

where have all the cowboys gone?

assessing talent flows between Canadian cities



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background

- quantitative analysis using [city-region/cluster database](#) to address key research questions related to themes I and II
 - innovation and economic performance of city-regions
 - employment growth
 - patenting
 - income, productivity (?)
 - inequality
 - talent attraction / retention
 - mobility flows
 - growth of highly educated / creative workforce

outline

- the **attraction** and retention of highly educated / creative workers ('talent')
- **data** and **methods**
 - city-region level data, occupational approach
 - mobility matrices (in-flows, out-flows, net flows)
 - quantitative analysis (descriptive statistics, regression)
- *preliminary* analysis of **talent flows** between Canadian city-regions
 - are highly educated / creative workers more mobile?
 - what are the overall patterns of labour mobility / talent flows between Canadian city-regions?
 - what quality of place characteristics are important in determining mobility patterns?
 - do these vary between different occupational categories?
- identify **next steps** and **future directions**

attracting and retaining talent

- regional economic development through attracting and retaining highly educated / creative workers (Florida 2002)
 - attracted to places with high levels of diversity, openness and tolerance, and other quality of place characteristics
- labour market mobility of highly skilled workers ('talent') and innovation
 - movement between firms, regions results in transfer of practices and ideas
 - "[workers] act as individual technology-transfer agents, moving ideas and techniques from firm to firm." (Christopherson 2002: 17)
 - 'brain circulation' facilitates building of networks / 'pipelines' between places (Saxenian 2006)
- differences between occupations in terms of quality of place characteristics that are important, politics, etc. (Markusen 2006)

attracting and retaining talent

- literature suggests a complex picture of mobility flows
 - distinctive and highly uneven geography
 - differences between domestic and international flows of talent
 - shaped by specific occupationally-based labour markets and industry dynamics, as well as individual characteristics / circumstances (e.g. age, gender, qualifications, etc.)
- scarce evidence that documents actual flows of talent *between* places leaves some unanswered questions:
 - are creative / talented workers more mobile than other workers?
 - what are their patterns of mobility?
 - what differences exist between different occupational groups?
 - what aspects of quality of place are important in determining mobility?

attracting talent: level of analysis

- what place characteristics / dimensions of quality of place are important in attracting / retaining talent?
 - economic & social characteristics of the region
 - income, cost of living, levels of inequality
 - economic diversity
 - social/cultural diversity, openness/tolerance
 - public provision
 - investment in local / regional innovation system
 - investment in local arts and culture scene
 - career opportunity / local career 'buzz'
 - critical mass of people in same occupation
 - diversity of work opportunities
- how do we operationalize this?

attracting talent: **methods**

- what determines the mobility (M) of workers in a particular occupation (*o*) between two cities/places, *i* and *j*?
 - $M_{ij_o} = f(\text{characteristics}_i, \text{characteristics}_j, \text{characteristics}_{(i-j)})$
 - *i* = origin, *j* = destination, *o* = occupation
- can measure flows in a number of different ways
 - in-flows, out-flows, net flows
 - domestic, international
- analysis of net domestic flows
 - descriptive statistics, network analysis
 - regression analysis
 - backwards, step-wise regression: 'Florida' measures, innovation system, economic indicators, diversity/variety
 - what variables best explain mobility patterns (by occupation)?

attracting talent: level of analysis and data sources

- mobility flows and place characteristics of destination
 - geography (140 city-regions)
 - 27 Census Metropolitan Areas (CMAs, urban core \geq 100,000)
 - 113 Census Agglomerations (CAs, urban core \geq 10,000)
 - occupations (50 occupations)
 - 2001 National Occupational Classification – Statistics (NOC-S)
 - measured at the 2-digit level
 - mobility flows by occupation
 - net domestic migration
 - note: does not consider international flows
- data sources for explanatory variables
 - Census of Population, 2001
 - US Patent and Trademark Office, 2000-2003

attracting talent: **explanatory variables**

- economic & social characteristics
 - employment growth (1996-2001)
 - unemployment rate
 - regional average annual income
 - affordability / cost of living
 - average rent, % households spending more than 30% of income on housing
 - economic diversity
 - industry, occupation, field of study
 - educational attainment
 - % post-secondary or higher, % university degree or higher
 - social diversity, openness / tolerance
 - % foreign-born, % persons in same-sex couples
 - diversity of place of birth, mother tongue, religion, self-reported ethnicity

attracting talent: **explanatory variables**

- quality of / investment in innovation system
 - patents, presence of university, PhDs per 1000
 - *(university enrollments, private R&D, tri-council funding, NRC institute funding)*
- quality of / investment in local arts/cultural scene
 - artists per 1000 population
 - *(arts council granting, creative/cultural activity)*
- career 'buzz' / opportunity
 - number of people in same occupation (critical mass)
 - international in-migrants in same occupation (global talent flow)
- *note:* since we are dealing with aggregate flows (i.e., not individuals), unable to account for gender, age, and family structure

attracting talent: measuring diversity

- diversity is measured as 'numbers equivalent' (NE) entropy for each city-region j (Beckstead and Brown 2003)
 - accounts for the number of groups (e.g. industries, occupations, etc.) and the distribution of employment between these groups

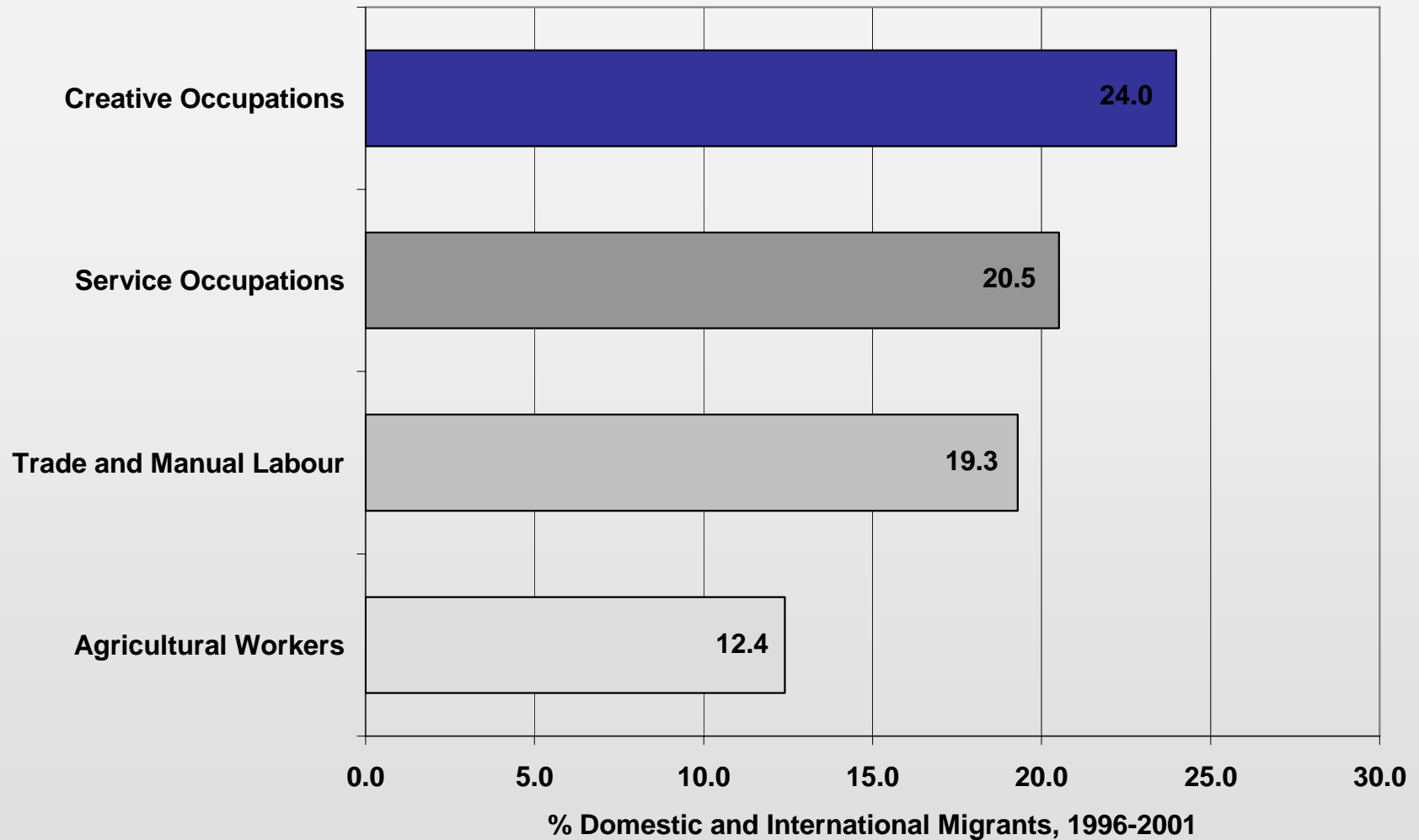
$$NE_j = \exp \left[\sum s_{ij} \ln \left(\frac{1}{s_{ij}} \right) \right]$$

