



Challenges and opportunities in leveraging online job ads to track labour shortages

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Labour shortages a major policy concern in Canada but no reliable way to identify or track them

Demand-side expansion:

- Very strong employment recovery, particularly among core aged workers
- Labour force participation and unemployment rates back to pre-Covid levels
- Job vacancies were 60% (+500k) higher in Q3 2021 than in 2019

But labour supply not keeping pace:

- Immigration levels on track to recover in 2022 after 2 years of being well below trend
 - down 9% (2019/20) then 28% (2020/21) vs 2018/19 levels
 - Target immigration levels now up +30% to bring in +400k people to Canada every year
- However, no evidence of a “Great Resignation” in Canada

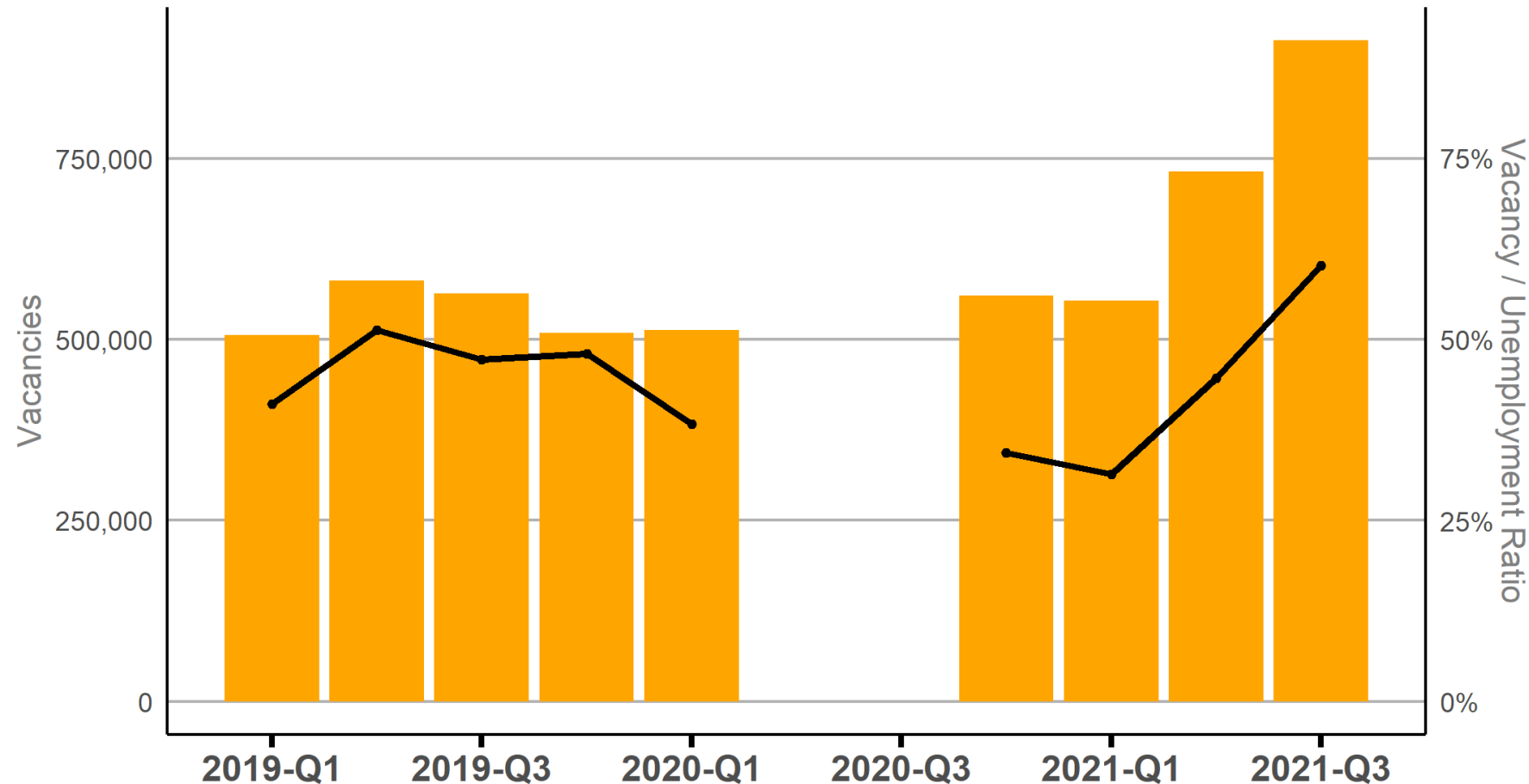
Labour shortages in theory and practice

- Excess demand for labour implies a “shortage”, though this does not necessarily require policy intervention
- Practically, a labour shortage is a lack of viable candidates for a specific job opening
 - i.e., an unmet need to fill a specific **role** at a specific **time** and **place**
- Measurement is challenging because we lack granular data on unmet demand and have even less on available supply

nb. For a discussion on the difference between labour and skills shortages see [LMI Insight Report no. 3](#)

Job vacancies (bars – left axis) and vacancy/unemployment ratio (line – right axis)

Canada, 2019-Q1 to 2021-Q3



Job vacancies point to a tight labour market at the macro level

Official data sources on unmet demand and available labour supply not well suited to measure labour shortages

Unmet demand - JVWS

Advantages:

- Business survey representative across sectors and occupations
- Data on vacancy duration

Limitations:

- Quarterly observations with 2-3 month delay
- Public administration sector excluded
- Limited or no regional data for detailed occupations

Available supply - LFS

Advantages:

- Monthly household survey representative across sectors and occupations
- 1 week lag from reference month

Limitations:

- Sample size among unemployed is small
- Unemployment by occupation or sector conceptually problematic

Toward a proxy for excess labour demand which is timely and granular

$$\text{Balance index} = \frac{\text{Ratio of Job Postings for Occupation } i \text{ in } t \text{ vs } (t-1)}{\text{Ratio of Potentially Available Labour Supply for Occupation } i \text{ in } t \text{ vs } (t-1)} = \frac{1 + \Delta J P_{i,t}}{1 + \Delta (Potential LS)_{i,t}}$$

Note:

- “**Potentially available labour supply**” is:
 - (Employment in Occupation i) + (Unemployment associated with Occupation i and similar occupations)
 - Unemployment counts are therefore duplicated across i
- t is a 3-month moving averages
- Growth is year-over-year change in 3mma

