GUIDE TO USING LABOUR MARKET INFORMATION IN ONTARIO

Ontario

Ministry of Training, Colleges and Universities

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EXECUTIVE SUMMARY

Labour market information (LMI) is information concerning the conditions in, and the operations of, the market for labour. The labour market – like other markets – can be described in terms of supply and demand components. The supply side primarily refers to the number of potential workers and their characteristics whereas the demand side refers to employers' staffing requirements. In the labour market, labour services are exchanged and it is the interaction of the workers and firms that determines, in part, the price of labour, the number of workers employed, and the working conditions attached to employment such as the work schedule and specific duties.

This Guide is designed to make the important world of LMI more understandable and accessible. In particular, it:

- Describes how labour markets work;
- Presents key labour market definitions and calculations;
- Provides a brief background on interpreting labour market statistics;
- Discusses some key LMI data sources; and
- Highlights the major classification systems used in Canada for organizing employment data by occupation and industry.

This Guide should be particularly useful to: job seekers, students, guidance counsellors, corporate trainers, human resource professionals, community agencies, and Local Boards of Ontario.

1. INTRODUCTION

LMI can be broadly defined as the information needed by individuals and organizations to make informed decisions about the labour market.[1] In narrower terms, LMI is synonymous with data about the supply of and demand for labour within a certain labour market.[2]

LMI may be thought of as the "grease" that allows the "wheels" of the labour market to operate efficiently and effectively. That is, in order for individuals to respond to market signals such as wage changes and job opportunities in a timely fashion, a certain threshold of knowledge is required. The creation and dissemination of accurate LMI performs the critical task of creating informed labour market participants.

LMI addresses questions such as:

- What are the highest paying occupations?
- What geographic regions have the brightest employment prospects?
- How are different segments of the population faring in the labour market?
- What jobs are employers having difficulty filling?
- What types of training and education do employers require of prospective employees?
- At what age does the typical worker retire?
- What occupations are projected to grow the fastest?

LMI can shed light on these and many other important questions related to the operation and the performance of the labour market. It can come in different forms depending on the needs of users:

- For individuals making career choices, the most relevant LMI is about available occupational options, training and educational opportunities, the current labour market environment, and future trends.
- For job seekers, LMI may be about job opportunities, skill level requirements, working conditions, prevailing wage rates, and effective job search strategies.

[1] Forum of Labour Market Ministers (2003), "Career and Labour Market Information: Service Delivery Guidelines."
[2] Roy (2000), "What is Labour Market Information?"

- For employers, LMI can guide compensation strategies, recruitment efforts, training practices, investment and location decisions, and collective bargaining.

- For educators, LMI can be useful when forecasting student demand, developing curricula, and planning course offerings.

While LMI normally takes the form of quantitative or numerical data, qualitative information can also shed light on labour market outcomes and trends. For example, whereas a survey of the working age population can be used to estimate the number of people that are unemployed, unstructured interviews or case studies may better capture the real life experiences of unemployed individuals.[3]

Whether a study makes use of quantitative or qualitative data depends, in part, on the particular research question at hand. The research approach adopted may also reflect the most common practices and techniques of the researcher's academic discipline. For example, economists tend to conduct quantitative research whereas sociologists may place relatively more emphasis on qualitative research. Similarly, community agencies and associations may collect information through focus groups or employer surveys.

[3] De Vaus (2002), Surveys in Social Research.

2. HOW THE LABOUR MARKET WORKS

Buyers and Sellers of Labour Interact in Labour Markets

A market exists whenever there is a good or service for which there are both buyers (demanders) and sellers (suppliers).[4] In the labour market, labour services are exchanged and those negotiations occurring between buyers and sellers partly determine the placement of workers in jobs with specified wages, benefits, and conditions of employment.

The demand for labour comes from employers and is derived from their need to employ workers to produce goods and services. Firms choose their staffing levels according to a number of factors, including: the cost of labour; the productivity of the workforce; the current and anticipated level of production; and the price that the firm can command for its output.[5] Job opportunities arise when firms expand their operations and when firms replace employees who are leaving their jobs, such as retirees.

