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Labor Market Gaps in the Green Transition: A calibrated labor flow network

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Extended Abstract

A major transition to a green economy is required in the next half-century if we are to maintain livable conditions on Earth. However, such a transition will lead to a shift in labor demand, for a different set of skills, in a relatively short period of time. Typically, these sectoral shifts result in simultaneous increases in unemployment and vacancy rates, pushing out the Beveridge curve [2]. While much of natural unemployment can be attributed to gradual sectoral shifts [4], the sectoral shift demanded by climate change should be accelerated as much as possible while minimizing vacancy rates and unemployment.

According to LinkedIn, there is already an increasing gap between the green labor supply and demand with a 6% and 8% growth annually [5]. On the other hand, sectors such as oil, gas, and coal should see unemployment rise as we transition to cleaner energy [6]. It will be crucial to connect unemployed workers with green jobs by providing them with the necessary skills.

In order to meet this demand quickly and efficiently, it is important for policy makers to consider which green occupations are most critical and least likely to be fulfilled by the skill set of the current labor supply. Labor flow networks have been used to model labor demand shocks due to automation [3] and are particularly useful in understanding how mismatches during market transitions impacts the Beveridge curve [1].

In a preliminary analysis using UK job posting data, I created an occupation network where occupations are connected by their overlap in required skills (Figure 1). This network revealed a large community of green occupations that are peripheral to the bulk of non-green jobs. This division likely contributes to the supply and demand gap during the green transition as workers don't have the skills to move from non-green jobs to the peripheral green jobs.

In this study, I pair US census data with O*NET's occupation and skill classifications to calibrate a labor flow network of occupations. I use O*NET's list of green occupations to model shifts in the labor demand and the resultant impacts on the Beveridge curve. This will allow me to identify which occupations have the highest unemployment rates and which have the highest vacancy rates. Then, I model the impact of an intervention by creating a link between high-unemployment (a) and high-vacancy occupations (b). The link from a to be b mirrors a skill training program where unemployed agents from a learn skills that are required for b. Such an intervention should bring the Beveridge curve to the bottom left, decreasing unemployment and vacancy rates.

This analysis will provide an answer to three important questions about the green transition's impact on the labor market: which occupations are likely to have the highest unemployment rates, which green occupations are likely to have the highest vacancy rates, and what skills should be acquired by whom in order to reduce both. The analysis will provide empirically-grounded and specific recommendations for green skill training programs.

References

[1] AXTELL, R. L., GUERRERO, O. A., AND LÓPEZ, E. Frictional unemployment on labor flow networks. *Journal of Economic Behavior & Organization 160* (Apr. 2019), 184–201.

[2] BOUVET, F. The Beveridge curve in Europe: new evidence using national and regional data. *Applied Economics 44*, 27 (Sept. 2012), 3585–3604.

[3] DEL RIO-CHANONA, R. M., MEALY, P., BEGUERISSE-DÍAZ, M., LAFOND, F., AND FARMER, J. D. Occupational mobility and automation: a data-driven network model. *Journal of The Royal Society Interface 18*, 174 (Jan. 2021), 20200898.

[4] LILIEN, D. M. Sectoral Shifts and Cyclical Unemployment. *Journal of Political Economy 90*, 4 (Aug. 1982), 777–793.

[5] LINKEDIN. Global green skills report 2022. *LinkedIn Insights* (2022).

[6] SEBA, T. *Clean disruption of energy and transportation: how silicon valley will make oil, nuclear, natural gas, coal, electric utilities and conventional cars obsolete by 2030*. Tony Seba, 2014.