- where s_{ij} = share of employment in each group i
- NE is interpreted as the number of groups that would be present in a region if employment were evenly distributed across all groups
 - ranges from 1 to N (max. possible number of groups)

key questions

- are highly educated / creative workers more mobile than other workers?
- what are the patterns of mobility of highly educated / creative workers?
- what are the key place characteristics / determinants that explain the mobility of highly educated / creative workers?
- in relation to all of these questions, what differences exist between different occupational groups?

flows of talent: 'creative' workers are more mobile



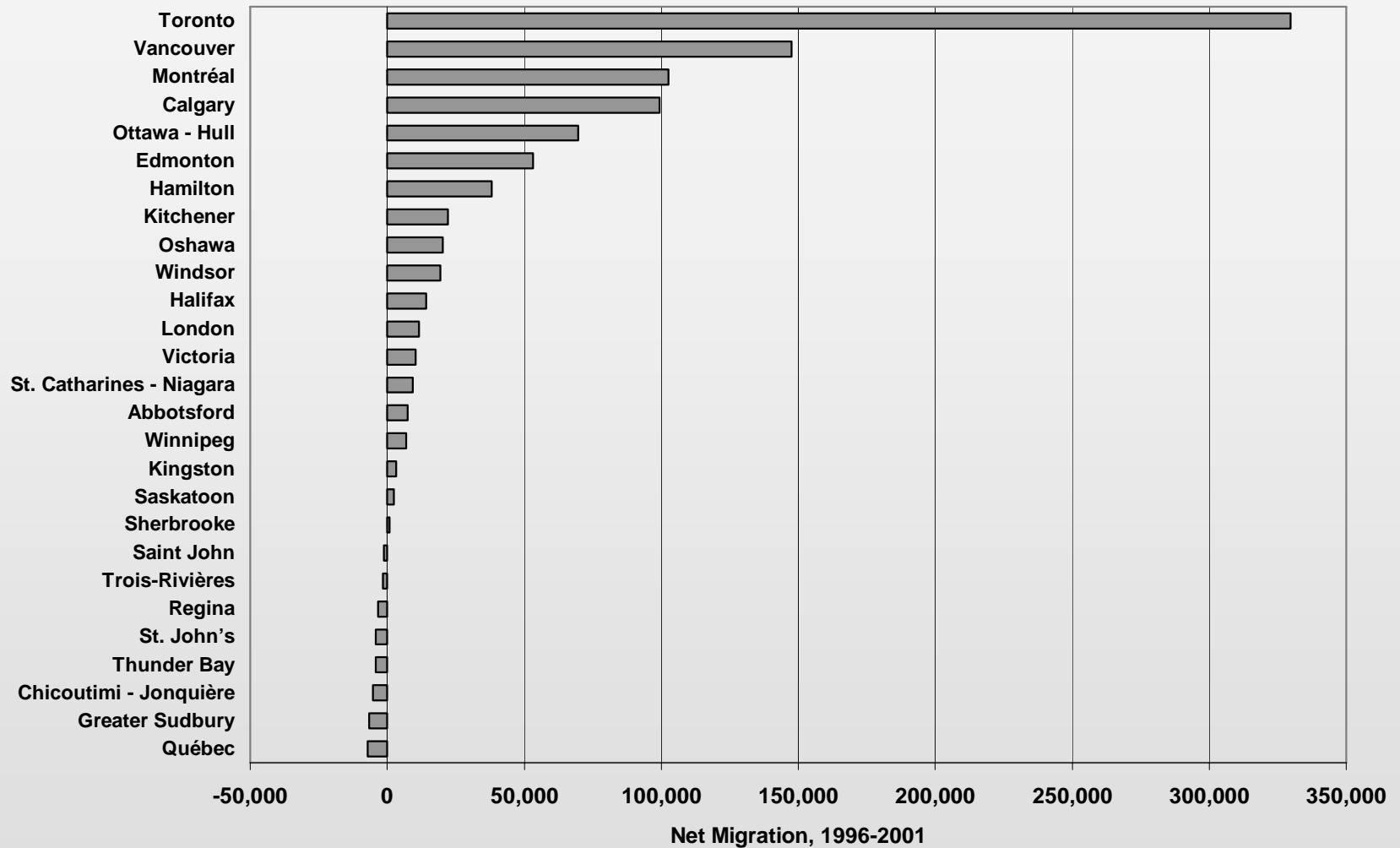
flows of talent: % in-migration by occupation - top 10

Occupations (3-digit NOCS)	Domestic	Int'l	Total
Managers in protective service	44.1	2.5	46.6
Other occupations in protective service	35.5	1.1	36.6
Other engineers	24.5	10.3	34.8
Transportation officers and controllers	31.8	2.6	34.4
Computer and information systems professionals	22.9	11.2	34.1
University professors and assistants	20.9	13.1	34.0
Mine service workers / oil & gas drilling operators	32.7	0.7	33.4
Life science professionals	28.5	4.7	33.2
Physical science professionals	23.4	9.7	33.1
Civil, mechanical, electrical & chemical engineers	23.3	8.8	32.2

