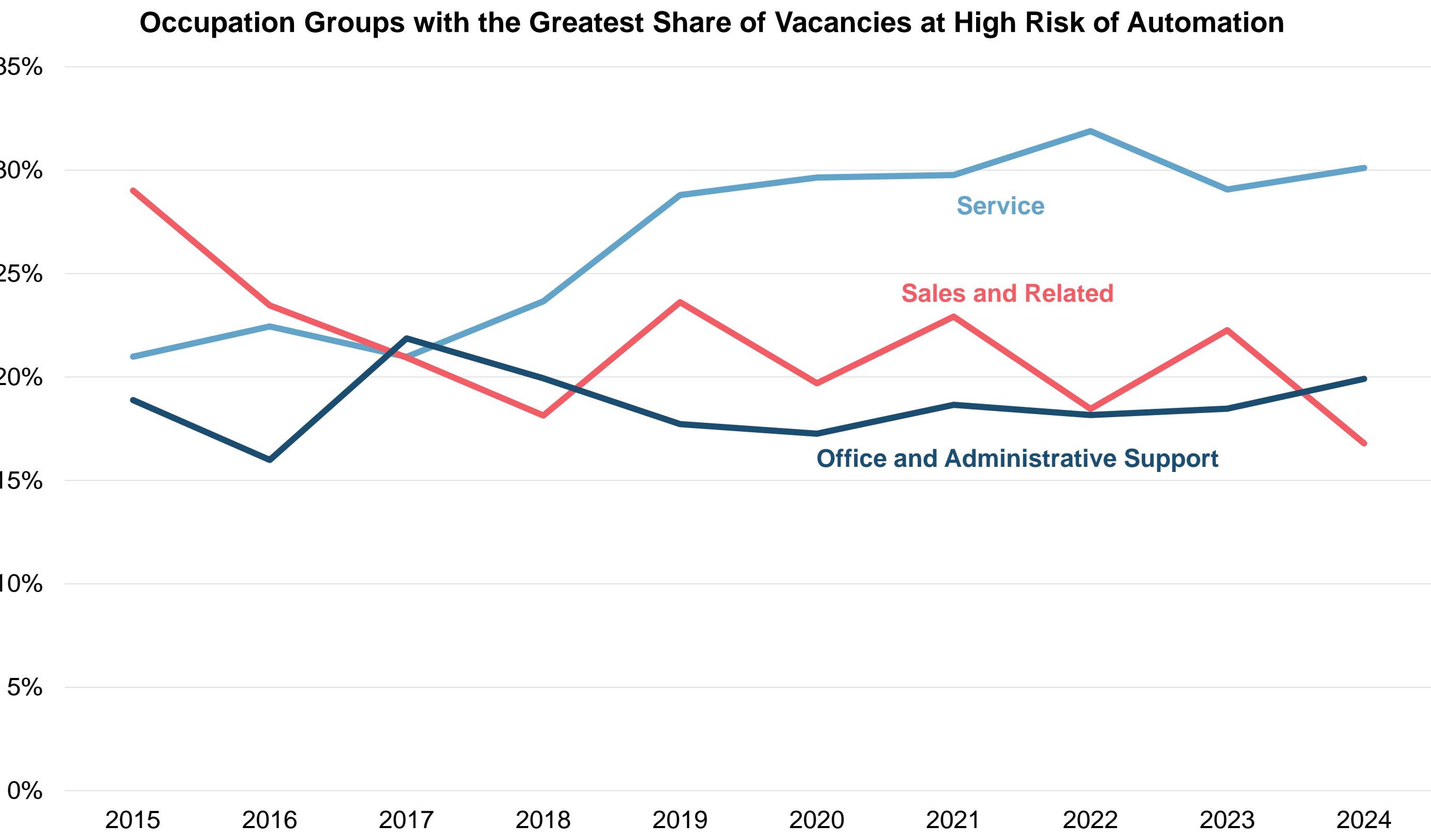
Source: Oregon Employment Department, Job Vacancy Survey

Top Vacancies at High Risk in 2024 by Occupation Group
- *Service*: Fast Food and Counter Workers, Restaurant Cooks, Food Preparation Workers
- *Sales and Related*: Retail Salespersons, Cashiers
- *Office and Administrative Support*: Receptionists and Information Clerks, All Other Office and Administrative Support Workers