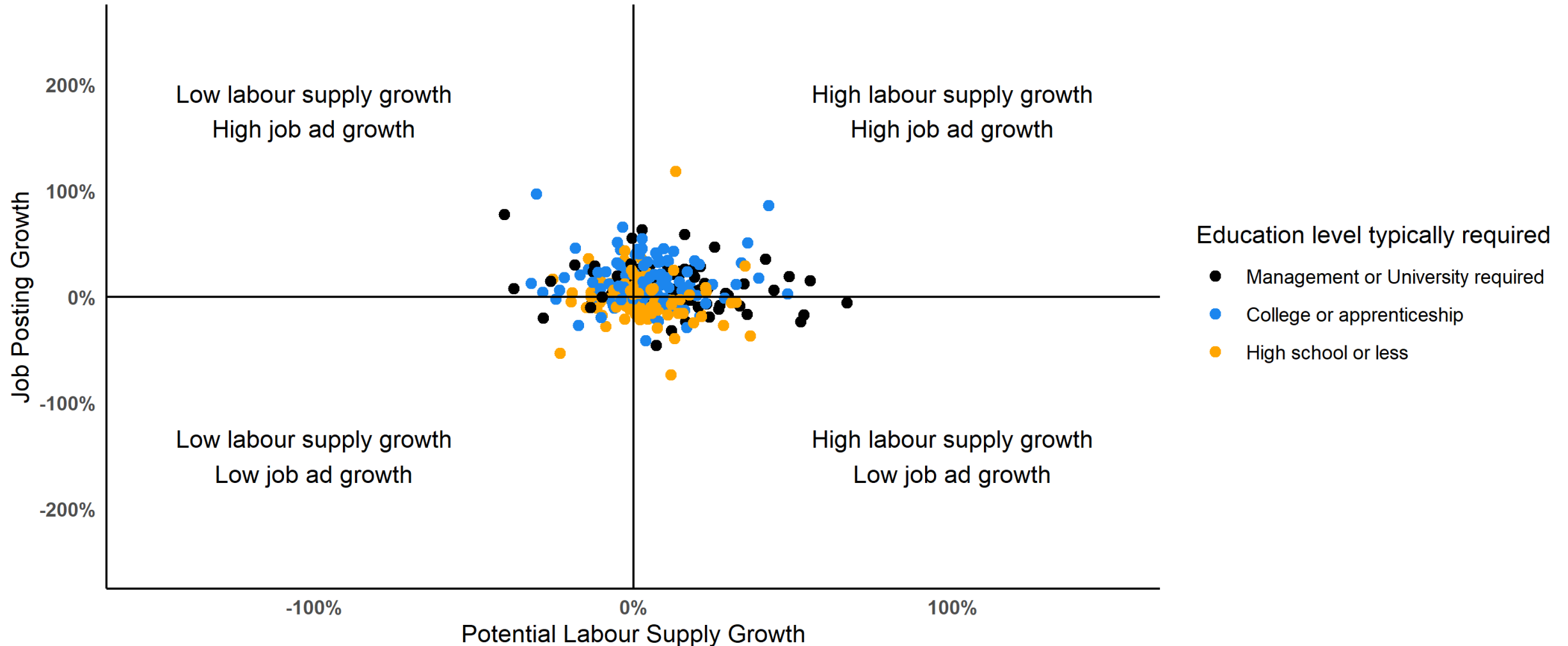
Data structure overview

- Employment and online job posting counts for detailed occupations (4-digit NOC codes) from LFS and “Vicinity Jobs”
- Unemployment counts for detailed occupations at those in same educational category and broad occupational category

Occupation		Broad Occupational Group	Education level required	Employment	Unemployment in group	Potential Labour Supply
Code	Title					
4411	Home child care providers	Occupations in education, law and social, community and government services (group 4)	High school and/or some on the job training (level C or D)	23,666	5,250	27,750
4412	Home support workers, housekeepers and related occupations			64,833	5,250	73,000
4413	Elementary and secondary school teacher assistants			121,166	5,250	13,3750
4423	By-law enforcement and other regulatory officers, n.e.c.			9,083	5,250	15,500