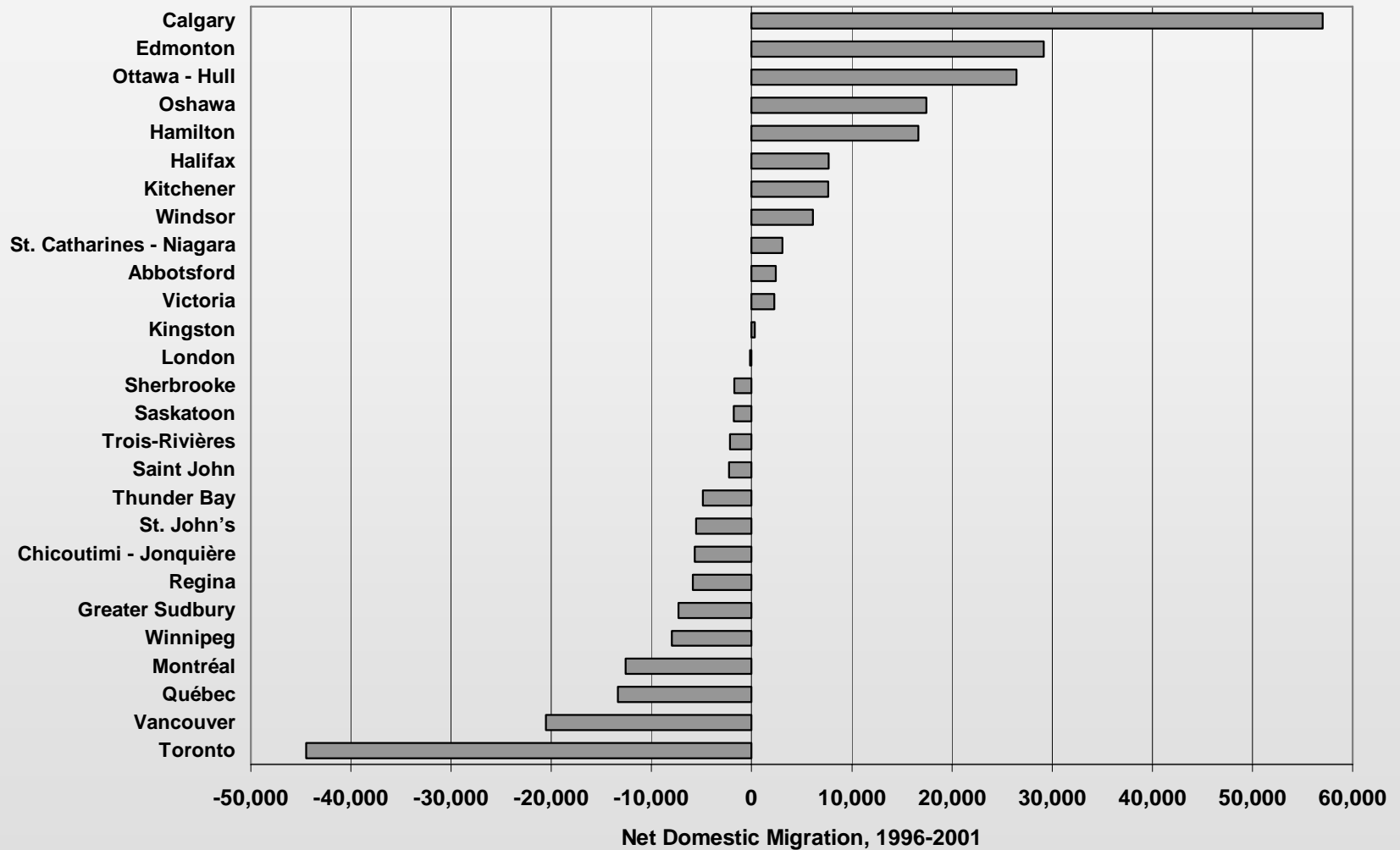
flows of talent: % in-migration by occupation - bottom 10

Occupations (3-digit NOCS)	Domestic	Int'l	Total
Agriculture and horticulture workers	12.4	3.7	16.1
Machine ops. & related in pulp & paper / wood processing	14.3	1.2	15.5
Upholsterers, tailors, shoe repairers, jewellers and related	11.8	3.5	15.3
Public works and other labourers, n.e.c.	14.4	0.9	15.3
Heavy equipment operators	14.8	0.4	15.2
Logging and forestry workers	14.7	0.3	15.0
Mail and message distribution occupations	13.1	1.8	14.9
Logging machinery operators	12.6	0.2	12.8
Contractors, supervisors in agric., hortic. & aquaculture	7.9	1.2	9.1
Other fishing and trapping occupations	8.0	0.3	8.3
Fishing vessel masters and skippers and fishermen	7.0	0.2	7.2

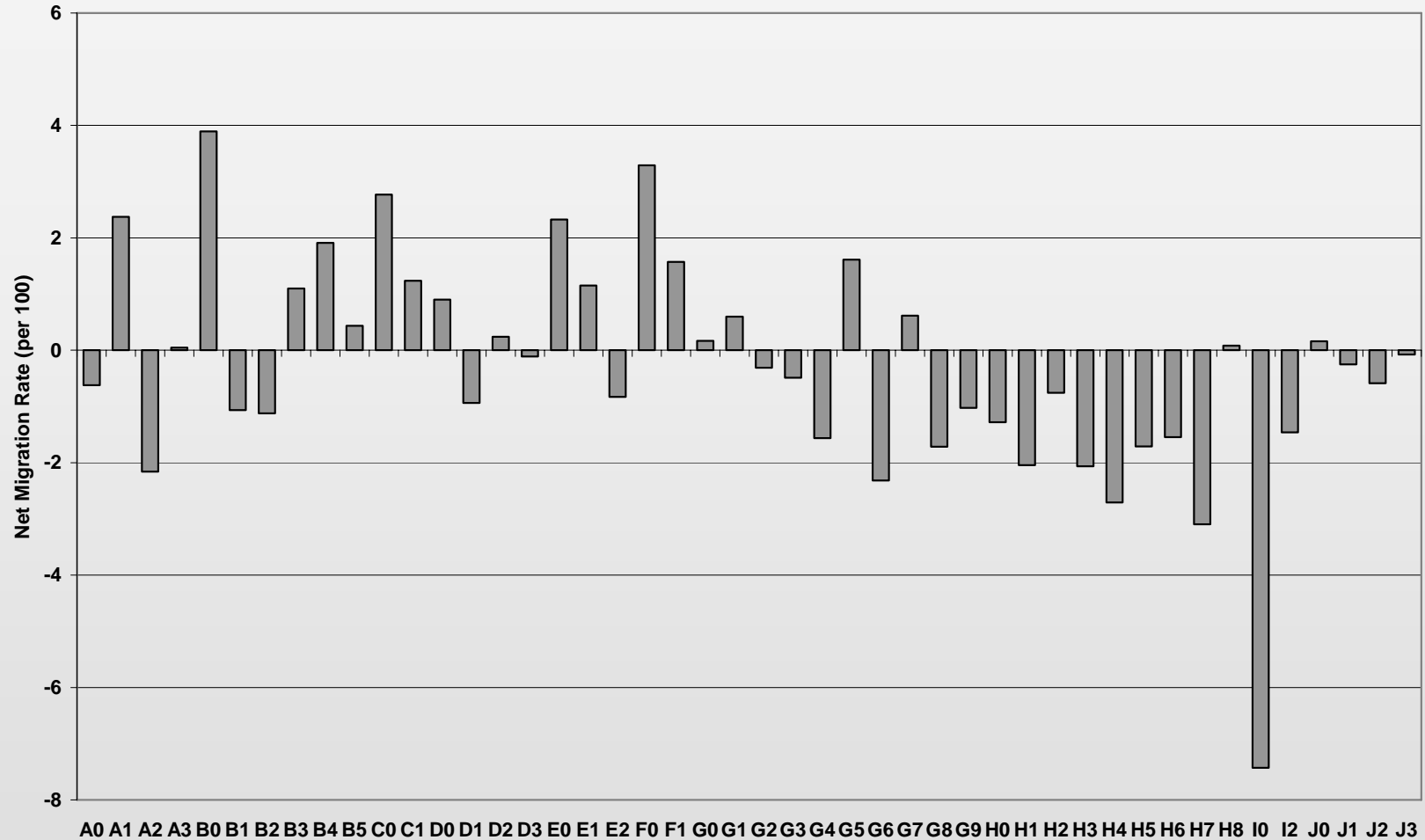
flows of talent: domestic and international migration