In the most basic terms, the supply of labour refers to the number of people currently working or actively seeking employment. The size of the labour supply is determined by the number of individuals of working age[6] (the working-age population) as well as the proportion of the working-age population that wishes to work.[7] Other aspects of labour supply include the hours that staff work, the effort put forth by employees, and the skills possessed by the workforce. Thus, labour supply is determined by numerous factors including: the age distribution of the population; retirement behaviour; migration patterns; education and training decisions; fertility rates; the state of the economy; and individuals' decisions concerning the allocation of time between work activities and leisure.

Uniqueness of Labour Markets

While the labour market is often described in terms of demand and supply components, there are many unique features of the labour market that constrain or limit the applicability of this theoretical framework. For example, basic economic supply and demand theory predicts that if the amount of something supplied exceeds the amount of something demanded, then its price should fall. Furthermore, its price is predicted to fall until the surplus (i.e., excess supply) is eliminated.

In a market for a commodity such as wheat, it seems reasonable that an excess supply results in a drop in its price as sellers underbid each other in order to

[4] Kaufman and Hotchkiss (2003), The Economics of Labor Markets (6th edition)
[5] Ibid.
[6] In Canada, this is defined as 15 years of age and older.
[7] This is technically referred to as the as the labour force participation rate. See the Labour Market Definitions section for further details.

attract buyers. Buyers, in turn, would probably choose to deal with the lowest-priced seller as long as there are no meaningful quality differences across sellers. In the labour market, however, excess supply does not typically result in price reduction (i.e., drop in the wage rate).[8] Similarly, excess demand does not necessarily lead to a rise in price. Some of the major reasons for these deviations from straightforward supply and demand economics are outlined below.

Institutional Forces

Institutional forces are the effects that organizations such as corporations, governments, and unions have on the labour market. These forces can be codified as formal rules (e.g., legislation) or exist as informal practices (e.g., behaviours). Irrespective of the particular form, institutional forces can have important impacts on labour market outcomes.

Labour market legislation is an obvious impediment to the unfettered operation of supply and demand forces. Below is a partial list, and description, of labour market legislation governing the Ontario labour market.

- The *Employment Standards Act* prevents wages from falling below a specified minimum wage rate. The Act also determines the maximum length of the work week and the conditions under which an employee is entitled to an overtime pay premium.

- The *Occupational Health and Safety Act* protects workers against health and safety hazards on the job by outlining the rights and duties of all parties in the workplace.

- The *Labour Relations Act* governs both the process by which a trade union acquires bargaining rights and the procedures by which trade unions and employers engage in collective bargaining.

- The *Ontario Human Rights Code* protects workers against discriminatory practices in the workplace and harassment in the workplace.

- The *Pay Equity Act* requires that “female” jobs be paid the same as “male” jobs of comparable value.

Institutions introduce rules and regulations that impact the workings of the labour market. For example, hiring practices within the firm may determine who can compete for particular jobs. As a result, an important distinction may exist between the internal labour market (i.e., workers within the firm) and the external labour market (i.e., workers outside of the firm). Workers inside internal labour

[8] Kaufman and Hotchkiss (2003), The Economics of Labor Markets (6th edition)

markets are, to a certain extent, buffered from the supply and demand pressures of the external labour market.

Long-Term Nature of the Employment Contract

Another significant feature of the labour market is the relatively long-term nature of the employment relationship.[9] That is, other economic transactions are of a short-term nature in comparison to the relationship that develops between a worker and a firm. One important implication of the long-term relationship between workers and firms is that wages and employment levels are less-responsive to supply and demand forces than they otherwise would be. For example, firms may choose to retain workers during an economic downturn in order to avoid the costs or re-hiring or training when the economy picks up.[10] Similarly, firms may choose not to reduce their workers' wages during a period of relatively high unemployment due to concerns that wage reductions may have long-term negative impacts on the morale, productivity, and turnover of their staff.[11]

Unique Workers and Unique Jobs

Another distinguishing feature of the labour market is the diversity in the characteristics of the service being traded. Workers differ along numerous dimensions, including skills, abilities, work experience, educational background, work attitudes and motivations. Similarly, employers and the jobs they offer differ according to such attributes as the nature and complexity of work, fringe benefits, working environment, promotional opportunities, and quality of employment relations. Clearly, it is challenging to describe something as a "market" when, to some extent, each worker and job is unique.

The uniqueness of workers and jobs has two main implications. First, labour market exchanges are dependent on numerous factors in addition to price. For example, workers may rationally "trade-off" a high wage for job security or for a pleasant working environment.[12] Second, it is important for both labour demanders and suppliers to acquire an adequate amount of information about the other party before transacting in the labour market.

