



Now and Tomorrow
Excellence in Everything We Do



Occupational Labour Demand and Supply in Canada

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*The views expressed in this document are the author's and do not necessarily reflect the opinions of Human Resources and Skills Development Canada or the Federal Government

Presentation Outline

- I. Introduction to the Canadian Occupational Projection System
- II. Data and Classification Systems
- III. Projection Methods, Innovations and Challenges
- IV. Summary and Direction of Future Work

A Brief History of COPS

- 1982 (Apr.) - The Canadian Occupational Projection System (COPS) was created
 - replaced the Canadian Occupational Forecasting System (COFOR)
- 1983-1988 (The developmental years)
 - Model development and enhancement
 - Forging partnerships
 - Projection production
- 1989-1993 (Sector studies era)
- Increased emphasis on sector studies
 - Relevant to program activities (immigration and training)
- 1994-2004 (LMI Emphasis)
 - Greater focus on Labour Market Information
 - Production of Job Futures

Recent Developments (2005-2011)

- Projection results used in support of policy and program analysis
- Production of labour supply, demand and imbalances at the broad skill and occupational level
- Ongoing model enhancement and development
- Provide outputs for use in Labour Market Information (LMI)
 - Occupational Summaries
 - Projection Data
- Provide outputs for use in fast tracking immigration claims
 - Contribute to the list of high demand occupations
- Disseminate to the public
 - Detailed data
 - Broad analysis

Goal of the COPS System

The Goal of the system is to ***estimate ex-ante labour market imbalances at the occupational level*** in support of policy analysis and labour market information production

Classification Systems

- ***National Occupational Classification (NOC)***
 - Classifies occupations into skill levels (education usually required for entry) and skill types
- ***North American Industrial Classification System (NAICS)***
 - Standardized industrial classification
 - Aggregated into 33 COPS Industries
- ***Classification of Instructional Programs (CIP)***
 - Encompasses the field of study choices of students
 - Aggregated into approximately 50 COPS major fields of study (MFS) by level of education

National Occupational Classification Matrix (NOC)



Human Resources and Social Development Canada

Ressources humaines et Développement social Canada

NATIONAL OCCUPATIONAL CLASSIFICATION MATRIX 2006

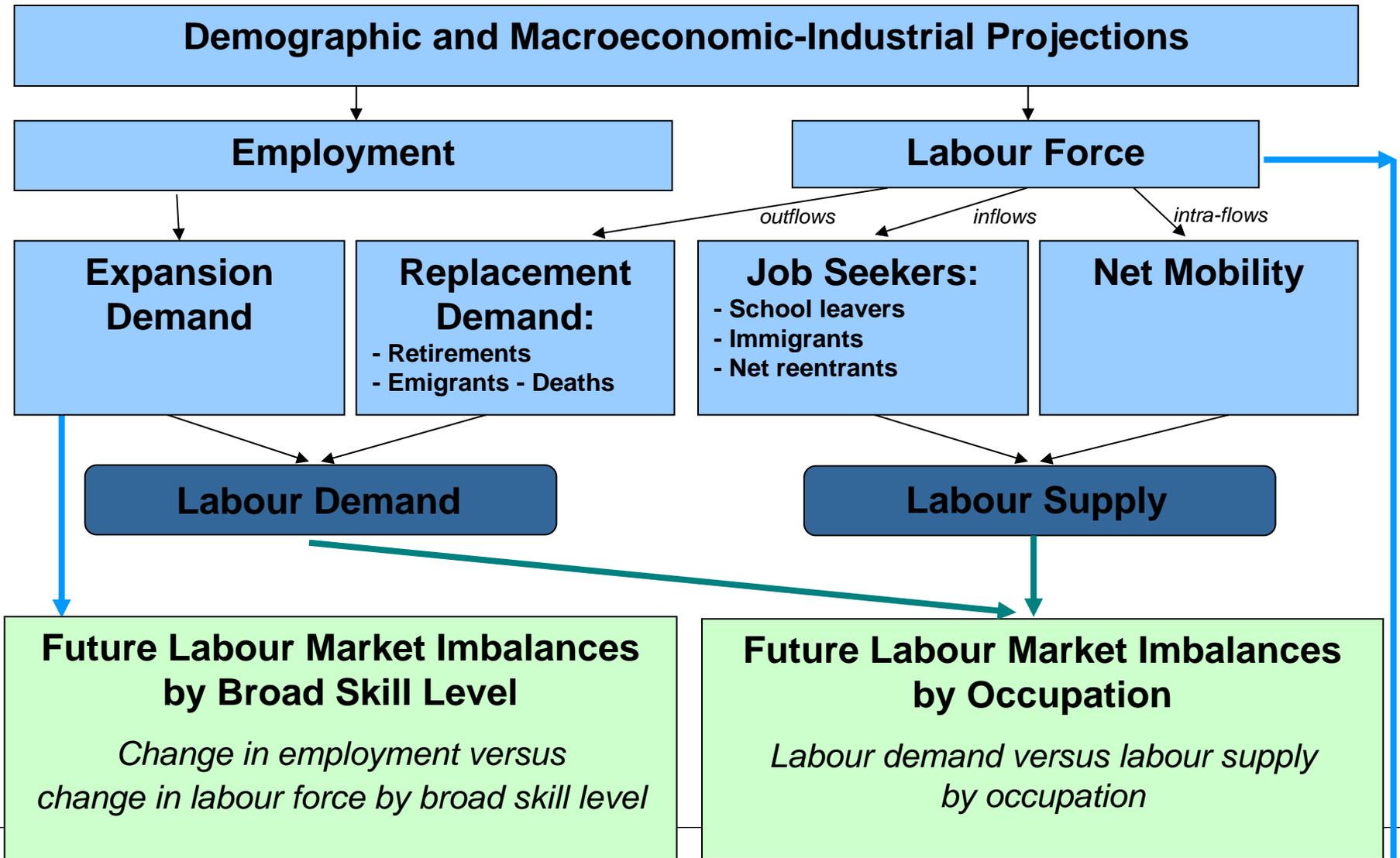
The National Occupational Classification (NOC) matrix provides an overview of the classification at the minor group level. It also illustrates how the NOC is accessible on the basis of skill level, skill type, or on a combination of these two criteria. The four skill level categories are listed on the left side of the matrix, while nine skill type categories are listed across the top. The tenth skill type category (0 Management Occupations) is organized across the top of the matrix. In most cases, each matrix cell consists of a major group.