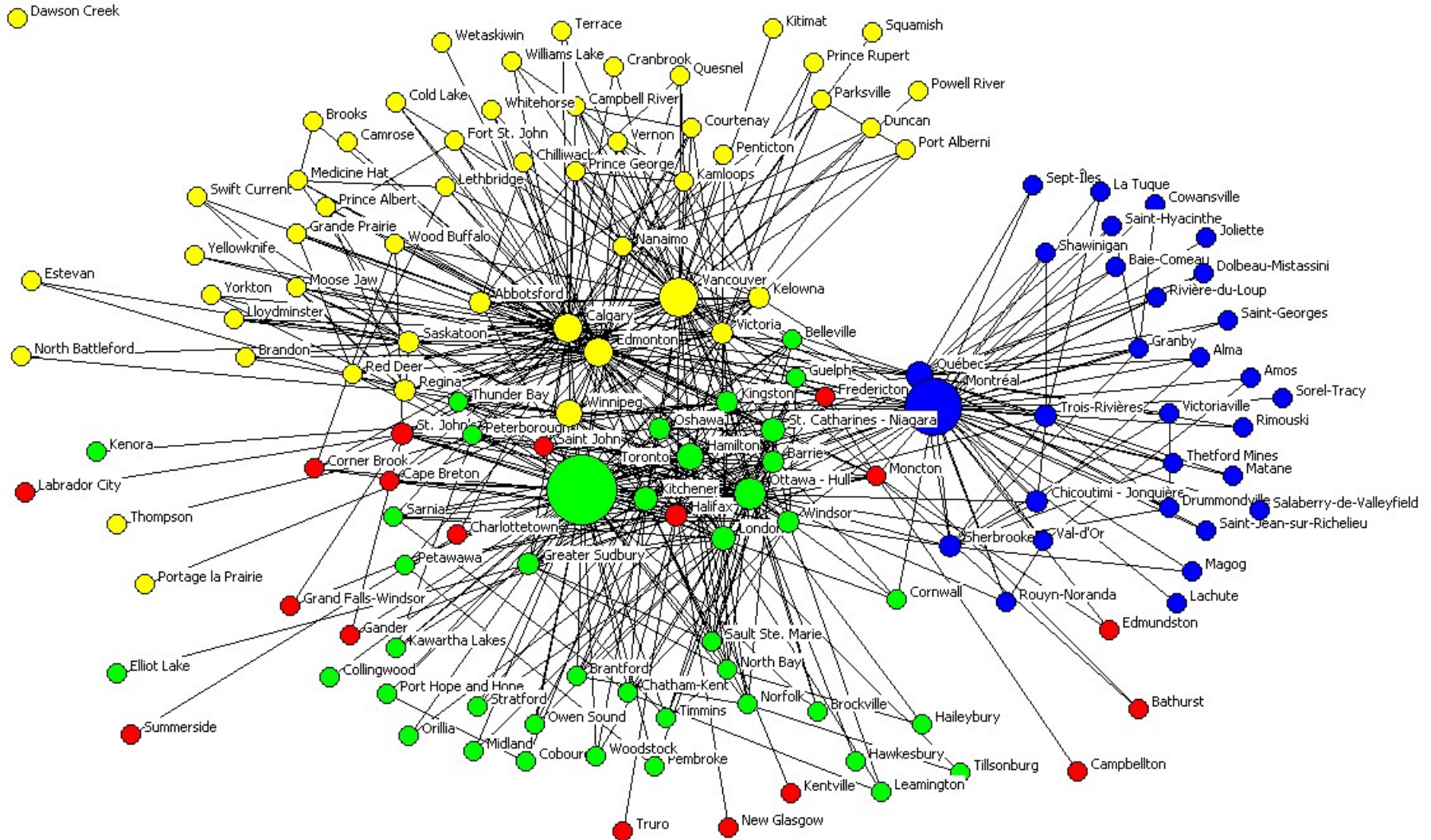
flows of talent: net domestic migration



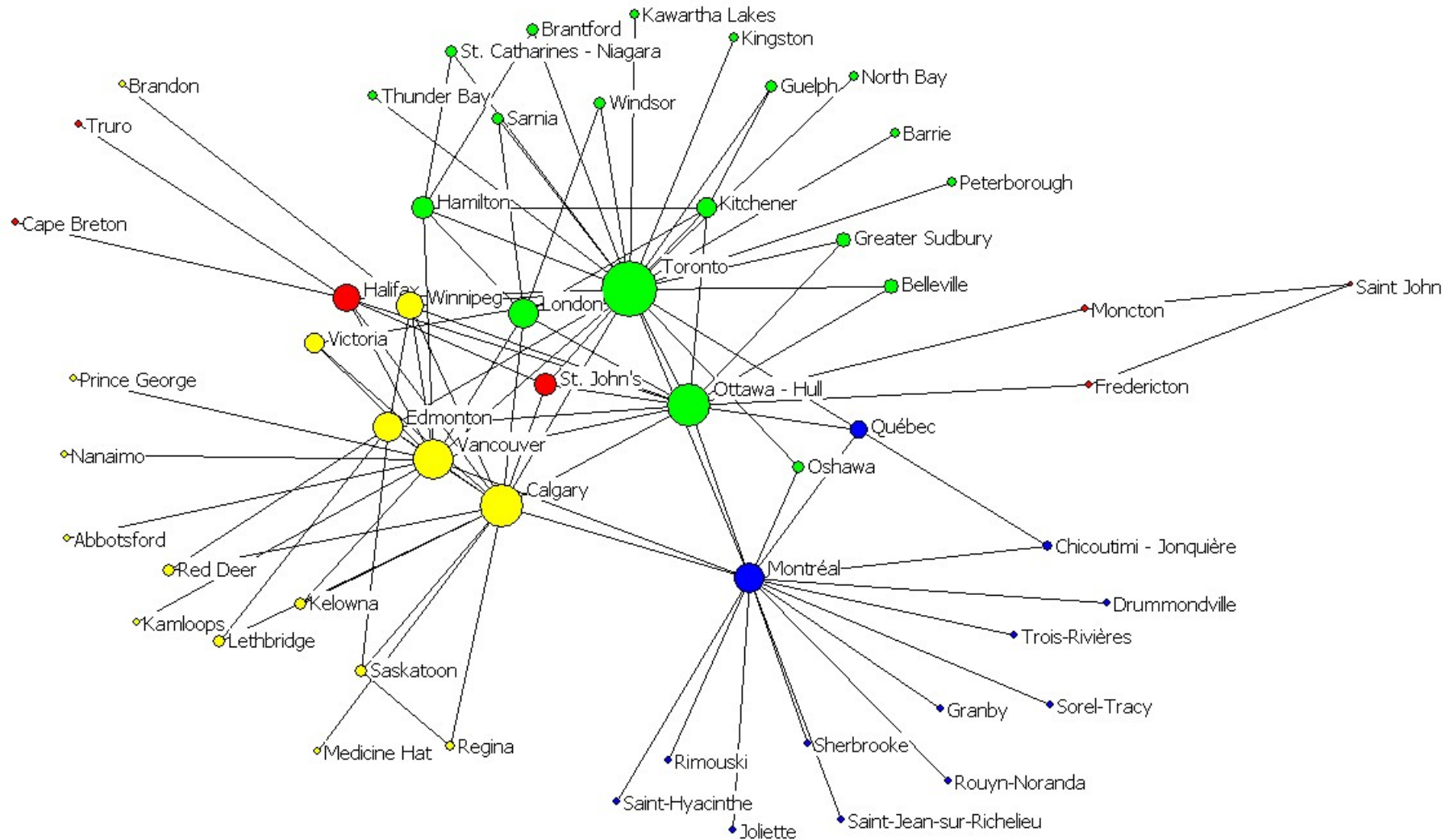
flows of talent: net domestic migration in toronto