2019: Potential labour supply slightly out paces job posting growth

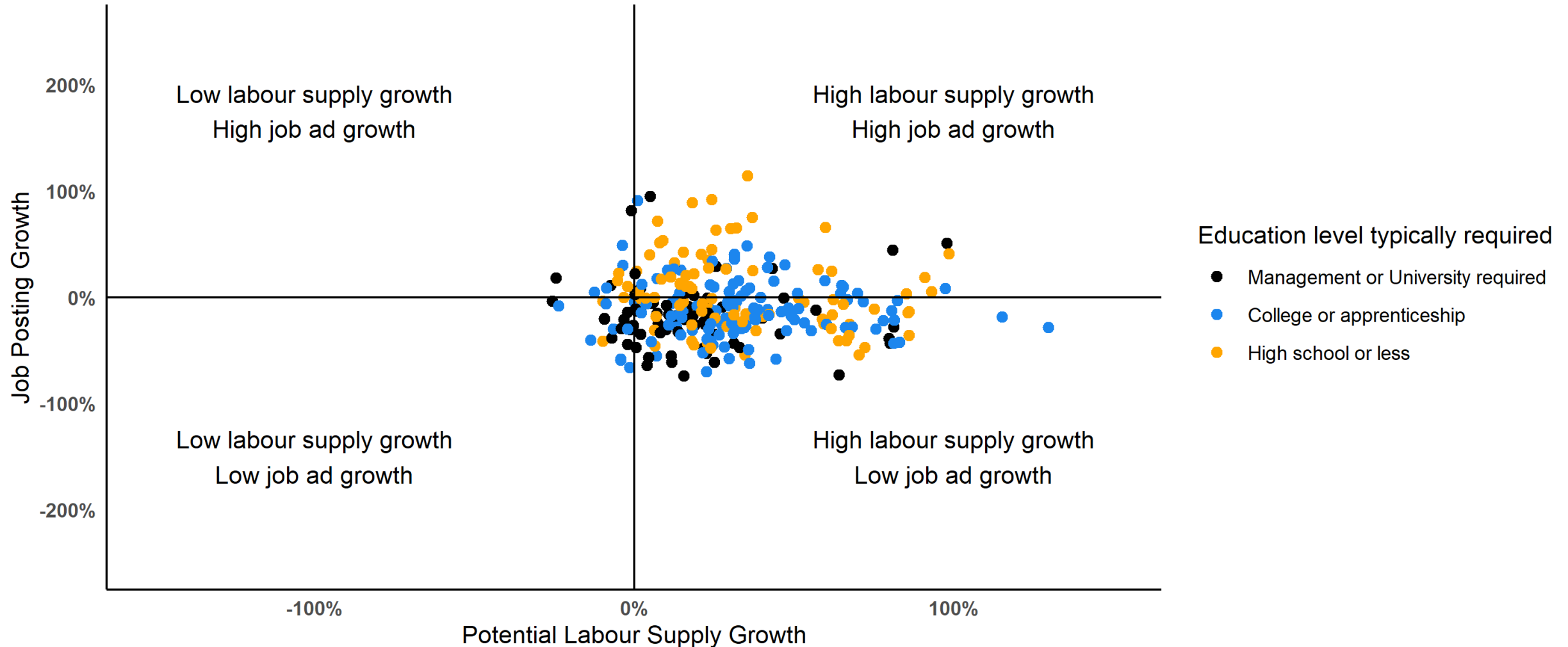
Growth rate of job postings and potential labour supply at detailed occupational level (4-digit NOC)
3-month rolling window up to Dec 2019



LMiC calculations. Includes only occupations with employment of at least 5,000 (average) and job postings of at least 100 (total) in past 3 months. Available labour supply is the sum