

The Future of the Canadian Industry

Forecasts of Labour Markets for Selected Industrial Aggregates

by Youssef Mehdi Fortin

(5445324)

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Supervisor: Professor Kathleen Day

ECO 6999

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Abstract

This paper aims to provide forecasts of labour supply and labour demand until 2035 for Canada and the provinces and for 29 industrial aggregates as defined by the North-American Industry Classification System (NAICS). To conduct our projections, we use a simple trend-based forecasting approach, developed by the Boston Consulting Group (BCG), holding other variables constant. Then, we compare our results to various projections conducted by governments and consulting groups. We find that discrepancies between our results and those of other publications using the same methodology come down to differences in the datasets used. We also find that the provinces can be classified into three categories with increasingly deeper expected labour shortages: sparsely populated provinces, densely populated provinces and oil-rich provinces. Compared to other publications, our results do not always line up if other publication include more recent years a 2013, the last year of data used in this paper. At the industry level, we find that tightly regulated industries or industries with higher entry costs yield more consistent long-term labour market forecasts regardless of the assumptions used when compared to highly competitive industries. We conclude by noting that in small samples, our methodology fails to distinguish between actual trends and noise in the data. As a result, trend-based methodologies are probably more appropriate for very high level and general analyses.

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1. Introduction

Each year, the International Labour Organisation produces short term projections and tries to identify the global challenges that will shape the future of labour markets (ILO, 2014 ; 2015). The World Economic Forum regularly holds talks and publishes reports on the future of the global workforce and talent management, while consulting companies, such as the Boston Consulting Group, venture long term projections of the state of international and national labour markets. In Canada, the federal and many provincial governments update on a yearly basis projections of labour market conditions for policy-making purposes and for dissemination to the general public. With a focus on employment prospects, many Canadian projections center on occupations.

Within the realm of projections of labour markets, the future of supply and demand for labour by industry within Canada and the provinces receives some attention. The organisations mostly involved in this endeavour are primarily the federal government and some provincial governments as well as some private firms. However, Canadian private firms charge a fee to access their research. This limits the availability of the information. Governmental agencies on the other hand do not coordinate their efforts. This makes comparisons between provinces impractical as the assumptions are not the same across all publications. This is where this paper fits. By using a homogeneous set of assumptions, we will attempt to see if economic growth levels historically observed are sustainable in the long run given expected demographic changes. We will provide a set of simple and comparable yearly projections for a selection of industrial aggregates and industries for Canada and each provinces from 2014 to 2035.

Such a long term view of employment also plays a role. As an economy's aptitude to

compete globally relies on the stable supply of human capital and talent, it is useful to see what could happen should a shock occur. An ageing population, like we are experiencing now, represents a major risk to that supply. Thus, in order to assess our future competitiveness, we should also elaborate on the base case scenario. That is to see what will become of the labour market, our supply of human capital, should everything else remain constant. It is important to note that this paper uses a strictly quantitative approach and is therefore limited in its scope and depth. Although scenarios in labour demand take into varying factors such as immigration rates and births, we do not take into account employability, job qualifications or education levels. Section 2 will cover the most recent literature on the topic of labour forecasts. Section 3 presents the data used as well as the model, its underlying assumptions and the forecasts scenarios. This is followed by Section 4 which presents the results, while Section 5 discusses those results and Section 6 concludes.

2. Literature Review

2.1 Labour Markets in the Literature

The relationship between employment prospects and technological development has received a lot of attention both in academic circles and the press. The concern here is that if machines get “smarter”, they could replace humans in a vast array of occupations. To a certain extent, they already have replaced cashiers. Autor and Dorn (2013) showed empirically that falling costs of automation of repetitive tasks and consumer preferences favoring variety over specialisation are responsible for four key observations related to low-skill labour in the United States. Hence, local labour markets that specialized in repetitive tasks: (1) distinctively adopted information technology, (2) moved low-skill workforce into service oriented professions, (3) showed wage growth at the tails of the market distribution, and (4) experienced gains in skilled labour. The

authors' model, based on two groups of individuals occupying imperfectly substitutable occupations, is well documented (Acemoglu and Autor, 2011). It also proved itself to be quite successful in predicting development as well as explaining cross country differences of skill premia (Goldin and Katz, 2009 ; Acemoglu, 2002).

In line with the idea that IT driven technology changes are making workers redundant, Acemoglu, Autor, Dorn, Hanson and Price (2014) looked within the IT-using American manufacturing industries for evidence. Their research provided limited support to that notion. Most importantly, production in that segment of the manufacturing sector contracted relative to the rest of the sector. This observation leads to the solution that any productivity gains only stem from an even more pronounced decline in employment. In another study, Frey and Osborne (2013) studied the probability of computerisation of 702 occupations on US labour market outcomes. While their findings identify that 47 percent of total US employment is likely to be computerised, they also found that the probability of computerisation diminishes with higher wages and higher levels of education.