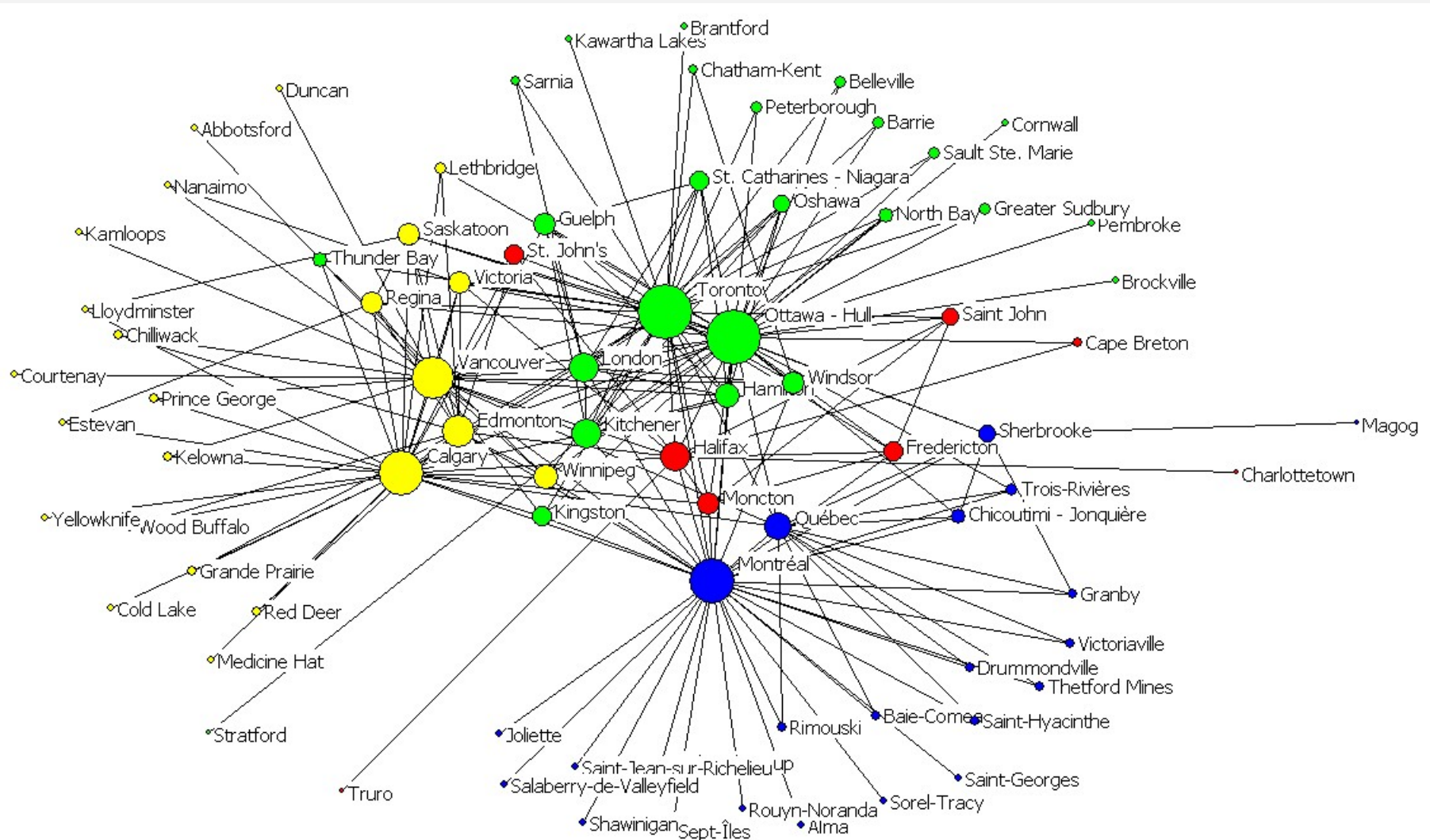
flows of talent: all occupations



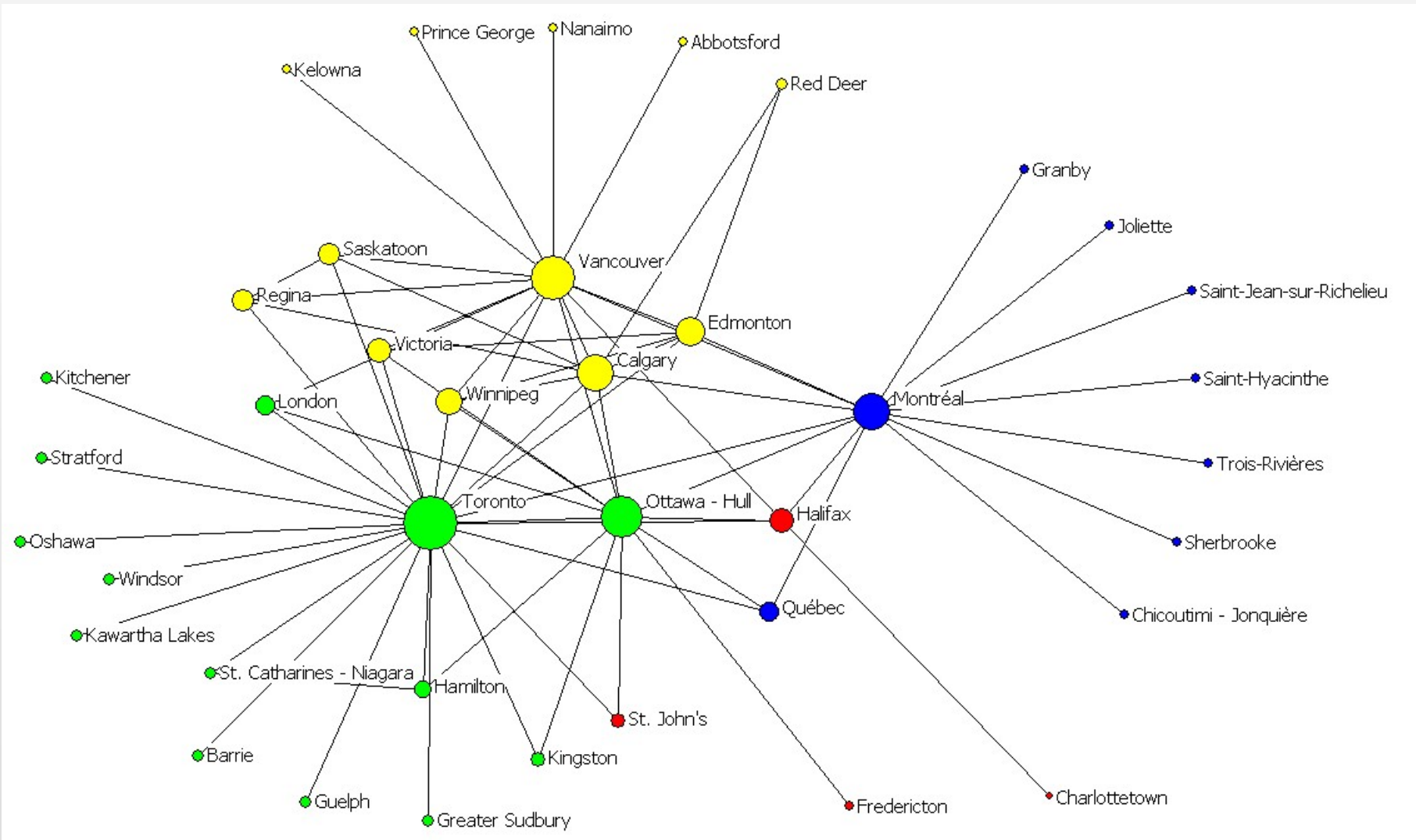
flows of talent: business and finance professionals