of employment and groups of unemployed who could transfer between occupations. Not seasonally adjusted. Statistics Canada, Labour Force Survey (RTRA); Vicinity Jobs job posting data.

2020: Job postings fall rapidly, potential labour supply increases rapidly

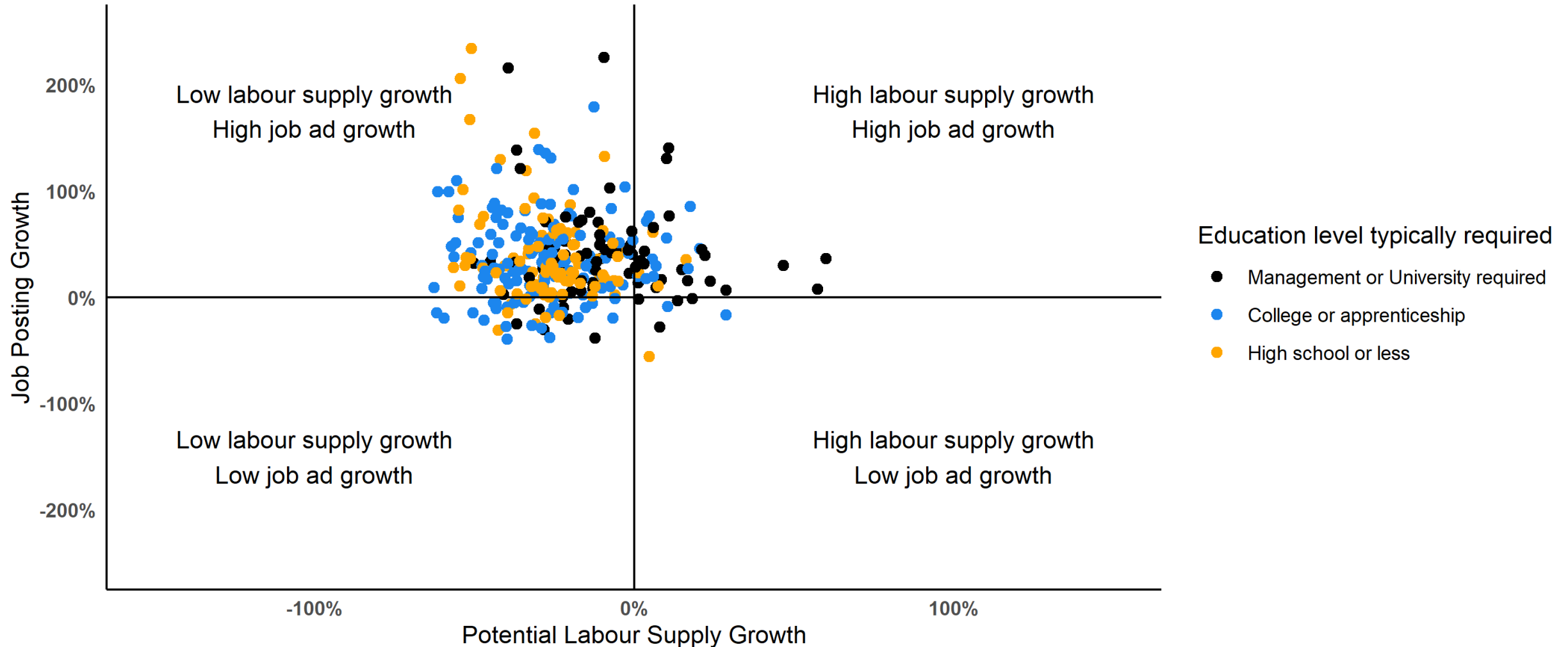
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2021: Job postings increase rapidly, potential labour supply not keeping pace