Multiplicity of Markets

So far, the term "labour market" has been used as if there were only one such market. In reality, however, "the" labour market is comprised of numerous

[9] According to a Statistics Canada study by Picot, Heisz, and Nakamura (2001) the average expected tenure of a complete job in 1999 was 53 months.
[10] Benjamin, Gunderson, and Riddell (2002), Labour Market Economics: Theory, Evidence, and Policy in Canada, 5th edition.
[11] Bewley (1999), Why Don't Wages Fall in Recessions?
[12] In economics, this idea is known as the theory of compensating wage differentials and was first articulated by Adam Smith in The Wealth of Nations.

individual sub-markets. The two most important ways in which the labour market can be subdivided are according to geographic location and occupation.

If firms and workers are searching for each other throughout Canada, the market is described as the *national* labour market. The search for highly skilled technical and professional occupations is often carried out on a national basis. The research director of a major pharmaceutical firm and the chief executive officer of a major charitable association are likely examples of positions in the *national* labour market. For some occupations, such as professional athlete or university professor, the labour market may even be *international* in scope. On the other hand, if the area of search is within the local community, the market is described as the *local* labour market. Real estate agents and taxi drivers are examples of occupations where job search and recruitment typically occur within a local labour market.

When analyzing wage and employment opportunities, another important dimension is the occupation under examination.[13] For example, supply and demand conditions likely differ across the following occupations: teaching, truck driving, and computer programming. Mobility between occupations is limited by some fairly obvious factors. First, occupational licenses limit one's ability to work in a given occupation (e.g., teachers need B. Ed. degrees to teach at public schools in Ontario). And second, different skill sets and work experience are required for satisfactory job performance across occupations. While the flexibility of workers to change employers is often highlighted in recent publications, workers still tend to have significant loyalty to their chosen occupations. In fact, some argue that "while workers were much more likely to change employers in the 1980s and 1990s, they were more likely to keep their occupation." [14]

The boundaries between individual labour markets are, at times, fairly porous. This means that workers may flow from one labour market to another. Continuing with the examples from above, it could be that a truck driver returns to school in order to become a teacher and thus forms part of the labour supply in the teaching profession. Or, a real estate agent abandons a local labour market search and instead moves across the country in order to secure employment. The amount of mobility existing across labour markets depends upon such factors as: the degree of similarities between occupations (in terms of job requirements and requisite skills); the costs of job search; the geographic disparities between regions; and demographic characteristics that may affect one's decision to move a significant distance (e.g., the presence of children, a working spouse, etc.).

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[13] An occupation refers to the kind of paid work performed. The kind of work is described in terms of tasks, duties and responsibilities, often including factors such as materials processed or used, the industrial processes used, the equipment used, and the products or services provided. See. http://www.statcan.ca/english/concepts/definitions/work.htm

[14] Cappelli (1999), The New Deal at Work

3. LABOUR MARKET DEFINITIONS

Selected Definitions

While much of the terminology used to describe the labour market activities of individuals may seem familiar, official documents tend to use fairly precise definitions.

In Canada, the two most important surveys that collect data on the worker side of the labour market are the Labour Force Survey (LFS) and the Census of Canada. [15] One basic function of these surveys is to categorize the "eligible" population (see working-age population below) into one of three distinct labour market states: employed, unemployed, and not in the labour force.

- The ***Working-age Population*** (POP) refers to people 15 years of age and over who are potentially surveyed by Statistics Canada (in the LFS or Census) regarding their labour market activities.[16]

- The ***Labour Force*** (LF*)* is the number of people 15 years of age and over who, during the survey reference week, were either employed or unemployed.[17]

- ***Employment*** (E) refers, for the most part, to the number of people who, during the survey reference week, worked for pay or profit.[18]

    - Workers are labelled as ***Full-time*** when they usually work 30 hours or more per week at their main (or only) job. Otherwise, they are deemed to be ***Part-time*** workers.

    - There are two broad categories of workers - those who work for themselves (***Self-employed***) and those who work for others (***Employees***).[19] This distinction is important for income and payroll tax purposes.