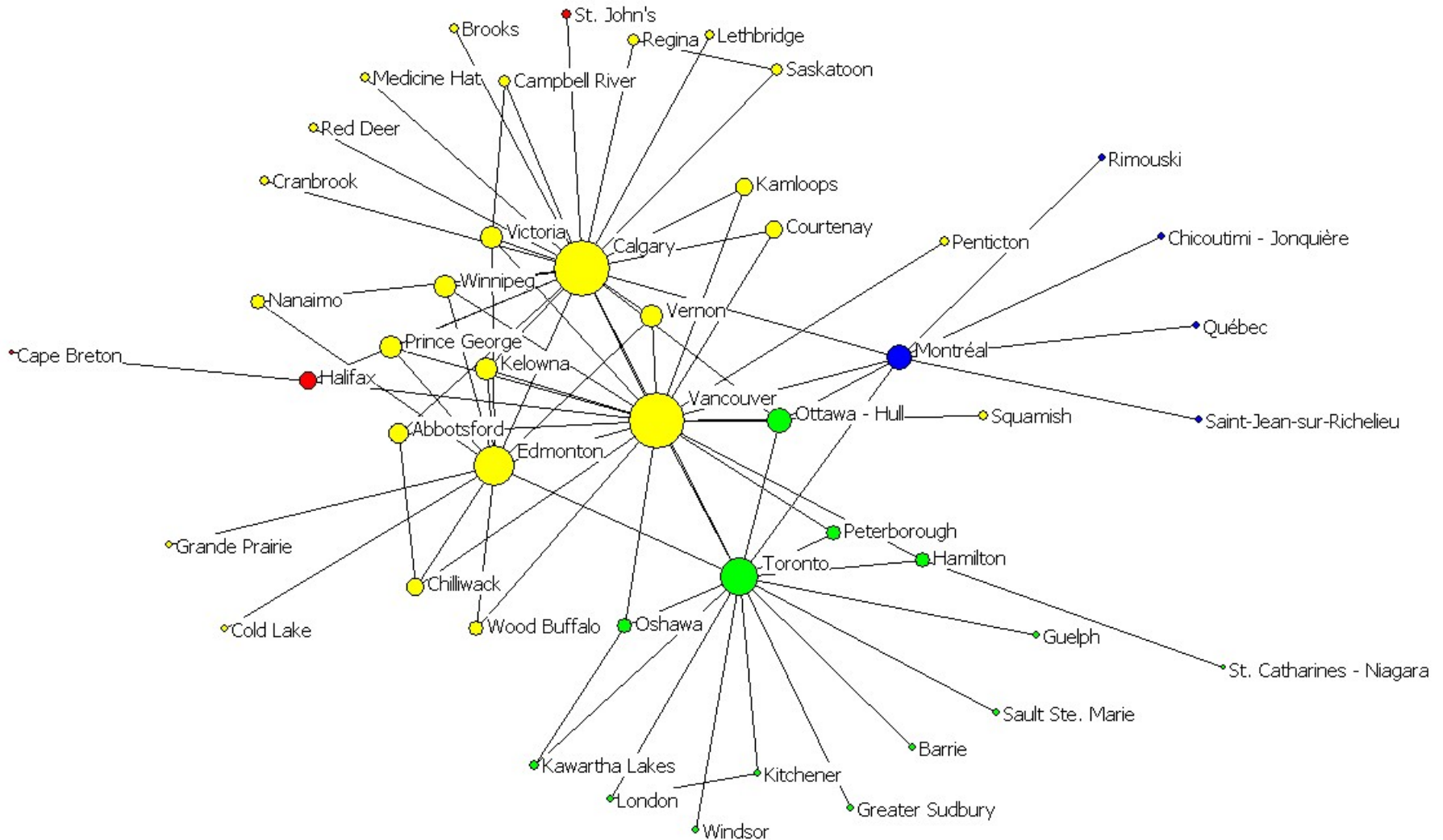
flows of talent: natural and applied science professionals



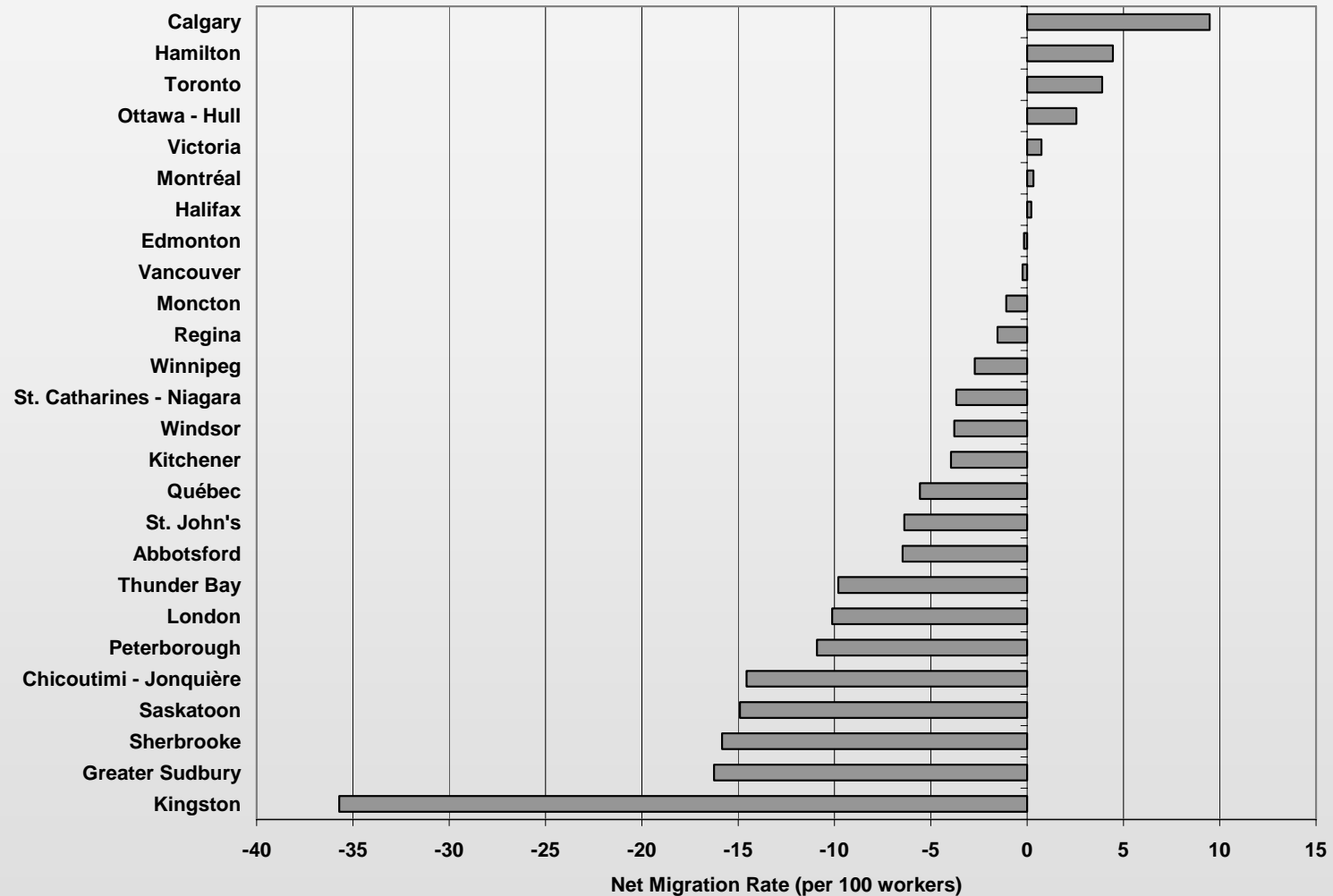
flows of talent: arts and culture professionals