	1 BUSINESS, FINANCE AND ADMINISTRATION OCCUPATIONS	2 NATURAL AND APPLIED SCIENCES AND RELATED OCCUPATIONS	3 HEALTH OCCUPATIONS	4 OCCUPATIONS IN SOCIAL SCIENCES, EDUCATION, GOVERNMENT SERVICE AND RELIGION	5 OCCUPATIONS IN ART, CULTURE, RECREATION AND SPORT	6 SALES AND SERVICE OCCUPATIONS	7 TRADES, TRANSPORT AND EQUIPMENT OPERATORS AND RELATED OCCUPATIONS	8 OCCUPATIONS UNIQUE TO PRIMARY INDUSTRY	9 OCCUPATIONS UNIQUE TO PROCESSING, MANUFACTURING AND UTILITIES
0 MANAGEMENT OCCUPATIONS					Major Group 00 SENIOR MANAGEMENT OCCUPATIONS 001 Legislators and Senior Management				
	011 Administrative Services Managers 012 Managers in Finance and Business Services 013 Managers in Communication (Except Broadcasting)	021 Managers in Engineering, Architecture, Science and Information Systems	031 Managers in Health, Education, Social and Community Services 041 Managers in Public Administration		051 Managers in Art, Culture, Recreation and Sport	001 Sales, Marketing and Advertising Managers 002 Managers in Retail Trade 003 Managers in Food Service and Accommodation 004 Managers in Protective Service 005 Managers in Other Services	071 Managers in Construction and Transportation 072 Facility Operation and Maintenance Managers	081 Managers in Primary Production (Except Agriculture)	091 Managers in Manufacturing and Utilities
SKILL LEVEL A Occupations usually require university education.	Major Group 11 PROFESSIONAL OCCUPATIONS IN BUSINESS AND FINANCE 111 Auditors, Accountants and Investment Professionals 112 Human Resources and Business Service Professionals	Major Group 21 TECHNICAL OCCUPATIONS IN NATURAL AND APPLIED SCIENCES 211 Physical Science Professionals 212 Life Science Professionals 213 Civil, Mechanical, Electrical and Chemical Engineers 214 Other Engineers 215 Architects, Urban Planners and Land Surveyors 216 Mathematicians, Statisticians and Actuarial Professionals 217 Computer and Information Systems Professionals	Major Group 31 PROFESSIONAL OCCUPATIONS IN HEALTH 311 Physicians, Dentists and Veterinarians 312 Optometrists, Chiropractors and Other Health Diagnosing and Treating Professionals 313 Pharmaceutical, Diagnostic and Radiological Technicians 314 Therapy and Assessment Professionals 315 Nurse Supervisors and Registered Nurses	Major Group 41 PROFESSIONAL OCCUPATIONS IN SOCIAL SCIENCE, EDUCATION, GOVERNMENT SERVICES AND RELIGION 411 Judges, Lawyers and Court Reporters 412 University Professors and Assistant Professors 413 College and Other Vocational Instructors 414 Secondary and Elementary School Teachers and Educational Counsellors 415 Psychologists, Social Workers, Counselors, Clerg and Pastors Officers, Researchers and Consultants 416	Major Group 51 PROFESSIONAL OCCUPATIONS IN ART AND CULTURE 511 Librarians, Archivists, Conservators and Curators 512 Writing, Translating and Public Relations Professionals 513 Creative and Performing Artists				
SKILL LEVEL B Occupations usually require college education or apprenticeship training.	Major Group 12 SKILLED ADMINISTRATIVE AND BUSINESS OCCUPATIONS 121 Clerical Supervisors 122 Administrative and Regulatory Occupations 123 Finance and Business Administrative Occupations 124 Secretaries, Records and Transcriptionists	Major Group 22 TECHNICAL OCCUPATIONS RELATED TO NATURAL AND APPLIED SCIENCES 221 Technical Occupations in Physical Science 222 Technical Occupations in Life Sciences 223 Technical Occupations in Civil, Mechanical and Industrial Engineering 224 Technical Occupations in Electronics and Electrical Engineering 225 Technical Occupations in Architecture, Drafting, Surveying and Mapping 226 Other Technical Inspectors and Regulatory Officers 227 Transportation Officers and Controllers 228 Technical Occupations in Computer and Information Systems	Major Group 32 TECHNICAL AND SKILLED OCCUPATIONS IN HEALTH 321 Medical Technicians and Technicians (Except Dental Health) 322 Technical Occupations in Dental Health Care 323 Other Technical Occupations in Health Care (Except Dental)	Major Group 42 PARA-PROFESSIONAL OCCUPATIONS IN LAW, SOCIAL SERVICES, EDUCATION AND RELIGION 421 Paralegals, Social Services Workers and Occupations in Education and Religion, n.e.c.	Major Group 52 TECHNICAL AND SKILLED OCCUPATIONS IN ART, CULTURE, RECREATION AND SPORT 521 Technical Occupations in Librarians, Archivists, Museums and Art Galleries 522 Photographers, Graphic Arts Technicians and Technical and Coordinating Occupations in Motion Pictures, Broadcasting and the Performing Arts 523 Associates and Other Performers 524 Creative Designers and Craftworkers 525 Athletes, Coaches, Referees and Related Occupations	Major Group 62 SALES AND SERVICE SUPERVISORS 621 Sales and Service Supervisors 622 Technical Sales Specialists, Wholesale Trade 623 Insurance and Real Estate Sales Occupations and Sales 624 Chef and Cooks 625 Baristas and Waiters 626 Public Officers and Flight attendants 627 Technical Occupations in Personal Service	Major Group 72 SKILLED TRANSPORT AND EQUIPMENT OPERATORS 721 Construction and Equipment, Trades and Related Workers 722 Supervisors, Railway and Motor Transportation Occupations 723 Mechanical and Related Occupations 724 Electrical Trades and Telecommunication Occupations 725 Plumbers, Pipefitters and Gas Fitters 726 Metal Forming, Shaping and Erecting Trades 727 Carpentry and Cabinetmaking 728 Masonry and Plastering Trades 729 Other Construction Trades 730 Machinery and Transportation Equipment Mechanics (Except Motor Vehicle) 731 Automotive Service Technicians 732 Other Mechanics 734 Lighthouse, Sales, Show-Repairs, Jewelers and Related Occupations 735 Stationary Engineers and Power Station and System Operators 736 Train Conductor Occupations 737 Crane Operators, Drivers and Blasters 738 Printing Press Operators, Commercial Divers and Other Trades and Related Occupations, n.e.c.	Major Group 82 SKILLED OCCUPATIONS IN PRIMARY INDUSTRY 821 Supervisors, Logging and Forestry 822 Supervisors, Mining, Oil and Gas and Related Workers 823 Underground Miners, Oil and Gas Drilling and Related Workers 824 Logging Machinery Operators 825 Contractors, Operators and Supervisors in Agriculture, Horticulture and Aquaculture 826 Fishing Vessel Masters and Deckhands and Fishermen	Major Group 92 SKILLED MANUFACTURING AND UTILITIES SUPERVISORS AND SKILLED OPERATORS 921 Supervisors, Processing Occupations 922 Supervisors, Assembly and Fabrication in Manufacturing and Processing 923 Central Control and Process Operators in Manufacturing and Processing
SKILL LEVEL C Occupations usually require secondary school and/or occupation-specific training.	Major Group 14 CLERICAL OCCUPATIONS 141 Clerical Occupations, General Office Skills 142 Office Equipment Operators 143 Finance and Treasury Clerks 144 Administrative Support Clerks 145 Library, Composition and Related Information Clerks 146 Mail and Message Distribution Occupations 147 Recording, Stenking and Distributing Occupations		Major Group 34 ASSISTING OCCUPATIONS IN SUPPORT OF HEALTH SERVICES 341 Assisting Occupations in Support of Health Services			Major Group 64 INTERMEDIATE SALES AND SERVICE OCCUPATIONS 641 Sales Representatives, Wholesale Trade 642 Retail Salespersons and Sales Clerks 643 Occupations in Travel and Accommodation 644 Tour and Recreational Guides and Guides 645 Occupations in Food and Beverage Service 646 Other Occupations in Protective Service 647 Childcare and Home Support Workers 648 Other Occupations in Personal Service	Major Group 74 INTERMEDIATE OCCUPATIONS IN TRANSPORT, EQUIPMENT OPERATION, INSTALLATION AND MAINTENANCE 741 Motor Vehicle and Tractor Drivers 742 Heavy Equipment Operators 743 Other Transport Equipment Operators and Related Workers 744 Other Installers, Repairers and Servicers 746 Long-haul Workers and Marine Headers	Major Group 84 INTERMEDIATE OCCUPATIONS IN PRIMARY INDUSTRY 841 Mine Service Workers and Operators in Oil and Gas Drilling 842 Logging and Forestry Workers 843 Agriculture and Horticulture Workers 844 Other Fishing and Trapping Occupations	Major Group 94 INTERMEDIATE MANUFACTURING AND UTILITIES OPERATORS AND ASSEMBLERS 941 Machine Operators and Related Workers in Metal and Mineral Products Processing 942 Machine Operators and Related Workers in Chemical, Plastic and Rubber Processing 943 Machine Operators and Related Workers in Pulp and Paper Production and Wood Processing 944 Workers in Textile Processing 945 Workers in Fabric, Fur and Leather Products Manufacturing 946 Machine Operators and Related Workers in Food, Beverage and Tobacco Processing 947 Printing Machine Operators and Related Occupations 948 Mechanical, Electrical and Electronic Assemblers 949 Other Assembly and Related Occupations 951 Machining, Metalworking, Woodworking and Related Machine Operators
SKILL LEVEL D On-the-job training is usually provided for occupations.						Major Group 66 ELEMENTAL SALES AND SERVICE OCCUPATIONS 661 Cashiers 662 Other Sales and Related Occupations 664 Food Counter Attendants, Kidney Helpers 665 Security Guards and Related Occupations 666 667 Other Occupations in Travel, Accommodation, Amusement and Recreation 668 Other Elemental Service Occupations	Major Group 76 TRADES HELPERS, CONSTRUCTION LABOURERS AND RELATED OCCUPATIONS 761 Trades Helpers and Labourers 762 Public Works and Other Labourers, n.e.c.	Major Group 86 LABOURERS IN PRIMARY INDUSTRY 861 Primary Production Labourers	Major Group 96 LABOURERS IN PROCESSING, MANUFACTURING AND UTILITIES 961 Labourers in Processing, Manufacturing and Utilities