[15] The most recent "Guide to the Labour Force" can be accessed at www.statcan.ca.
[16] The definition does not include people residing in Yukon, Northwest Territories and Nunavut, as well as residents of Indian reserves, full-time members of the Canadian armed forces or inmates of institutions.
[17] Technically, "people" refers to the Working-Age Population. See note 16.
[18] Employed individuals also include those who performed unpaid family work, or had a job but were not at work due to own illness or disability, personal or family responsibilities, labour dispute, or vacation.
[19] A series of common law tests have evolved from decisions in the Canadian courts that are used to determine whether you are an employee or an independent contractor. These are: control over how and when work is performed; the degree of integration within the organization; financial risk borne by individual; and whether hired on a project or temporal basis.

- ***Unemployment*** (U) refers**,** for the most part, to people who were without employment but were actively seeking employment.[20]

- Those categorized as ***Not in the Labour Force*** (NILF), are those in the working age population who are neither employed nor unemployed. Retired individuals and "stay-at-home" moms and dads may be examples of those not in the labour force.

According to a report by the United Kingdom's National Skills Task Force "there is a substantial lack of clarity in the language that is widely used to discuss skills issues." [21] This conclusion holds true regarding Canadian research and analysis of the labour market demand side.

In particular, many of the terms used to describe imbalances on the demand side (e.g., "labour shortage", "skills shortage", "skilled labour shortage", "vacancy", and "skills gap") are, at times, used synonymously, whereas on many occasions, they are meant to convey distinct concepts. Specifically, in some studies the term "skills shortage" is used as an overarching phrase to reflect all forms of hiring difficulties. That is, it may refer to the quantitative aspect of the imbalance (i.e., number of vacancies) or it could refer to qualitative aspects (i.e., workers lacking a desired skill set) or it could refer to shortages of specific types of workers (e.g., skilled trades workers).

As the National Skills Task Force notes, "it is vital to have a clear framework for thinking about what is an immensely complex topic, together with a shared vocabulary for talking about skills issues." Accordingly, utilizing the terms ***job vacancy*** and ***skill gaps*** may avoid some of the confusion noted above.

- A ***Job Vacancy*** is a job which**:** is vacant for a given reference period, employers have undertaken some specific recruiting action, is available immediately, and is available to workers outside the location.[22] If a position remains unfilled for a lengthy period (e.g., four months or longer) it may be described as a "hard-to-fill" or "long-term" vacancy.

- ***Skill Gaps*** refer to situations where existing or potential employees do not have the required skills and experience to meet the firm's skill needs.[23]

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[20] Determining unemployment status is quite complicated. For example, someone is unemployed if he or she was without work during the reference week but did not search for work for the preceding four weeks because he or she was on a temporary layoff or had a new job scheduled to commence in four weeks or less. Full-time students are considered unemployed if they are without work and looking for part-time employment but are considered not in the labour force when their job search pertains to full-time employment.

[21] National Skills Task Force (1998), "Towards a National Skills Agenda".

[22] Morissette and Zhang (2001), "Which Firms Have High Job Vacancy Rates in Canada?",

[23] Human Resources Development Canada (2001) "Labour Market/Skill Shortages in Canada: An Overview."

According to the above two definitions, a “job vacancy” is the quantitative term referring to the difference between the quantity of labour supplied and the quantity of labour demanded at a given wage rate. On the other hand, a “skills gap” is a qualitative term and may, or may not, result in a vacancy depending on a firm’s hiring practices. In some instances, an employer may respond to a skills gap through re-training workers. In other instances, this may not be possible nor practical.

Calculations

The following calculations indicate the relationships between the three distinct labour market states:

POP = LF + NILF

LF = E + U

The following three calculations are commonly reported labour market statistics.

*The **Labour Force Participation Rate*** (LFPR) (also referred to as “the participation rate”) is the total labour force expressed as a percentage of the population 15 years of age and over.

$$\text{LFPR} = \frac{\text{LF}}{\text{POP}} \times 100$$

*The **Unemployment Rate*** (UR) is the total number of unemployed expressed as a percentage of the labour force.[24]

$$\text{UR} = \frac{\text{U}}{\text{LF}} \times 100$$

*The **Employment Rate*** (ER) (also referred to as “the employment to population ratio”) is the total number of employed expressed as a percentage of the working age population.

$$\text{ER} = \frac{\text{E}}{\text{POP}} \times 100$$

[24] The unemployment rate is often, somewhat imprecisely, referred to as the “jobless rate.”