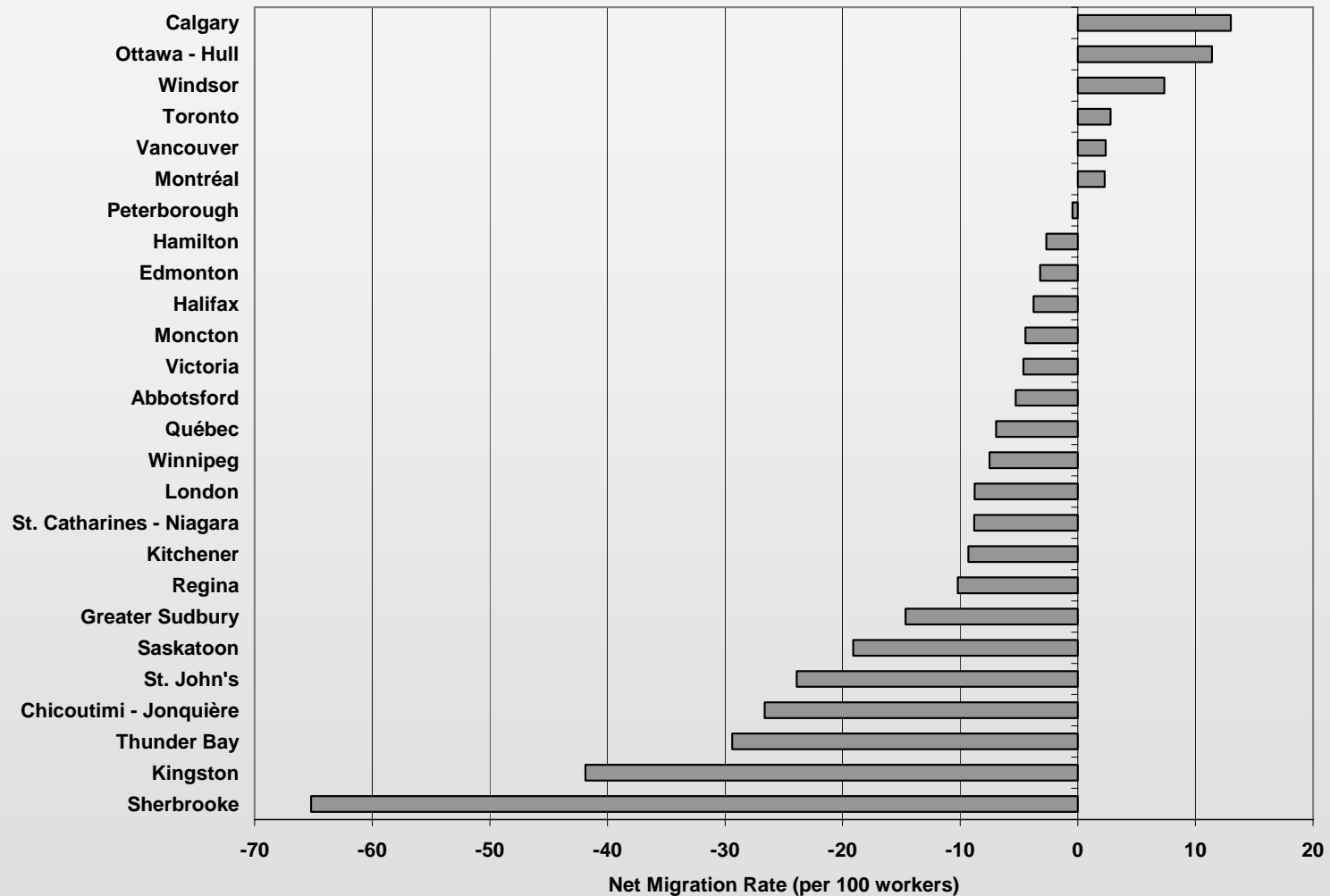
flows of talent: construction trades



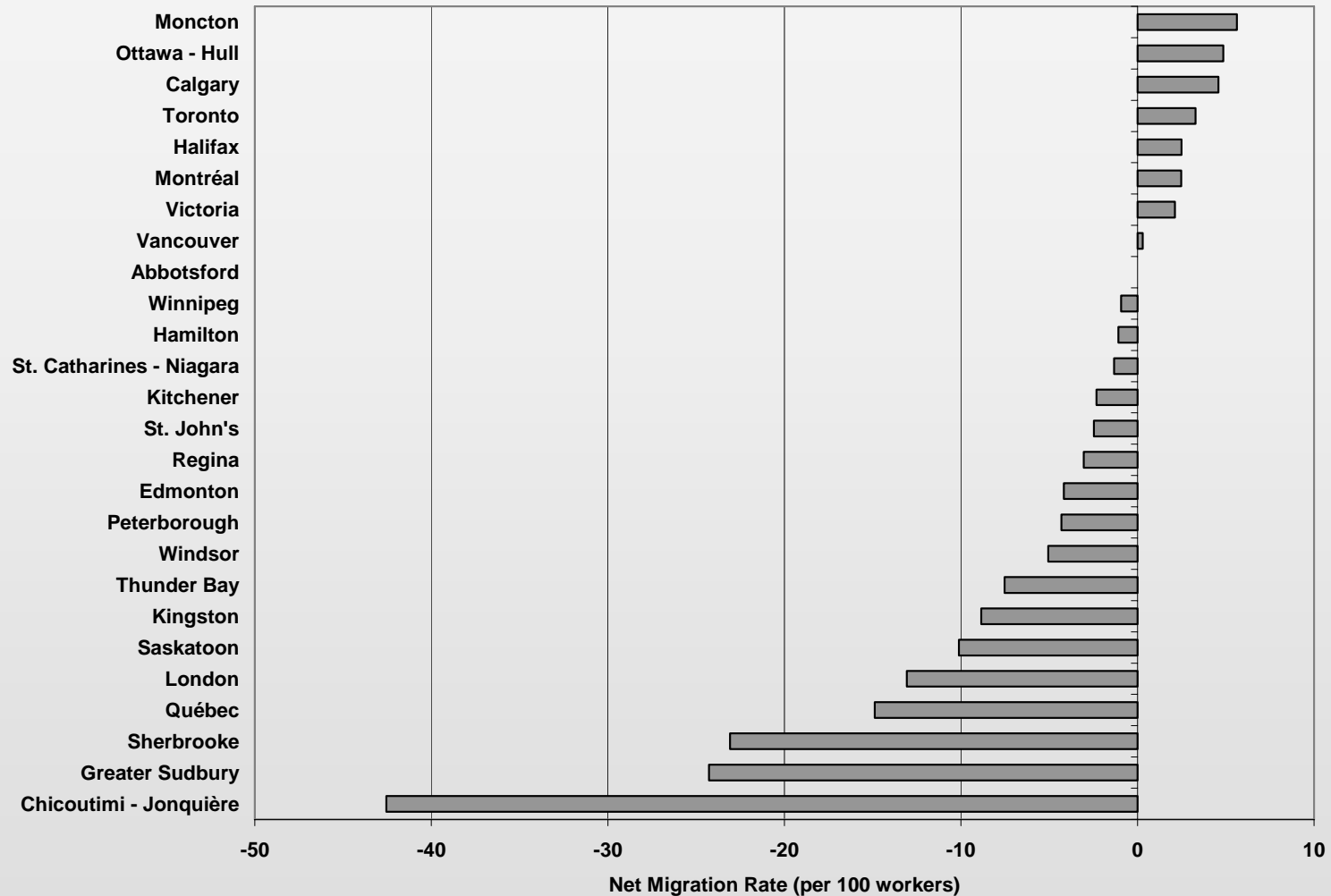
net domestic flows: business and finance professionals