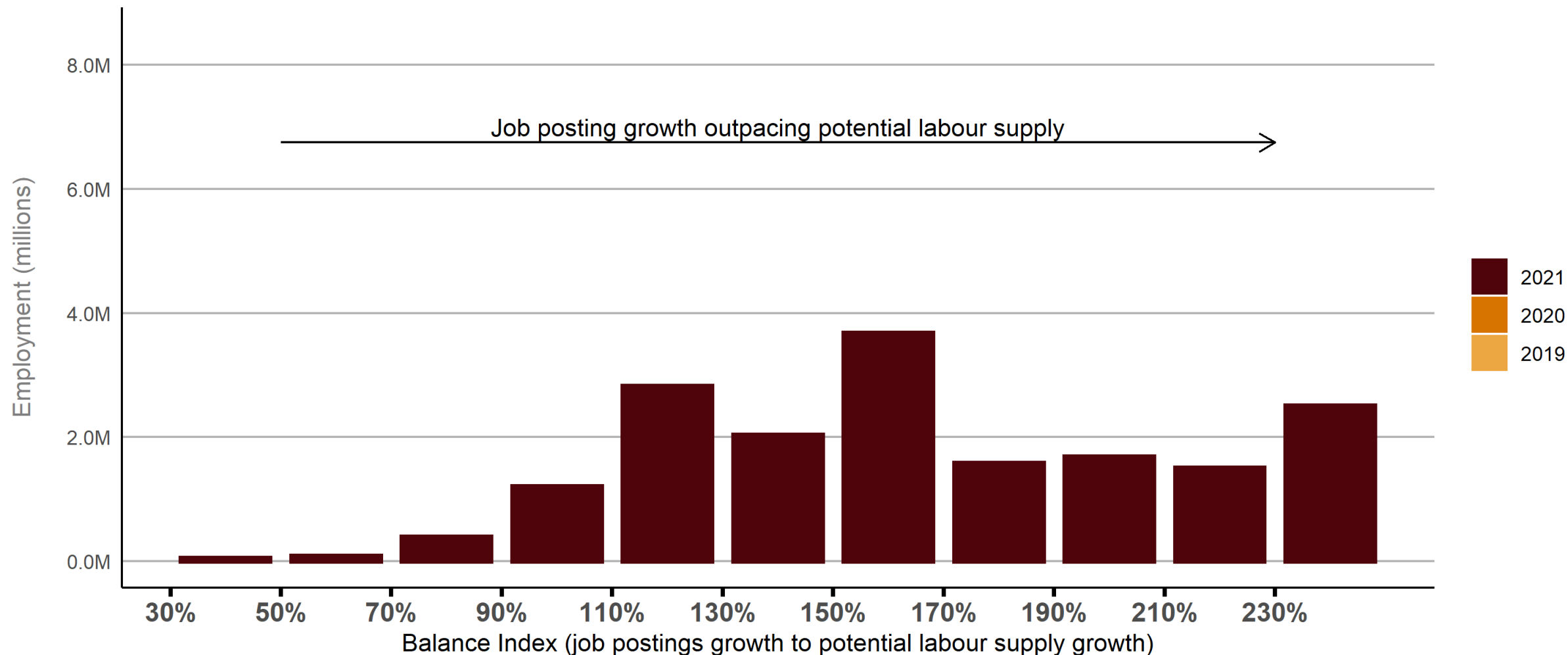
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Balance index distribution by employment levels