Introduction

There are a variety of ways to attempt to measure automation depending on the dataset, how automation is defined, and many other factors. We used artificial intelligence occupational exposure (AIOE) and O*NET measures in this analysis, that were notably produced at different times. Accordingly, AIOE and O*NET define automation differently, especially when it comes to computerization versus artificial intelligence technologies. O*NET might be viewed as an "older" definition of automation, from a study published in 2013, while AIOE might be viewed as a "newer" definition of automation, as the study was published in 2021. Depending on the extent of analysis, one must compare the differences in timeliness versus the definition of automation. It is possible that O*NET's definition of automation may reflect what we've seen over the past decade, while AIOE is more reflective of current times and the near future. However, there are many opportunities for continued research and analysis in this ever-changing field of automation, and we do not believe our findings will necessarily hold true as generative AI and related tools continue to be integrated into daily lives.

Our initial exploration provides an early analysis of the impact of automation in Oregon. Both analyses show a similar trend: the hiring gap between high and low risk automation jobs is narrowing. We are not suggesting a causal relationship and any potential correlation does not inherently lead to causation. Automation is rapidly evolving and additional insights will continue to emerge as people and jobs adapt to the new technology and environment. While the overall impact to employment is not yet known, it is likely that job duties will shift and new skills will be needed to adapt to the changing labor market.

Literature Review

- There is "no clear relationship between AI exposure and employment growth," and instead "AI increases productivity directly and shifts the task composition."[3]
- "Automation-prone jobs have become slightly more complex, requiring a wider range of skills, and that employers are willing to pay more for these jobs," which highlights "the ability to integrate AI tools into work is becoming increasingly valued."[4]
- "Unlike technologies that require specialists for implementation,… generative AI can be used by white-collar professionals across various industries and locations."[5]

Discussion

Job Vacancy Survey
- The share of job vacancies based on risk of automation has fluctuated over the past decade, with differing trends over the past three years.
- The share of low risk automation occupation vacancies surpassed high and medium risk in 2023 and remained higher in 2024.
- Service, sales and related, and office and administrative support occupations had the greatest shares of vacancies at high risk of automation at any given time from 2015 to 2024.
- In 2024, the most frequently posted occupations at high risk of automation that employers were hiring for included fast food and counter workers (2,079), retail salespersons (1,056), cashiers (821), and restaurant cooks (798).

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- The trends are similar across Oregon and the U.S., though Oregon has a slightly lower share of job postings for high AI exposure occupations and a slightly higher share for low AI exposure occupations.
- There is no clear relationship between AIOE score and job postings from 2015 to 2019.
- Job postings as well as the share of job postings for the high AIOE group dropped substantially in the third and fourth quarters of 2023 and remained relatively low in 2024.
- The high AIOE score does not necessarily mean that the workers in an occupation will get their jobs replaced. For example, demand is still high for medical and health services managers.
- High AIOE occupations are more likely to fall in the Management, Business, and Financial and Professional and Business Services occupation groups, while the low AIOE occupations are more likely to require manual labor or be physically intensive.

References

1. National Center for O*NET Development. Additional Initiatives. O*NET Resource Center.
2. Frey, C. B. and Osborne, M. (2013), The Future of Employment: How susceptible are jobs to computerisation? Oxford Martin Programme on Technology and Employment.
3. Georgieff, A. and R. Hyee (2021), "Artificial intelligence and employment: New cross-country evidence", *OECD Social, Employment and Migration Working Papers*, No. 265, OECD Publishing.
4. Demirci, O., Hannane, J., and Zhu, X. (2024), How Gen AI Is Already Impacting the Labor Market. Harvard Business Review.
5. Berger, G., Dawson, N., and Yuan, A. (2024), AI's Expanding Reach: Mapping the Spread of AI Skills Across America. The Burning Glass Institute.
6. Felten, E., Raj, M., Seamans, R. (2021), "Occupational, industry, and geographic exposure to artificial intelligence: A novel dataset and its potential uses." *Strategic Management Journal* 42(12):2195–2217.

What is Lightcast?

For over two decades, Lightcast has been a pioneer in big-data analysis of job postings from all over the internet. Their tools collect raw data on postings from more than 160,000 online sources, then synthesize and interpret those findings to provide meaningful insight in near real time. Job posting analytics can identify supply and demand for workers, skills, and jobs all over the world, as well as important contextual details like compensation trends.