Main data sources used in the projections

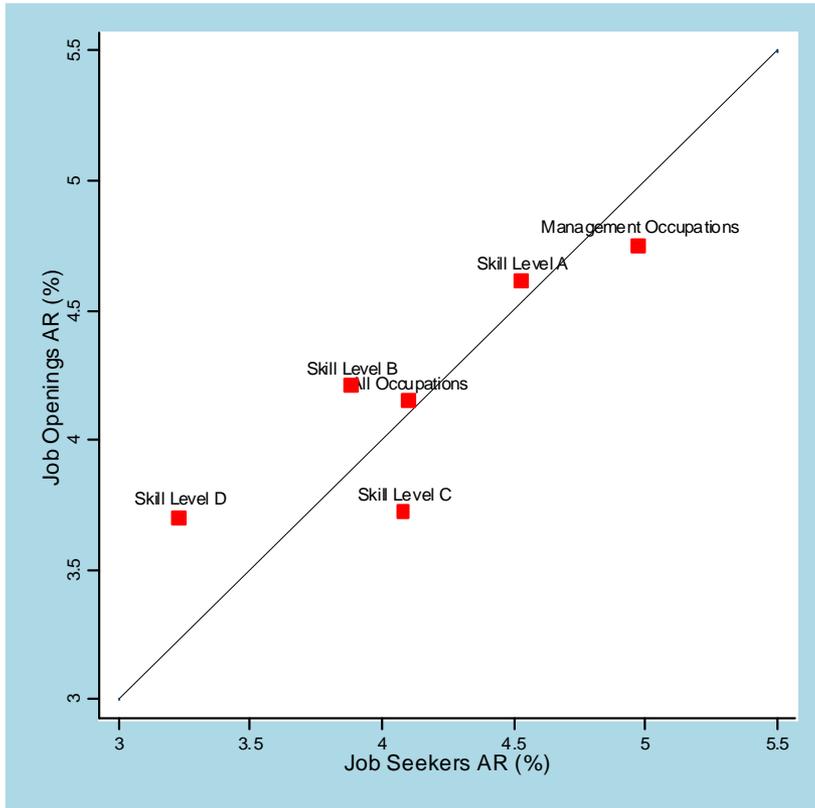
Data Sources (Statistics Canada)	Principal Use
Labour Force Survey <i>(Monthly)</i>	<ul style="list-style-type: none"> - Primary data to project employment growth by occupation (expansion demand) - Occupational distribution of non-PSE graduates (high school and less than high school) and discontinuants (from PSE)
Census <i>(Every 5 years)</i>	<ul style="list-style-type: none"> - Provide the labour force participation rate of immigrants - Allocation of new immigrants by occupation
National Graduates Survey <i>(Every 5 years)</i>	<ul style="list-style-type: none"> - Primary source of data on how graduates by field of study map into employment in specific occupations
Post-secondary Student Information System <i>(Annual)</i>	<ul style="list-style-type: none"> - PSIS data used to project new school enrolments and the new supply entering the labour market from the different education levels
Annual Demographic Statistics	<ul style="list-style-type: none"> - Demographic projections used for immigration, emigration, deaths as well as inputs for other “supply-side” models

Summary of COPS Projection Methods



Imbalances at the broad skill level

Broad Skill Imbalances 2011-2020:
COPS 2011 Reference Scenario

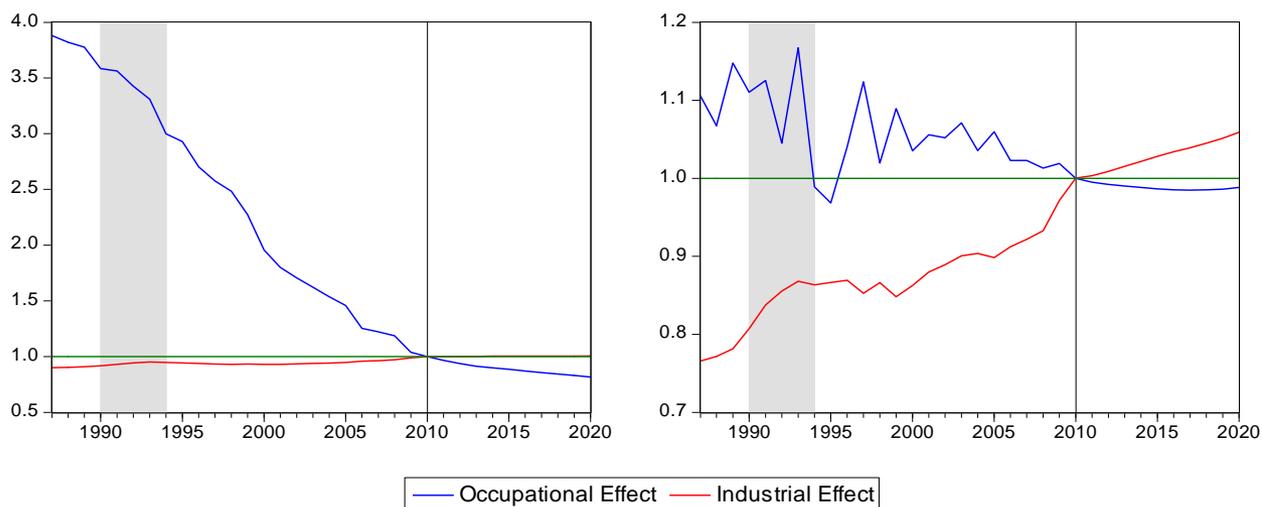


- The analysis of ***broad skill imbalances*** compares growth in *employment* by skill level to growth in the *labour force* by educational qualification
- The 45° line represents balanced growth between *job openings* and *job seekers* at the broad skill level
- The starting points of the analysis are important, particularly during volatile periods
- The analysis is used primarily to make overall assessments before presenting detailed occupational evaluations