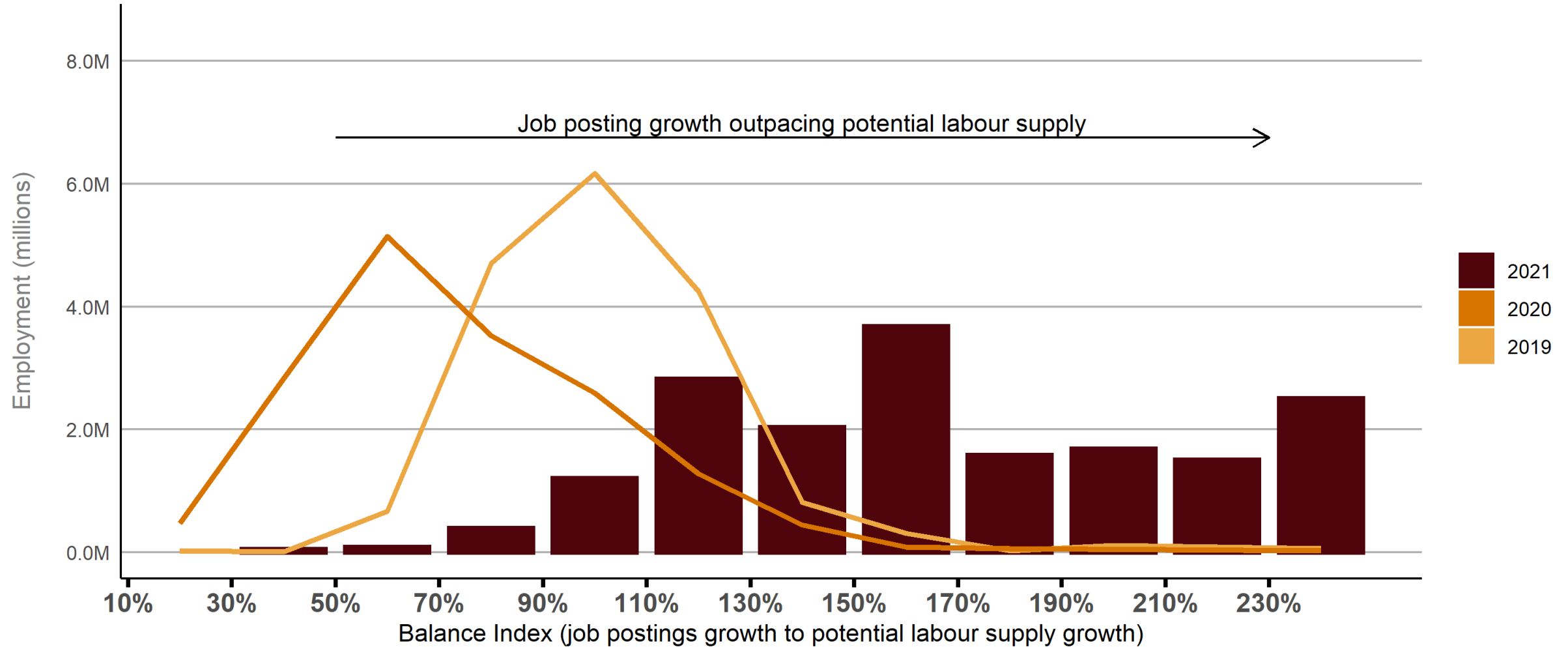
Employment density of balance index by detailed occupation (4-digit NOC)
3-month moving average up to Dec 2021



LMiC calculations. Ratio is cumulative growth of 3 month moving sum of job postings over 3 month moving average of potential labour supply at 4-digit occupational level. Includes only occupations with employment of at least 5,000 (average) and job postings of at least 100 (total) in past 3 months. Not seasonally adjusted. Statistics Canada, Labour Force Survey (RTRA); Vicinity Jobs job posting data.