Defining Automation – AIOE

Artificial Intelligence Occupational Exposure (AIOE) measures an occupation's exposure to artificial intelligence (AI) by examining how 10 common AI applications may be related to the occupational abilities from O*NET.[6]
- High AIOE: Occupations in the upper quartile of AI occupational exposure score.
- Low AIOE: Occupations in the lower quartile of AI occupational exposure score.

Job Postings Trend for High and Low AI Exposure Occupations in Oregon
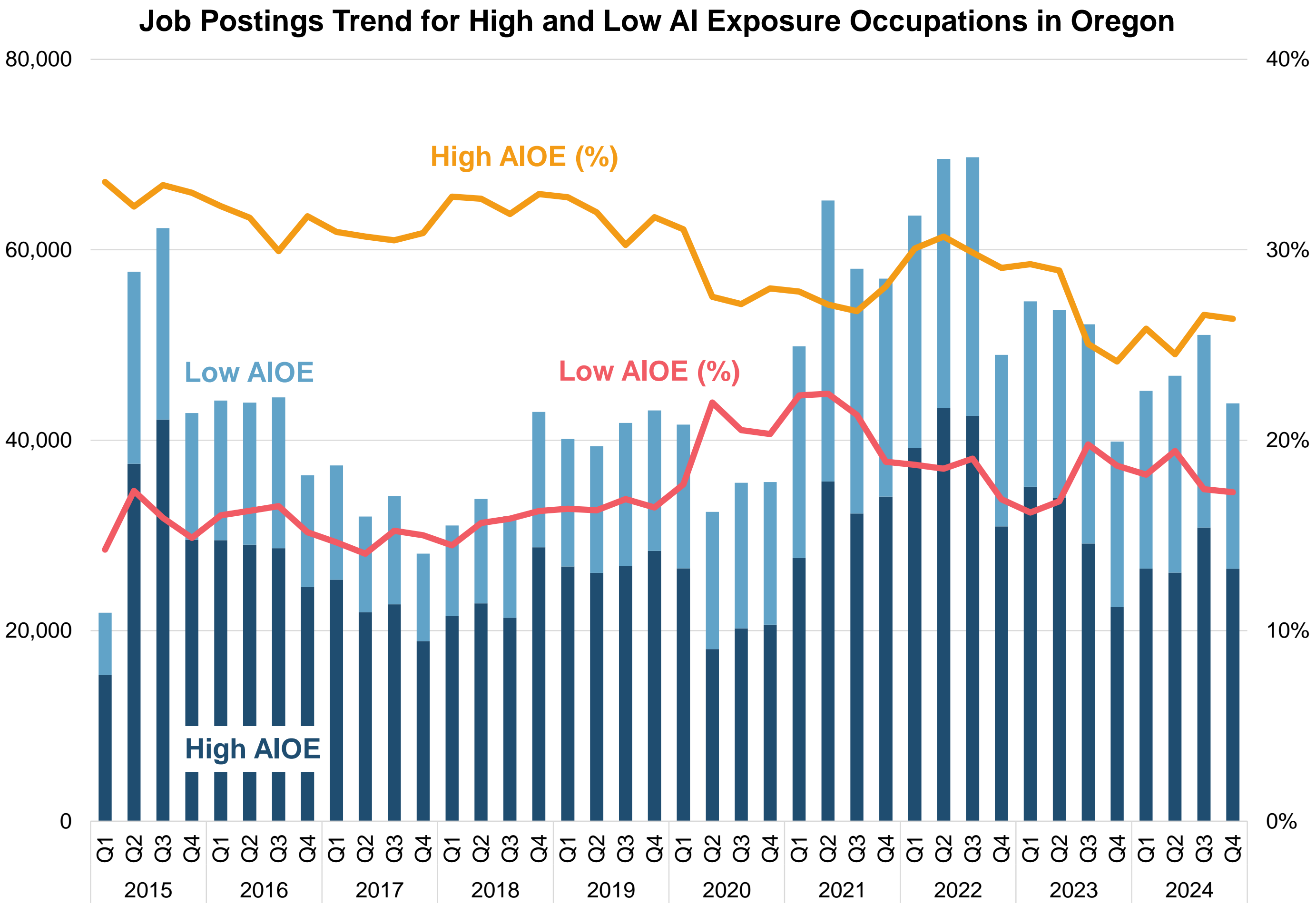
Source: Oregon Employment Department, Conference Board-Lightcast Help Wanted Online

- The share of job postings that fell into the high or low AIOE groups remained relatively steady from 2015 to 2019.
- The share of job postings for the low AIOE group spiked in 2020. Occupations in the low AIOE group experienced either an increase or small decrease in the number of job postings in 2020.
- The share of job postings for the high AIOE group dropped in 2020, partially recovered to pre-pandemic levels in 2021 and 2022, and experienced another drop in 2023.