Expansion Demand

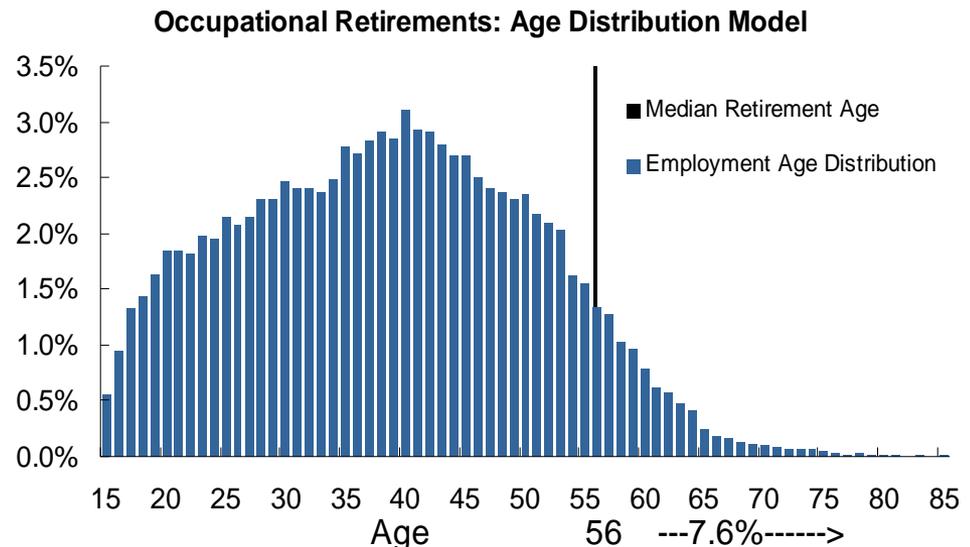
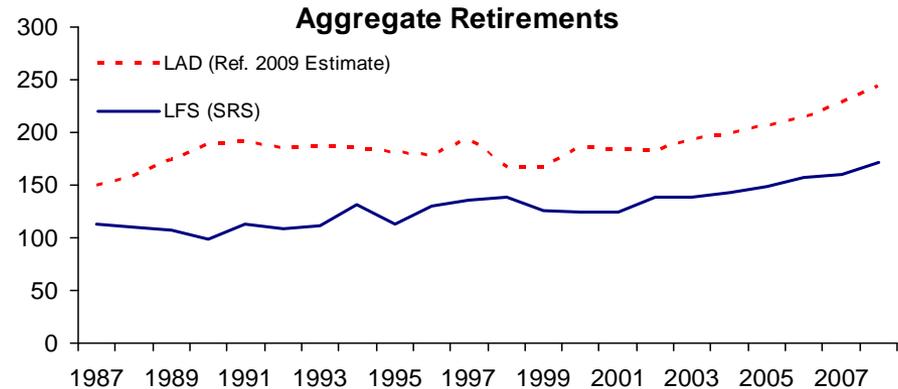
- Projects the new occupational demand stemming from anticipated economic growth
- Projections of occupational shares (140 occupations) are made within each industry group (33 industries)
- Autonomous equations for occupational clusters
 - Allows related occupations at the detailed level to trend together
- The results are decomposed into occupational and industrial effects using shift-share analysis as an analytical and validation tool

COPS 2011 Reference Scenario, Expansion Demand: Shift Share Analysis
N124-Secretaries, Recorders and Transcriptionists and N321-Medical Technologists and Technicians)



Replacement Demand: Retirements

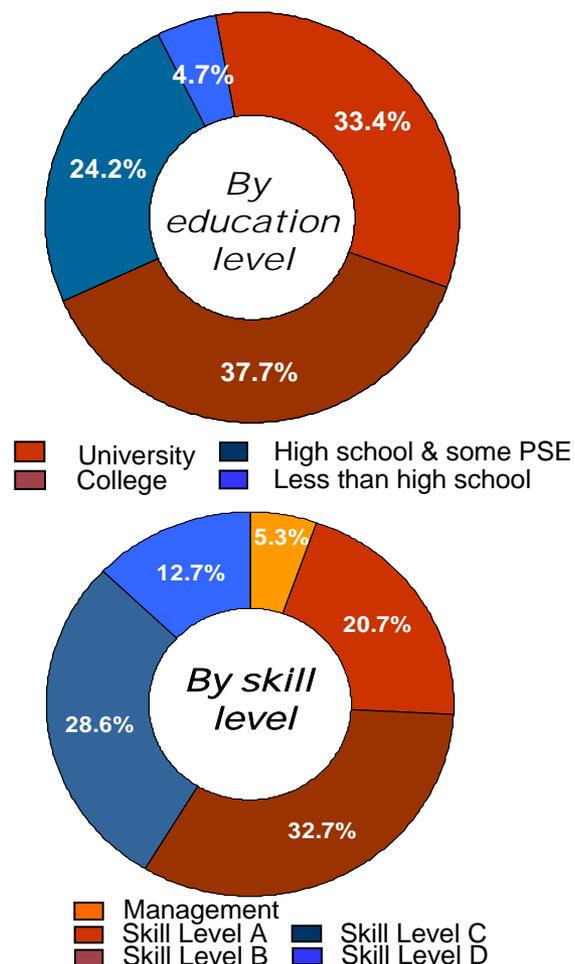
- Projects new job openings generated by existing workers leaving their current positions because of retirement
 - Retirement is defined as a permanent withdrawal from paid employment for those aged 50+
- Aggregate retirement rates by age and gender are computed using tax filer data (due to lack of reliable alternative data sources)
- Occupational Retirements are computed by ageing the occupational profiles of employment (Age Distribution Model)
- Total Occupational Retirements are constrained to equal aggregate retirements



School Leavers

- The school leavers model accounts for new entrants into the labour market from the education system
- Student flows are estimated by OLS regression
- Estimated student flows are converted to field of study choices by a fixed share vector
- 2 field-of-study to occupation transition matrices are used:
 - The first scenario constrains leavers into “intended occupations” by assuming certain fields and levels of study do not intend to work in specific occupations (i.e. bachelor in anthropology is not compatible with food counter attendant)
 - The second matches graduate outcomes to the occupational classification of recent labour force entrants by age and education.
 - Comparison between these facilitates an analysis of intended versus realized outcomes (contributes to analysis of occupational mismatch)

