

Supplemental Appendix for “From Online Job Postings to Economic Insights: A Machine Learning Approach to Structuring Naturally Occurring Data”^{*}

Tatjana Dahlhaus[†] Reinhard Ellwanger[‡] Gabriela Galassi[§]
Pierre-Yves Yanni[¶]

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Abstract

This appendix provides supplementary material for “From Online Job Postings to Economic Insights: A Machine Learning Approach to Structuring Naturally Occurring Data”.

^{*}The views expressed in document are those of the authors and no responsibility for them should be attributed to the Bank of Canada.

[†]Bank of Canada, Email: tdahlhaus@bankofcanada.ca

[‡]Bank of Canada, Email: rellwanger@bankofcanada.ca

[§]Bank of Canada, Email: ggalassi@bankofcanada.ca

[¶]Moov AI, Email: pyanni@gmail.com

A Sector Abbreviations and NAICS Codes

The table below lists the full names and NAICS codes for the sectors referenced in Figure 2 of the paper.

Abbreviated Name	Full Name	Code
Agric.	Agriculture, Forestry, Fishing, and Hunting	11
Mining	Mining, Quarrying, and Oil and Gas Extraction	21
Utilities	Utilities	22
Constr.	Construction	23
Manuf.	Manufacturing	31
Wholesale	Wholesale Trade	41
Retail	Retail Trade	44
Transp.	Transportation and Warehousing	48
Infor.	Information and Cultural Industries	51
Finance	Finance and Insurance	52
Real est.	Real Estate and Rental and Leasing	53
Profess.	Professional, Scientific, and Technical Services	54
Manag.	Management of Companies and Enterprises	55
Admin.	Admin. Support, Waste Mgmt., and Remed. Services	56
Educ.	Educational Services	61
Health	Health Care and Social Assistance	62
Arts	Arts, Entertainment, and Recreation	71
A&F	Accommodation and Food Services	72
Other s.	Other Services (except Public Administration)	81
Pub. Adm.	Public Administration	91

B Inferring Tech and Non-Tech Companies and Digital Jobs

This section details the inferred classification of tech and non-tech firms underlying the analysis reported in Section III.

There are no predefined industry codes that specifically represent the tech sector. To infer the classification of tech firms, we first construct a list of 150 Canadian tech companies using job boards and consulting reports. We then match these companies to inconsistently declared names in the Indeed dataset using the algorithm described in the paper. We next collect the sectors (NAICS codes) to which these companies mainly belong and select those sectors for which the proportion of the manually selected tech firms is above the average. The selected sectors added to the manually identified company list are *consumer electronics repair and maintenance* (NAICS 811211) and *electronics and appliance stores* (NAICS 443).¹ For the analysis presented in the paper, the set of tech company names comprises all firms that are either matched to the original set of 150 manually collected tech companies or classified under any of the above NAICS categories.

The classification of digital occupations follows the methodology outlined in Galassi, Bellatin, and Chu 2025. Table A2 lists all NOC categories identified under this methodology. In our data, job postings by all inferred tech companies represent 2.6% of total job postings in our data, while digital occupations represent 7% of total postings. As expected, digital jobs are overrepresented in tech firms (25% of job postings) relative to non-tech firms (6% of job postings). Half of all digital vacancies in non-tech firms are concentrated in the following sectors: *specialty trade contractors, food services and drinking places, credit intermediation and related, educational services, business, repair and maintenance, food and beverage stores (supermarkets), and clothing and accessories stores*. This pattern likely reflects the increasing integration of digital technologies into traditionally non-tech sectors, even though digital occupations remain a minority within these industries.

¹We excluded a few sectors that, despite a larger than average share of tech firms, cannot be plausibly associated with tech sectors, such as *finance and insurance, professional, scientific, and technical services, language schools, and family planning centers*. The results are robust to the inclusion of these sectors.

Table A2: NOC categories defined as digital occupations

NOC Code	NOC Title
131	Telecommunication carriers managers
213	Computer and information systems managers
1254	Statistical officers and related research support occupations
1422	Data entry clerks
1454	Survey interviewers and statistical clerks
2133	Electrical and electronics engineers
2147	Computer engineers (except software engineers and designers)
2161	Mathematicians, statisticians and actuaries
2171	Information systems analysts and consultants
2172	Database analysts and data administrators
2173	Software engineers and designers
2174	Computer programmers and interactive media developers
2175	Web designers and developers
2241	Electrical and electronics engineering technologists and technicians
2242	Electronic service technicians (household and business equipment)
2281	Computer network technicians
2282	User support technicians
2283	Information systems testing technicians
7202	Contractors and supervisors, electrical trades and telecommunications occupations
7241	Electricians (except industrial and power system)
7242	Industrial electricians
7243	Power system electricians
7244	Electrical power line and cable workers
7245	Telecommunications line and cable workers
7246	Telecommunications installation and repair workers
7247	Cable television service and maintenance technicians
7333	Electrical mechanics
9222	Supervisors, electronics manufacturing
9223	Supervisors, electrical products manufacturing
9523	Electronics assemblers, fabricators, inspectors and testers
9524	Assemblers and inspectors, electrical appliance, apparatus and equipment manufacturing
9525	Assemblers, fabricators and inspectors, industrial electrical motors and transformers

References

Galassi, G., A. Bellatin, and V. Chu (2025). “Letting Job Postings Talk: Recent Trends in Digitalization.” *Research in Labor Economics, Big Data Applications in Labor Economics, Vol. 52B*, pp. 1–33.