While the above calculations refer to the worker or supply side of the labour market, the ***Job Vacancy Rate*** (JVR) is a similar concept on the employer or demand side. The JVR is the number of vacant positions expressed as a percentage of total positions (both filled and unfilled).

$$JVR = \frac{V}{E + V} \times 100$$

For example, according to the Canadian Federation of Independent Business (CFIB), in the first quarter of 2002, 4.5 per cent of the total jobs of their member firms (small and medium-sized enterprises) were vacant.[25]

[25] Mallet (2002), "Help Wanted: Update" (Available at www.cfib.ca)

4. TYPES AND AVAILABILITY OF LABOUR MARKET INFORMATION

The majority of primary labour market data in Canada is generated by Statistics Canada through a variety of surveys. Table 1 presents some of their major labour market surveys.

TABLE 1. Selected Statistics Canada Labour Market Surveys[26]

Survey	Sample Description	Survey Content
Adult Education and Training Survey (AETS)	Survey of individuals periodically conducted since 1990.	The AETS includes detailed information about training including incidence, type, duration as well as economic and demographic data.
Census of Canada	The first Census was taken in 1871 and included questions dealing with the personal characteristics of the population, industry and characteristics of the country. The Census was originally conducted every 10 years, but since 1971 has been conducted every five years.	The Census contains a broad range of economic, social, and demographic information about individuals and families.
Labour Force Survey (LFS)	The LFS was initiated in 1945 and is the main source of official economic indicators such as the unemployment rate or the labour force participation rate. It is a monthly survey of about 53,000 households which contain roughly 100,000 individuals.	The LFS contains detailed information on demographic characteristics (e.g., age, sex, educational attainment), job characteristics (e.g., union status, firm size, permanency) and wages and hours of work for those 15 years of age and older.
Longitudinal Survey of Immigrants to Canada (LSIC)	About 12,000 immigrants aged 15 and older who arrived in Canada from abroad between October 2000 and September 2001 were interviewed three times as a part of this survey: six months, two years, and four years after their arrival.	The LSIC was designed to study the process by which new immigrants adapt to Canadian society. Topics covered in the survey include language proficiency, housing, education, foreign credential recognition, employment, health, income, and perceptions of settlement in Canada.
Survey of Labour and Income Dynamics (SLID)	Annual longitudinal survey with a sample of about 15,000 households or 30,000 people designed as a panel that follows individuals for a six year period.	The SLID examines labour market transitions and changes in people's economic status. It includes data on labour market activities, work experience, job characteristics, personal characteristics, income and employer characteristics.

[26] Components of Table 1 have been adapted from Appendix 1B in Ehrenberg, Smith, and Chaykowski (2004), Modern Labour Economics: Theory and Policy (Canadian Edition).

Survey	Sample Description	Survey Content
Workplace and Employee Survey (WES)	Annual longitudinal survey conducted since 1999 consisting of an employer and an employee component. Employee and employer components can be linked as well as a panel over three years.	Employee survey contains workplace information (e.g., job characteristics, training and development) and employee information such as demographics and work history. Employer survey contains information on compensation, training, vacancies, strategy, technology usage, and work organization.
Youth in Transitions Survey (YITS)	The YITS contains longitudinal surveys of each of two cohorts, ages 15 and 18-20, to be surveyed every two years. The initial sample size of the survey of the 15 year old cohort conducted in 2000 was 38,000 and of the 18-20 year old cohort was 29,000.	The YITS examines the patterns of, and influences on, major transitions in young people's lives, particularly with respect to education, training and work. Content includes formal educational experiences, achievement, aspirations, expectations, and employment experiences.

Table 2 lists some surveys that are conducted on a regular basis by some institutions, employer associations, and private firms.