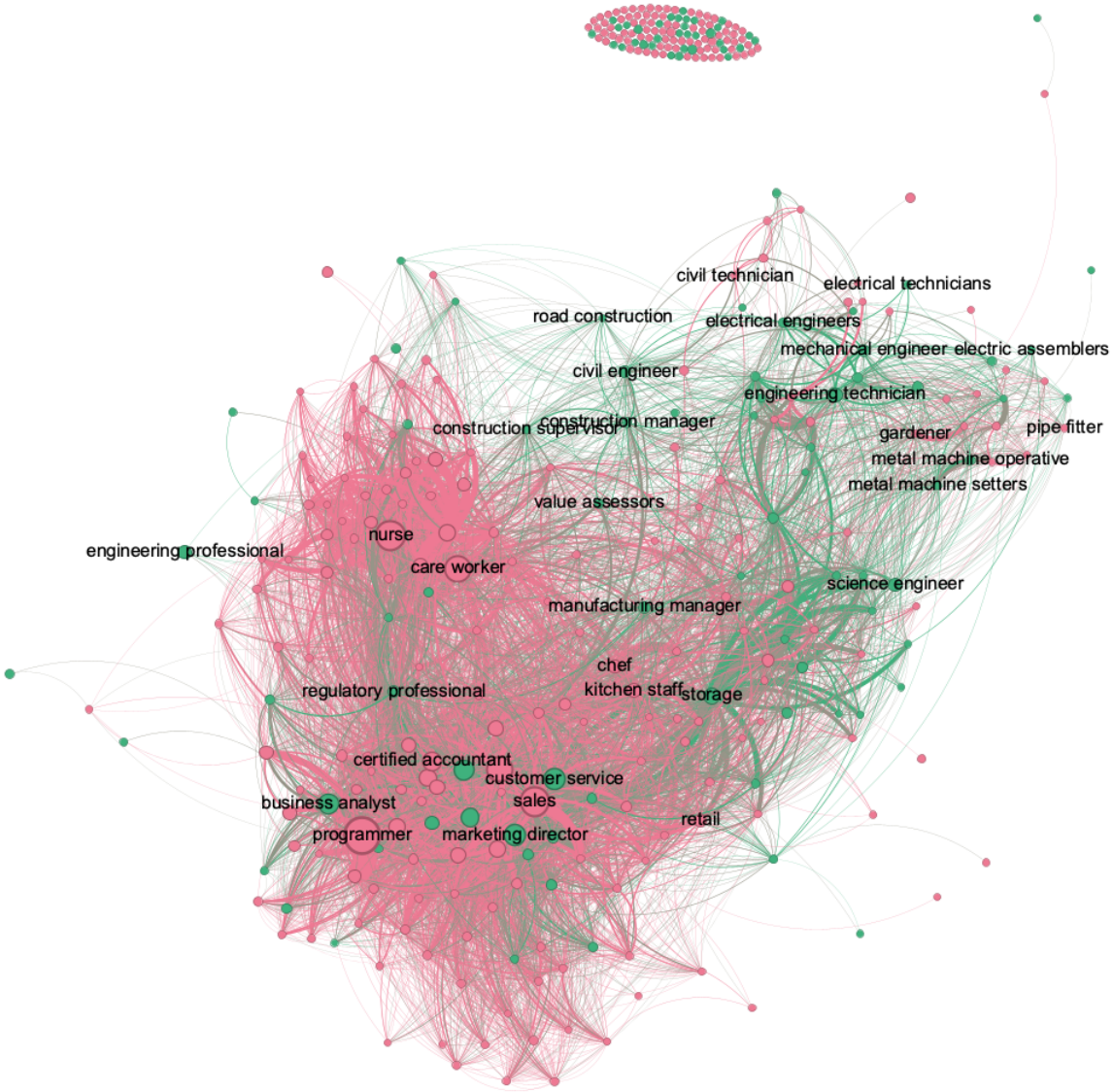

Figure 1: This is an occupation network created based on UK job posting data. Each node is an occupation, it's size is scaled to the number of job postings, and each edge is weighted by the number of overlapping required skills. Green nodes are green jobs as classified by O*NET while red nodes are not green.