12 Shift right in 2021 in line with macro picture, but built from detailed occupation

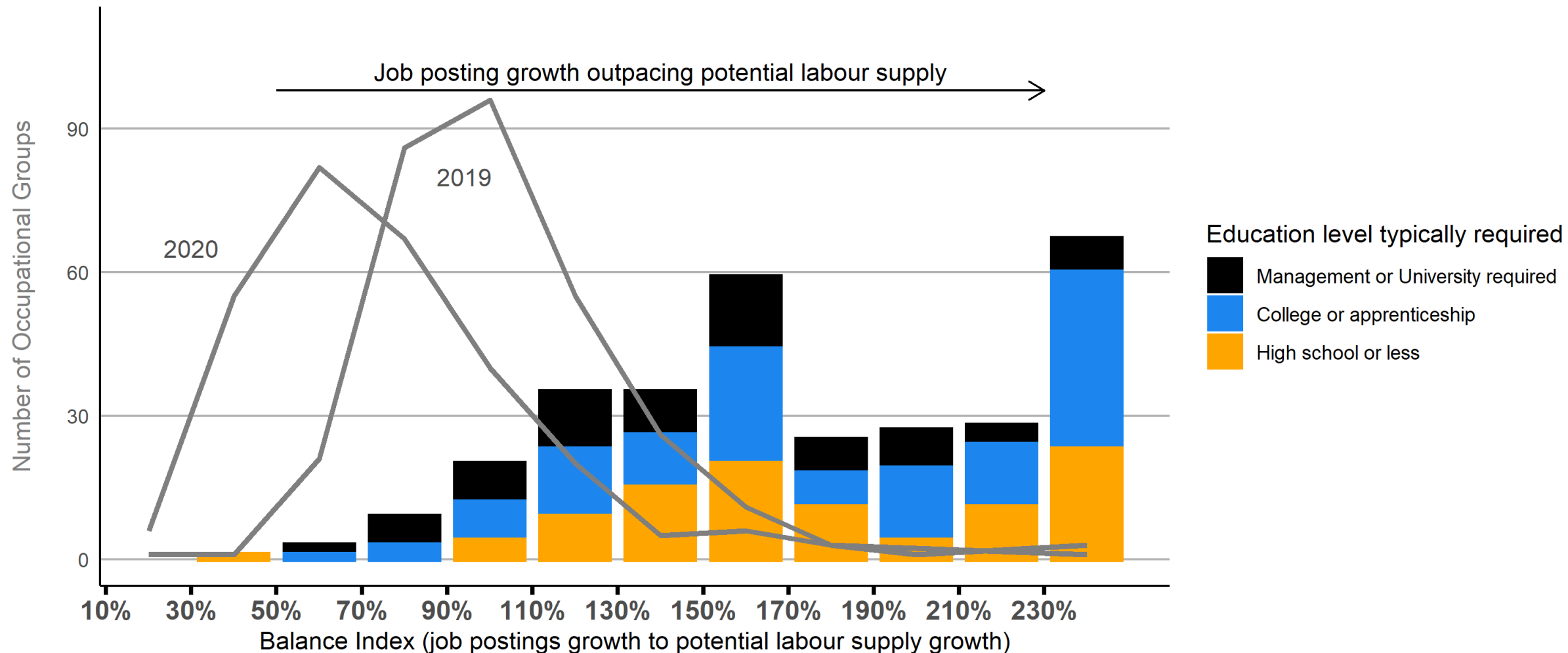
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Identification of tight labour markets at granular level possible