TABLE 2. Selected Non-Statistics Canada Labour Market Surveys

Survey	Sample Description	Survey Content
Bank of Canada Business Outlook Survey (BOS)	Quarterly interviews are conducted by the Bank of Canada's regional offices with senior management of about 100 firms, selected in accordance with the composition of Canada's gross domestic product.	The BOS gathers views of business on issues including: future sales growth, investment plans, forecast employment levels, ability to meet demand, labour shortages, and inflation expectations.
Canadian Federation of Independent Business (CFIB)	CFIB regularly surveys their members (more than 100,000 small and medium-sized businesses). A typical CFIB survey contains over 20,000 responses.	Businesses are surveyed on a wide variety of topics including: tax policies, major concerns (e.g., labour shortages), government budgets, and legislation.
Conference Board of Canada Learning and Development Outlook Survey (LDO)	The LDO has been conducted eight times on a bi-annual basis. Most recently, the LDO was conducted between June and August 2004 when a total of 206 organizations responded to the questionnaire which was sent to 2,343 Canadian organizations.	The LDO contains information on workplace training, including: content, delivery methods, measurement, expenditures, anticipated changes in expenditures, and connection to organizational goals/performance.
Manpower Employment Outlook Survey (MEOS)	The Canadian version of the MEOS is based on interviews with more than 1,700 public and private employers in 43 cities/regions across Canada. It is conducted quarterly.	The MEOS measures employers' intentions to increase or decrease the number of employees in their workforce during the next quarter.

5. INTERPRETING LABOUR MARKET DATA

Seasonally Adjusted Versus Unadjusted Data

When monthly labour market data are reported in the media, the data have typically been *seasonally adjusted*. If, for example, economists are commenting on the most recent unemployment rate or the latest monthly change in employment, they are undoubtedly looking at seasonally adjusted data.

In general, seasonally adjusted data have been modified to account for predictable (i.e., seasonal) changes that occur throughout the year. For example, due to weather patterns in Canada, more people are employed in agriculture in the summer months than during the winter months. Similarly, due to the Christmas shopping season, more people are likely to be employed in the retail sector in December than in March. Seasonally adjusted data remove the predictable, average trends in the data so that when two monthly data points are compared across time, the value has changed for some reason *other* than seasonal factors. For example, if the seasonally adjusted unemployment rate declines, one may reasonably infer that the economy is stronger.

From Surveys to Populations

Surveys of samples (i.e., a subset of the population) are generally conducted with the aim of making statements or generalizations about the population. For example, the Labour Force Survey is a survey of roughly 60,000 households in Canada. On the basis of the responses of these 60,000 households, statements about the broader population are made. For example, in June 2005, the Canadian unemployment rate was 6.7 per cent. An important question, therefore, is "How well can one extrapolate the results from the sample to the target population?" In other words: "How *accurate* are the sample statistics?"

Accuracy

As long as the survey participants (i.e., those comprising the sample) are selected in a random manner,[27] probability theory enables us to say how likely it is that the patterns observed in the sample reflect those of the population.[28] The accuracy, or closeness of sample values to population values, is determined by two factors. First, the size of the sample relative to the size of the population. If, for example, only a handful of full-time Canadian workers were surveyed, then one would be hard-pressed to make meaningful statements about Canadian workers in general. And second, the greater the degree of dispersion in the

[27] In a random sample, each individual in the larger group or population has an equal chance of being selected for the survey.

[28] If the sample is not drawn in a random manner, statistical adjustments called weighting can be used to allow generalization about the population.

values of the underlying population (i.e., are the biggest and smallest values far apart?), the estimate derived from the sample is less accurate.[29]

Luckily, users of labour market data do not have to worry too much about these statistical issues. Instead, it is the task of statisticians to determine whether a sample statistic is a sufficiently accurate estimate of the underlying population value. If not, data from a survey may be *suppressed* (i.e., not released).[30]

Confidence

When public opinion poll results are reported, information concerning the degree of accuracy of the estimates accompanies the results. For example, in a recent study of "Canadian Values" by the research and polling firm EKOS, there were 1,217 interviews of Canadians aged 18 and over that were completed. The results of the sample were stated to represent true national opinion "within +/- 2.8 percentage points, 19 times out of 20."[31] As an illustration of these concepts, 58 per cent of the survey respondents thought that over the last 10 years, Canada was becoming "more like the United States." Applying the sampling error (i.e., the +/- 2.8 percentage point range) allows one to conclude that there was a 95 per cent chance that *if* all Canadians aged 18 and over were *actually* surveyed, between 55.2 to 60.8 per cent *would have* answered that Canada was becoming more like the United States (i.e., in the same manner that the sample did).[32]

[29] In the extreme case, if there was zero variation in the population values, a sample of size one would yield a perfectly accurate estimate.
[30] Results from a survey may also be suppressed when there is concern that, due to small sample size, an individual respondent may be identified.
[31] See http://www.ekos.ca/admin/articles/TS_July_1st.pdf
[32] For more information about sample size requirements, see De Vaus (2002), Surveys in Social Research (5th edition)

APPENDIX A: DESCRIBING DATA

Quantitative variables can be described in a few different ways. The most important dimensions are: central tendency, distribution, and dispersion.