School leavers by education level and skill level, 2011-2020



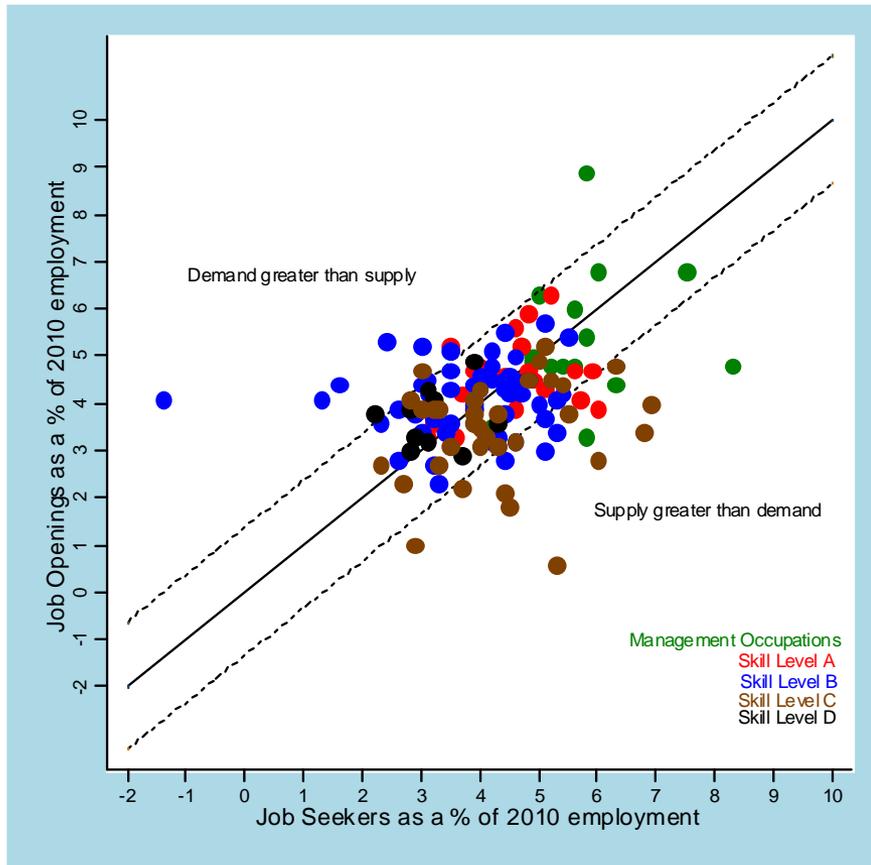
Source: COPS 2011 Reference Scenario.

Demographic-Driven Components

- Many model components rely on simple extrapolations and rely primarily on demographic factors:
 - The ***Immigration Model*** (labour supply flow) relies on a fixed participation rate and occupational vector combined with a gross population inflow generated by the demographic model
 - Work is currently underway to include dynamics in the occupational transition vector
 - ***Emigration*** (Replacement Demand – labour demand flow) is simply computed using the demographic accounts combined with occupational and participation rate assumptions
 - ***In-service mortality*** (Replacement Demand – labour demand flow) uses age-specific death rates combined with occupational age distributions
- In addition, synthetic cohort approaches are used to obtain ***net labour market re-entrants, net occupational mobility*** and the ***unemployment add-factor***

Imbalances at the Occupational Level

Occupational Imbalances 2011-2020:
COPS 2011 Reference Scenario



- The analysis of **occupational imbalances** compares the number of *job seekers* to the number of *new job openings* as a share of base year employment
- The 45° line represents balanced growth between *job openings* and *job seekers* at the broad skill level
- The starting point of the analysis matter, particularly during volatile periods
- The analysis is used primarily to make overall assessments before presenting detailed occupational evaluations

Stock-Flow Consistency

- All Occupational projection models, with the exception of the expansion demand and labour force participation model, are estimated as flows
- There is no single anchor to the aggregate labour market situation
- All results are reconciled to the aggregates via a stock-flow accounting system
 - both historical estimates and projections

Labour market conditions

- Components are combined to produce a qualitative assessment of conditions in occupation by component
- Qualitative assessments of employment prospects are compiled