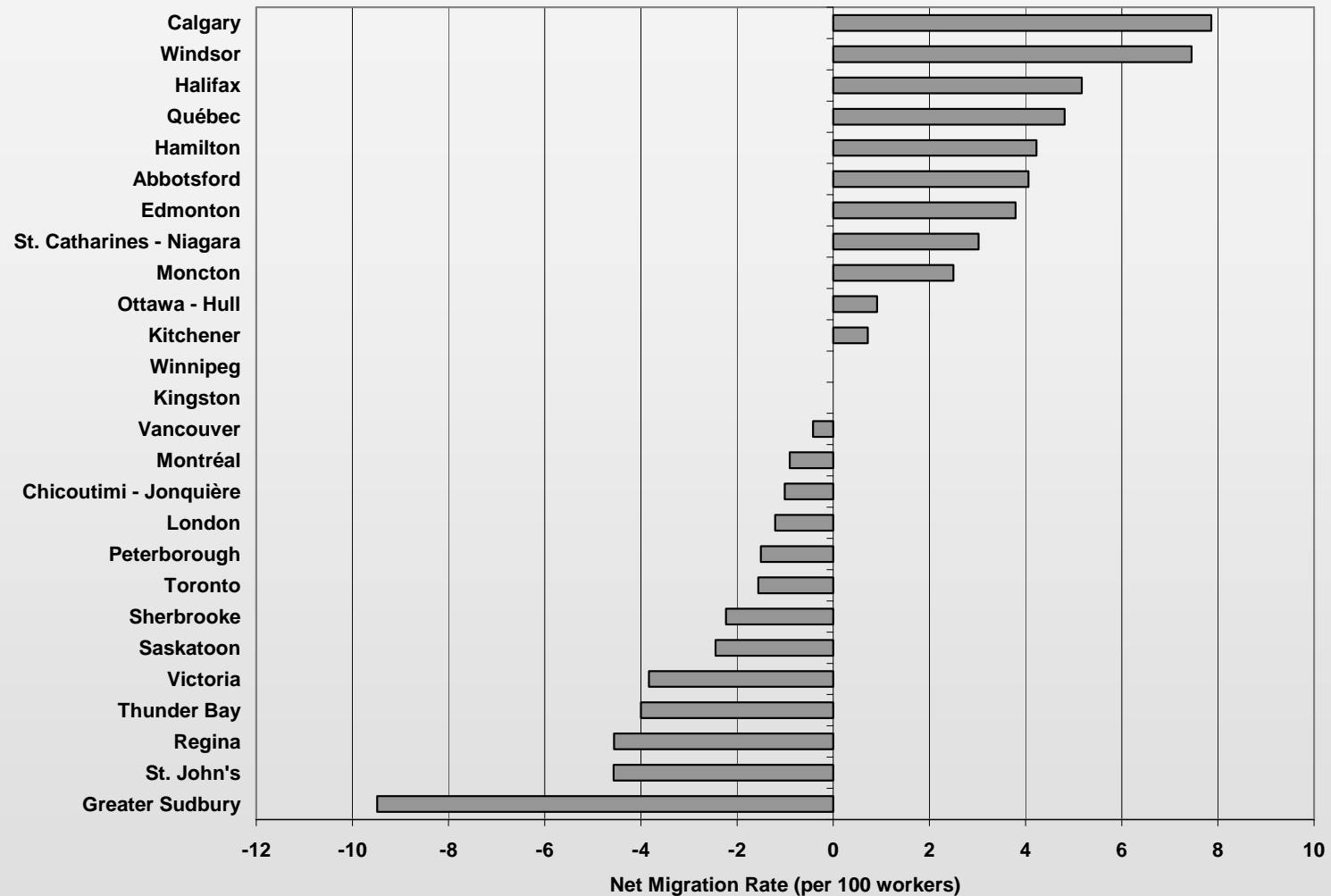
net domestic flows: natural and applied science professionals



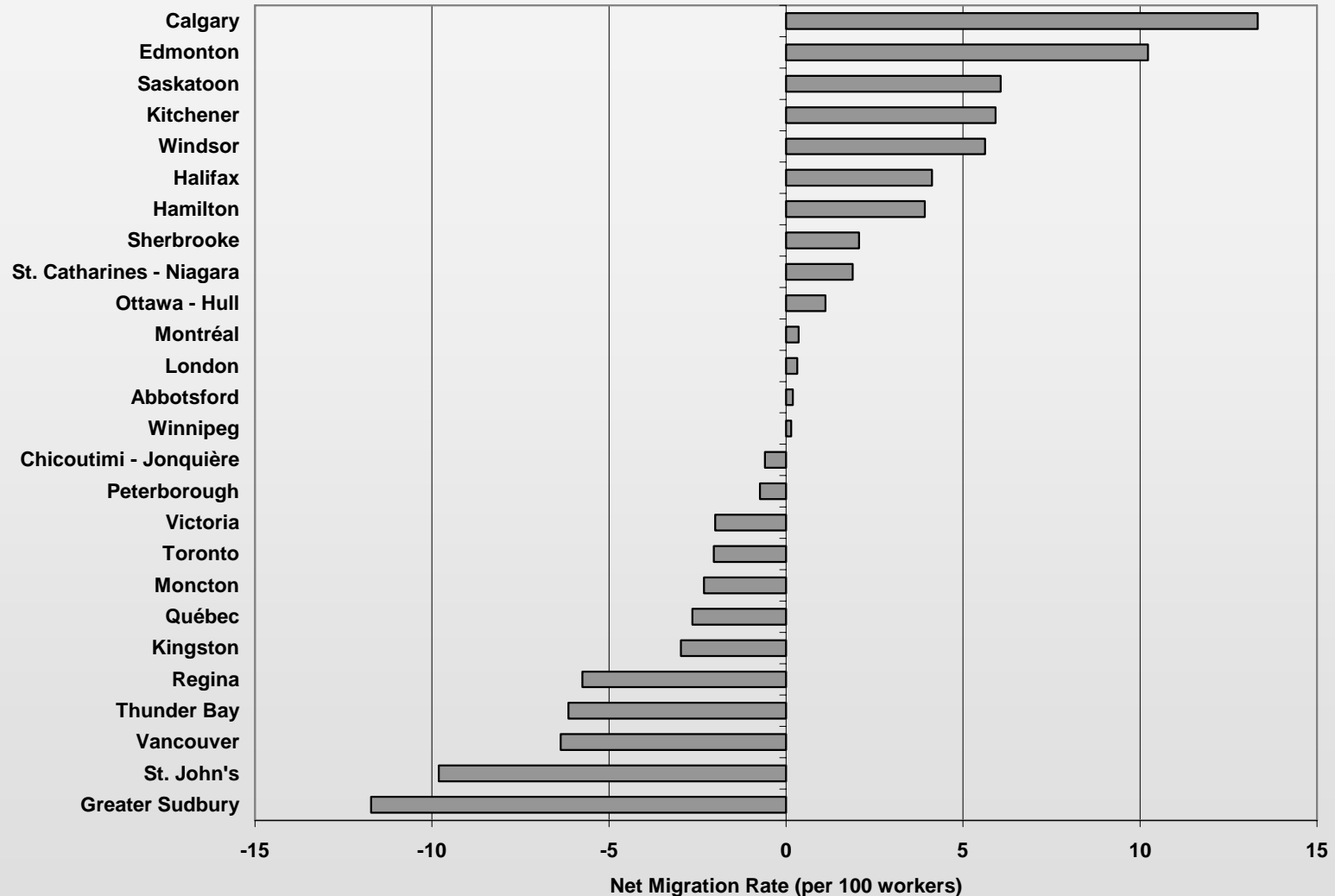
net domestic flows: arts and culture professionals



net domestic flows: chefs and cooks



net domestic flows: construction trades



net domestic flows: quality of place characteristics

	Business & Finance Professionals	Natural & Applied Science Professionals	Arts & Culture Professionals	Chefs and Cooks	Construction Trades	Manufacturing Assemblers
Unemployment Rate	✓	✓		✓	✓	✓
Income Affordability			✓	✓	✓	
University						✓
Patents per 1000					✓	✓
PhDs per 1000	✓	✓				✓
% Post Secondary +				✓	✓	
% Bachelors +	✓	✓			✓	
% Foreign Born		✓				
% Bohemians			✓			
% Same Sex Couples			✓			
Critical Mass						
Industrial Diversity					✓	
Occupational Diversity		✓			✓	
Cultural Diversity						

next steps: **multivariate analysis and metrics**

- different measures / specification of the dependent variable
 - net flows, in-flows, out-flows
 - explore the differences between global talent flows (international in-migration) and local talent flows (domestic in-migration)
- incorporation of additional data to support ONRIS / ISRN research
 - develop additional metrics based on data currently available
 - social diversity, cohesion, and inclusion
 - how else to define / measure quality of place?
 - develop additional metrics based on new data sources
 - investments in the regional innovation system
 - private R&D, university enrolments, additional patent data
 - investments / characteristics of the local arts & cultural scene
 - include recent data from the 2006 Census of Population
 - available in March 2008

preliminary findings and open questions

- different dimensions of quality of place matter to the mobility patterns of different occupations
 - are there differences by knowledge types?
- policy emphasis on talent attraction or retention?
 - dependent on size? scale?
- what is a 'good' pattern of migration?
 - local vs. national considerations
 - competitiveness vs. inclusion / equality

thank you

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