Central Tendency

As an example, consider a hypothetical value for a very important labour market indicator – earnings. Suppose that in Canada the average annual salary (of full-time employees) in a recent year was $35,000. In statistical terminology, this is referred to as the *mean* which is calculated as the summation of the data divided by the number of observations.[33]

An alternative measure of central tendency is the *median* which, in this case, would be the middle salary. If Canadian workers were "lined up" according to their salaries (from the lowest to highest), the median salary is that salary possessed by the worker right in the middle. That is, it is the salary of the worker whose salary exceeds those of half of the workers and is also less than half of all workers. Using the median, instead of the mean, avoids the problem of extreme values exerting significant influence. For example, suppose Bill Gates who, in 2005, had an estimated wealth of $46.5 Billion (U.S.) moved to Canada. The inclusion of Bill Gates' wealth would skew the mean or "average" wealth of Canadians. Using the median avoids this issue.

Distributions

Continuing with the example of workers' salaries, a distribution of salaries could also be described. Salaries could, for instance, be divided up into 10 equal groups (referred to as deciles) or five equal groups (referred to as quintiles). A perfectly equal distribution implies that each individual gets an equal share (e.g., in this example, the top 10 per cent of workers earn 10 per cent of the total amount that firms devote to salaries). When describing the degree of inequality within a distribution, graphical depictions as well as special formulae (e.g., Gini Index) are often used.

Dispersion

One purpose of a dispersion measure is to evaluate how well a mean summarizes a distribution. The greater the *variance*[34] in a group, the worse job the mean does of representing a typical value. If, for example, every full-time worker in Canada earned the exact same salary then, by definition, there is no variation and the mean value (i.e., $35,000) does a perfect or complete job of describing the distribution. If, however, there are very large differences among the salaries of workers, then knowledge of the average yields less information about any particular individual's salary.

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[33] In this example, add up all salaries and then divide that total by the number of workers.

[34] Technically, the variance is calculated as the sum of squared differences around the mean divided by the number of observation. The standard deviation of a variable is the square root of the variance.

APPENDIX B: OCCUPATIONAL AND INDUSTRIAL CLASSIFICATION SYSTEMS

Two important ways to classify jobs are by occupation (i.e., the kind of paid work performed) and industry (i.e., the good or service that the firm produces).

Occupational Classification

The current occupational classification system most commonly used by governments in Canada is the National Occupational Classification (NOC).[35] It gives labour market analysts a standardized way of understanding the nature of work. Its most basic task is to classify occupations according to their skill type and skill level. (The most recent version of the NOC is the NOC 2001.)

Skill type is based on the type of work performed, but also reflects the field of training or experience normally required for entry into the occupation. Ten broad occupational categories, based on skill type, are identified in the NOC. They are subdivided into major groups, minor groups and unit groups. (The NOC contains over 500 occupational unit groups and includes over 30,000 occupational titles.)

Skill level corresponds to the type and/or amount of training or education typically required to work in an occupation. The NOC consists of four skill levels (identified A through D). For example, skill level A indicates occupations usually requiring university education compared to skill level D occupations in which there are no formal educational requirements and on-the-job training is usually sufficient.

Industrial Classification

The North American Industry Classification System (NAICS)[36] is an industry classification system developed by the statistical agencies of Canada, Mexico and the United States. Created against the background of the North American Free Trade Agreement, it provides common definitions of the industrial structure of the three countries and facilitates comparative analysis of the three economies.

NAICS is based on a production-oriented, or supply-based conceptual framework in that establishments are grouped into industries according to similarity in the production processes used to produce goods and services. The classification is revised on a five-year revision cycle in order to ensure that the classification continues to reflect the rapidly changing structure of the economy. The most recent version of the NAICS (NAICS 2002) groups economic activity into 20 sectors and 928 Canadian industries.

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[35] The 2001 version of the NOC used by Statistics Canada is slightly different than that used by HRSDC. The two classifications differ only in the aggregation at the major group level. The HRSDC version is described above. See http://www.statcan.ca/english/concepts/occupation.htm.

[36] See http://www.statcan.ca/english/concepts/industry.htm for more details.