EX-POST	Empns10 ('000)	Expansion Demand				Retirements				Deaths		Emig	Expected Demand			School Leavers		Immigration			Mobility		Others	PR+	AF	UR	Educ	NS	Expected Supply		Excess Demand (annual)	NFLMS	XD / SL+M	CLMC REF10	FL MC	U. Rate 2010	U. Rate 2018			
		11-20	AAGR	AR		11-20	AR	AAR		11-20	AR	11-20	09-18	AR		11-20	AR		11-20	AR		11-20	AR		11-20	11-20	11-20	11-20	11-20	11-20	11-20	11-20	11-20	11-20	11-20	11-20				
		NO AF ->																																						
All Occupations	15,731.8	1,987.4	1.2	1.3	A	3,696.3	2.3	2.2	A	495.8	0.3	A	354.0	6,533.5	4.2	A	4,736.7	3.0	A	1,065.3	0.7	A	0.00	0.0	A	461.50	605.12	164.19	-207.89	-99.93	0.00	6,263.5	4.1	A	27.0	0.2	4.7%	Fair	5.0	3.1
Management	1,490.1	177.7	1.1	1.2	A	441.8	3.0	2.8	AA	55.0	0.4	AA	33.4	707.8	4.8	AA	251.1	1.7	BA	85.0	0.6	A	268.93	17.6	AA	117.70	56.86	78.92	-12.28	-5.81	0.00	722.82	5.0	AA	-1.5	-0.1	-4.5%	Fair	2.6	3.3
Skill Level A	3,020.9	524.8	1.6	1.7	AA	698.8	2.3	2.1	A	99.4	0.3	A	69.5	1,392.5	4.6	A	979.1	3.2	A	197.1	0.7	A	-7.44	-0.2	A	179.90	112.37	91.68	-19.42	-4.72	0.00	1,348.6	4.5	A	4.4	0.1	3.7%	Good	2.5	1.0
Skill Level B	5,331.3	684.4	1.2	1.3	A	1,275.1	2.4	2.2	A	164.4	0.3	A	120.0	2,244.0	4.2	A	1,550.0	2.9	A	246.3	0.5	A	-27.40	-0.5	A	233.32	205.17	123.01	-61.53	-33.33	0.00	2,002.2	3.9	A	24.2	0.5	13.5%	Fair	4.5	0.2
Skill Level C	4,364.5	421.3	0.9	1.0	A	978.3	2.2	2.1	A	128.9	0.3	A	96.8	1,625.4	3.7	A	1,352.6	3.1	A	355.4	0.8	A	28.99	0.6	A	-18.32	172.89	-74.52	-78.35	-38.34	0.00	1,718.7	4.1	A	-9.3	-0.2	-5.5%	Fair	6.2	7.1
Skill Level D	1,525.0	179.1	1.1	1.2	A	302.2	2.0	1.8	A	48.1	0.3	A	34.3	563.8	3.7	A	603.9	4.0	AA	181.4	1.2	AA	-263.09	-15.4	BA	-51.10	57.84	-54.89	-36.32	-17.73	0.00	471.1	3.2	BA	9.3	0.6	11.8%	Limited	10.6	4.7
Business, Finance & Adm	3,194.2	310.6	0.9	1.0	A	901.5	2.8	2.6	A	103.1	0.3	A	70.9	1,386.1	4.3	A	847.5	2.7	A	178.2	0.6	A	63.6	1.9	A	93.3	122.3	32.2	-41.4	-19.9	0.00	1,182.6	3.8	A	20.4	0.6	19.8%	Fair	3.8	-2.1
Natural and Applied Sc.	1,281.9	240.8	1.7	1.9	AA	244.9	1.9	1.7	A	33.7	0.3	A	29.6	549.0	4.3	AA	445.4	3.5	A	135.3	1.1	AA	-12.8	-1.0	A	69.5	48.5	37.0	-11.2	-6.7	0.00	637.5	5.1	AA	-8.8	-0.7	-15.2%	Fair	3.4	8.0
Health	1,137.5	247.2	2.0	2.2	AA	296.3	2.6	2.3	A	36.9	0.3	A	26.8	607.2	5.3	AA	331.8	2.9	A	52.4	0.5	A	112.8	9.8	AA	42.4	42.3	19.9	-13.7	-6.1	0.00	539.3	4.8	A	6.8	0.6	17.7%	Fair	1.6	-3.6
Social Sc., Education & Gov	1,504.3	211.7	1.3	1.4	A	342.0	2.3	2.1	A	45.1	0.3	A	34.1	632.9	4.2	A	504.3	3.4	A	64.5	0.4	A	-48.2	-3.1	A	82.2	56.4	43.5	-12.8	-4.9	0.00	602.9	4.1	A	3.0	0.2	5.3%	Fair	2.9	1.0
Art, Culture, Recreation & Sport	490.0	76.9	1.4	1.5	A	110.3	2.2	2.0	A	17.4	0.3	A	11.3	215.9	4.3	A	196.3	3.9	AA	26.3	0.5	A	-38.1	-7.3	BA	26.4	19.0	13.8	-4.4	-1.9	0.00	210.9	4.3	A	0.5	0.1	2.3%	Fair	4.2	2.9
Sales and Services	4,090.6	502.8	1.2	1.2	A	850.6	2.1	1.9	A	134.3	0.3	A	92.2	1,579.8	3.9	A	1,382.6	3.4	A	314.5	0.8	A	-307.6	-7.1	BA	53.0	156.1	-6.4	-64.6	-32.2	0.00	1,442.5	3.7	A	13.7	0.3	8.1%	Fair	5.5	2.2
Trades & Transport	2,657.5	308.1	1.1	1.2	A	596.1	2.2	2.1	A	77.9	0.3	A	59.3	1,041.4	3.9	A	720.0	2.7	A	137.4	0.5	A	131.0	4.5	A	77.5	105.9	27.6	-36.9	-19.0	0.00	1,065.9	4.1	A	-2.4	-0.1	-2.9%	Fair	7.5	7.4
Primary	513.5	47.6	0.9	0.9	A	114.0	2.2	2.1	A	22.7	0.4	AA	11.4	195.7	3.8	A	134.5	2.6	A	22.2	0.4	A	-8.5	-1.5	A	11.3	20.6	2.7	-8.0	-4.1	0.00	159.5	3.3	BA	3.6	0.7	23.1%	Fair	8.9	2.5