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Dec 2021



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Elementary and secondary school teacher assistants (4413)

Work Req. Type	Work Requirement	TF-IDF Rank	TF-IDF Score
Skills	Teaching and Training	1	1.11%
	Conflict Management skills	2	0.39%
	Planning	3	0.30%
Knowledge	First aid	1	2.89%
	American Sign Language (ASL)	2	2.40%
	CPR	3	1.25%
Tools and technology	Educational software	1	1.16%
	Scribes	2	0.99%
	Mechanical lifts	3	0.92%
Other	Technical Support	1	0.19%
	Self-starter / Self-motivated	2	0.10%
	Flexibility	3	0.07%

- Net potential labour supply growth (Dec 2020 - Dec 2021): **-9%**
- Net job posting growth (Dec 2020-Dec 2021): **+133%**
- Average Offered wage (Dec 2020 – Dec 2021): **\$23.28 (+4%)**
- Balance index: **2.57**

Hairstylists and barbers (6341)

Work Req. Type	Work Requirement	TF-IDF Rank	TF-IDF Score
Skills	Customer service	1	0.33%
	Interpersonal skills	2	0.12%
	Teamwork	3	0.07%
Knowledge	Office administration	1	1.73%
	Cantonese language	2	0.10%
	Mandarin language	3	0.09%
Tools and technology	Clipper	1	3.18%
	Blow dryers	2	0.50%
	Shears	3	0.18%
Other	Fast-paced Setting	1	0.35%
	Flexibility	2	0.27%
	Sales	3	0.14%

- Net potential labour supply growth (Dec 2020 - Dec 2021): **-27%**
- Net job posting growth (Dec 2020-Dec 2021): **+54%**
- Average Offered wage (Dec 2020 – Dec 2021): **\$18.89 (-3%)**
- Balance index: **2.10**

Other trades helpers and labourers (7612)

Work Req. Type	Work Requirement	TF-IDF Rank	TF-IDF Score
Skills	Ability to learn	1	0.30%
	Time management	2	0.23%
	Troubleshooting	3	0.13%
Knowledge	Current Good Manufacturing Practice (GMP/cGMP)	1	0.45%
	Occupational Health and Safety Act	2	0.31%
	Quality assurance	3	0.15%
Tools and technology	Forklifts	1	2.41%
	Power tools	2	1.56%
	Scaffolding	3	0.53%
Other	Fast-paced Setting	1	0.20%
	Data entry	2	0.14%
	Self-starter / Self-motivated	3	0.13%

- Net potential labour supply growth (Aug 2020 - Aug 2021): **-50%**
- Net job posting growth (Aug 2020-Aug 2021): **+82%**
- Average Offered wage (Aug 2020– Aug 2021): **\$22.26 (-3%)**
- Balance index: **3.68**

Bus drivers, subway operators and other transit operators (7512)

Work Req. Type	Work Requirement	TF-IDF Rank	TF-IDF Score
Skills	Customer service	1	0.37%
	Teaching and Training	2	0.26%
	Supervisory skills	3	0.24%
Knowledge	Highway Traffic Act	1	2.25%
	National Safety Code of Canada	2	1.37%
	First aid	3	1.13%
Tools and technology	Passenger buses	1	0.94%
	Smoke detectors	2	0.64%
	Minibuses	3	0.59%
Other	Flexibility	1	0.12%
	Fast-paced Setting	2	0.07%
	Goal oriented	3	0.07%

- Net potential labour supply growth (Dec 2020 - Dec 2021): **-30%**
- Net job posting growth (Dec 2020-Dec 2021): **+48%**
- Average Offered wage (Dec 2020 – Dec 2021): **\$25.38 (+3%)**
- Balance index: **2.11**

Next Steps

Validation:

- Comparisons to JVWS
- Correlations with wage growth
- Temporal shifts (e.g., job postings lead, supply lags)
- Other?

Refinements:

- Revisiting inclusion / exclusion criteria or other outlier controls (e.g., winsorisation)
- Applying to sub-national and sub-provincial regions
- Others sources of potential labour supply (e.g., industry groups, similarity scoring occupations)
- Introducing non-linearity into balance index

Questions

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