Share of Job Postings for High AI Exposure Occupations in Oregon
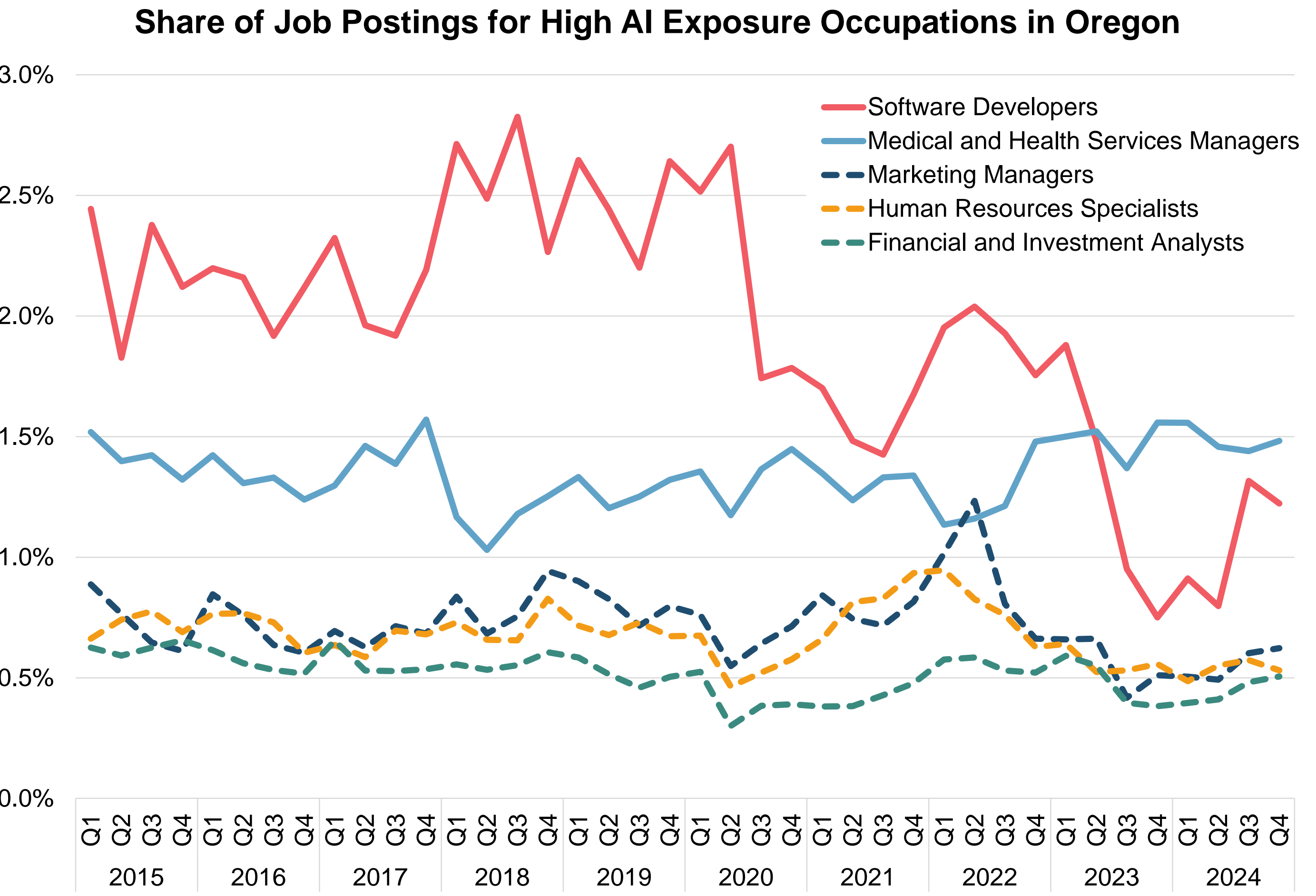
Source: Oregon Employment Department, Conference Board-Lightcast Help Wanted

- The share of software developer job postings soared in 2018 and 2019, and then dropped substantially in 2020. It recovered but was still much lower than pre-pandemic levels in 2021 and 2022, before falling to the lowest level since 2015 in 2023. This could be due to the widespread layoffs and/or the adoption of AI tools.

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