Processing, Manufacturing & Utiliti	853.2	41.8	0.5	0.5	BA	240.4	2.8	2.7	A	24.7	0.3	A	18.5	325.5	3.8	A	174.3	2.0	BA	134.4	1.6	AA	107.8	11.6	AA	5.9	34.1	-6.1	-14.8	-7.3	0.00	422.4	5.1	AA	-9.7	-1.1	-31.4%	Limited	8.1	15.5
00-09 Management Occupations	1,490.1	177.7	1.1	1.2	A	441.8	3.0	2.8	AA	55.0	0.4	AA	33.4	707.8	4.8	AA	251.1	1.7	BA	85.0	0.6	A	268.93	17.6	AA	117.70	56.89	78.92	-12.3	-5.8	0.00	722.8	5.0	AA	-1.5	-0.1	-4.5%	Fair	2.6	3.3
11 Professional Occ's in Busi	548.6	104.9	1.8	1.9	AA	148.6	2.7	2.4	A	20.6	0.4	AA	12.8	286.9	5.2	AA	155.7	2.8	A	27.6	0.5	A	17.8	3.2	A	32.6	20.4	16.6	-3.5	-0.9	0.00	233.7	4.3	A	5.3	1.0	29.0%	Good	2.4	-6.4
12 Skilled Administrative & B	976.4	82.9	0.8	0.8	A	317.4	3.3	3.1	AA	33.5	0.3	A	21.5	455.4	4.7	A	211.5	2.2	A	35.7	0.4	A	16.6	1.7	A	41.9	36.9	22.1	-11.1	-6.0	0.00	305.7	3.2	BA	15.0	1.5	60.6%	Fair	2.7	-12.6
14 Clerical Occupations	1,359.1	91.6	0.7	0.7	A	331.7	2.4	2.3	A	38.2	0.3	A	29.7	491.2	3.6	A	424.8	3.1	A	95.0	0.7	A	-26.6	-1.9	A	-5.6	53.2	-22.9	-24.1	-11.8	0.00	487.5	3.7	A	0.4	0.0	0.7%	Fair	5.2	4.5
21 Professional Occ's in Natu	692.2	144.0	1.9	2.1	AA	111.5	1.6	1.4	BA	18.7	0.3	A	16.1	290.4	4.2	A	244.2	3.5	A	88.6	1.3	AA	-8.4	-0.9	A	41.3	25.8	21.1	-4.5	-1.1	0.00	367.7	5.4	AA	-7.7	-1.1	-23.3%	Good	2.7	10.3
22 Technical Occ's in Related	512.0	80.2	1.5	1.6	A	115.0	2.2	2.0	A	12.8	0.2	BA	11.7	219.6	4.3	A	186.5	3.6	A	41.0	0.8	A	-17.6	-3.3	A	22.4	19.7	11.8	-5.9	-3.2	0.00	232.3	4.7	A	-1.3	-0.2	-5.6%	Fair	4.6	5.9
31 Professional Occupations	472.9	113.7	2.2	2.4	AA	119.9	2.5	2.2	A	17.5	0.4	AA	11.2	262.2	5.5	AA	137.1	2.9	A	23.2	0.5	A	33.5	7.0	A	27.7	17.3	14.1	-3.0	-0.7	0.00	221.6	4.8	A	4.1	0.9	25.4%	Good	1.0	-6.4
32 Technical / Skilled Occupa	242.5	44.2	1.7	1.8	AA	56.7	2.3	2.1	A	6.5	0.3	A	5.6	112.9	4.7	A	84.8	3.5	A	11.2	0.5	A	1.1	0.5	A	10.3	9.0	5.4	-2.7	-1.5	0.00	107.4	4.5	A	0.5	0.2	5.7%	Fair	1.5	-0.6
34 Assisting Occ's in Support	316.2	73.9	2.1	2.3	AA	74.6	2.4	2.0	A	9.0	0.3	A	7.6	165.0	5.2	AA	98.6	3.1	A	15.9	0.5	A	44.8	13.9	AA	-1.3	12.0	-5.2	-5.4	-2.7	0.00	158.1	5.1	AA	0.7	0.2	6.0%	Fair	2.4	0.3
41 Professionals in Social Sci	1,072.1	131.6	1.2	1.2	A	255.2	2.4	2.2	A	32.9	0.3	A	24.1	443.7	4.1	A	963.7	3.4	A	45.2	0.4	A	-44.2	-4.0	A	64.1	40.1	32.7	-6.9	-1.7	0.00	428.9	4.1	A	1.5	0.1	3.6%	Fair	2.9	1.5
42 Paraprofessional Occ's in I	398.8	77.6	1.8	1.9	AA	73.4	1.8	1.6	BA	10.9	0.3	A	9.3	171.2	4.3	A	137.2	3.4	A	19.1	0.5	A	-18.6	-4.5	A	17.1	15.1	9.0	-4.5	-2.4	0.00	154.9	4.0	A	1.6	0.4	10.4%	Fair	3.1	-0.7
51 Professional Occupations	235.1	30.6	1.2	1.3	A	63.7	2.7	2.5	A	9.7	0.4	AA	5.3	109.3	4.7	A	78.2	3.3	A	12.5	0.5	A	-8.1	-3.3	A	14.1	8.8	7.2	-1.5	-0.4	0.00	96.8	4.2	A	1.3	0.5	13.8%	Fair	3.4	-1.5
52 Technical / Skilled Occ's	249.5	45.0	1.7	1.8	AA	41.8	1.7	1.5	BA	7.1	0.3	A	5.7	99.6	4.0	A	113.8	4.6	AA	13.0	0.5	A	-35.5	-13.5	BA	10.9	9.6	5.8	-2.9	-1.6	0.00	102.3	4.2	A	-0.3	-0.1	-2.1%	Fair	4.9	5.1
62 Skilled Sales & Service Oc	1,024.7	148.3	1.4	1.4	A	214.5	2.1	1.9	A	31.9	0.3	A	23.4	418.0	4.1	A	326.7	3.2	A	50.2	0.5	A	-44.9	-4.2	A	44.6	39.2	23.5	-11.8	-6.4	0.00	376.5	3.8	A	4.2	0.4	11.0%	Fair	4.1	0.3
64 Intermediate Sales & Servi	1,277.7	150.4	1.1	1.2	A	231.6	1.8	1.7	BA	38.3	0.3	A	28.7	449.0	3.5	A	503.4	3.9	AA	98.8	0.8	A	-145.3	-10.8	BA	-5.3	50.0	-21.6	-22.7	-11.1	0.00	451.5	3.7	A	-0.3	0.0	-0.4%	Limited	5.3	4.7
66 Elemental Sales &																																								

Technical challenges

- Occupational mobility is fairly rudimentary in the system
- Many flows are only captured as residual series in the stock-flow reconciliation
- Many of the data series used are constructed internally
 - often very limited snapshots of data are used to construct entire time series
 - this is difficult to validate
- Evaluating the accuracy of all system components is problematic given time constraints
 - This is particularly problematic as policy analysts want to know the degree of certainty associated with each projection

Conceptual challenges

- Ex-ante imbalances require a constant wage to generate excess demand or supply – our demand side is determined within equilibrium framework
 - We have no feedback between demand and supply via wages or employment adjustment
 - The current supply side is treated as an assessment of whether educational and immigration trends are capable of meeting the anticipated (market-determined) growth in demand
- Are the model results appropriate for Policy Analysis or LMI?
 - Do point estimates produce too much false certainty?
- In the school leavers model, the evaluations of anticipated outcomes often rely on analyst judgement
 - It is uncertain whether it is reasonable to construct an “ex-ante” educational to occupation transition matrix based on assumptions

Future Work

- Results of the 2011 projection cycle will be posted on the internet
- Continuing model improvement work
- Work on expanding the accounting system for the stock models
 - Major revision of the labour force participation model
- Research and modelling of occupational mobility flows
- Next projection cycle is in 2013

Thank You

For Canadian occupational projection data, occupational summaries and technical documentation please visit:

www23.hrsdc.gc.ca