In the realm of high-skilled labour, Kuhnen and Oyer (2015) looked at the consequence of uncertainty on corporate hiring. Using data from the MBA graduates' labour market, they demonstrated that uncertainty about the goodness of fit of job candidates to a firm's industry deters hiring. This finding was also demonstrated by other researchers (Bandiera, Guiso, Prat, and Sadun, 2011). Moreover, firms tend to value temporary types of employment, like internships, that provide the company the option to familiarize itself with potential permanent employees before hiring them. The negative effect of uncertainty on hiring is amplified: (1) when firms face superior firing and replacement costs, and (2) when direct competition from

similar firms is less prevalent. Hence, the results suggest that firms faced with uncertainty treat hiring decisions in the same way as they would making decisions regarding investment in physical capital. This pattern has also been observed in other pieces of literature (Bloom, Bond, and Van Reenen, 2007).

International organisations also regularly weigh in on the challenges faced by workers and employers alike. Population ageing, changes in professional skill demand and increases in personal income inequality come as the main areas of concern (ILO, 2015 ; ILO, 2014 ; OECD, 2014a ; WEF, 2014b). Hence, the literature is not necessarily unified on the prognostic. Low-skill, low pay and repetitive jobs may be more at risk of disappearing than others, but the pace at which skill requirements change to meet the reality of the labour market may also compromise the chances for highly skilled individuals to find employment.

Forecasting of labour markets conditions receives sporadic interest in the literature. Recent research focused on the impact of the Financial Crisis of 2008 on the future of employment and economic growth worldwide. As economic growth is expected to remain below trend for the foreseeable future, there is a risk that employment prospects could be altered (ILO, 2015 ; ILO, 2014 ; OECD, 2014a). Once changing demographics, persistent wages, and income inequality are factored in, economic growth appears to be sufficient but not necessary to drive employment growth (OECD, ILO, and World Bank, 2014). Thus, there is a need to find alternative avenues to boost labour markets. One solution is to look at productivity growth as an indirect factor contributing to employment growth (MGI, 2015 ; BCG, 2014).

Employment, gross domestic product and labour productivity are therefore three important time series that lend themselves well to forecasting. In general the latter two are more often the

subject of research than the former (Rapach and Strauss, 2008 ; Gupta, Kabundi, Miller, and Uwilingiye, 2014). To predict those time series, the academic literature surveyed shows a preference for either econometric approaches or atheoretical statistical procedures. In this context and to improve forecast accuracy, variable selection is a crucial part of the research. Oftentimes, forecasts will include a vast array of variables which are considered to either lead or lag changes in employment (Gupta, Kabundi, Miller, and Uwilingiye, 2014 ; Rapach and Strauss, 2010). The research surveyed focusses on the effectiveness of bagging and combining methods for forecasting total employment for the economy using an autoregressive distributed lag (ARDL) model (Rapach & Strauss, 2010 ; 2008 ; 2005).¹ The main finding of these researchers is that a mix of bagging and combining methods predicts more accurate movements in employment than the benchmark autoregressive model.

More recently, Gupta, Kabundi, Miller, and Uwilingiye (2014) argued that looking only at aggregate levels of employment overlooks some important information that directly affects sectoral levels of employment. Such information therefore has a direct effect on the aggregate level of employment. They proceed to compare standard ARDL and Bayesian autoregressive models with versions incorporating feedback from 143 series.

As general rules, two elements stood out significantly from a review of the academic literature. First, we were struck by the relatively narrow number of researchers in the field. Rapach and Strauss produced most of the literature pertaining to employment forecasting. Second, the modelling techniques used are highly complex in nature. While those techniques are cutting-edge, the accuracy of each forecast remains a function of the validity of the underlying

¹ Bagging, also called bootstrap aggregating, is a special case of model averaging using bootstraps. By taking the average an average of bootstraps applied to multiple subsets of the original data, the researcher can reduce variance while avoiding overfitting when finding a non-linear best fit model to his data.

assumptions. As the properties of those models are still being assessed, we doubt that those models are any more accurate in predicting long term employment than simpler models. Tellingly, our search of the academic literature did not yield any references for an analysis of Canadian labour markets using those methodologies.

Academics are not the only ones conducting forecast exercises. Canadian and international agencies also carry out detailed research on the future of employment. Most tend to use trends econometric models for which the choice of variable is entrenched in economic theory. For instance, the International Labour Organisation (2010) uses the Global Employment Trends (GET) model. This model is based on Okun's Law which states that there is a negative relationship between the unemployment rate and movements in real gross domestic product. However, this method is highly sensitive to missing or low quality data which have to be imputed if there is any chance for the analysis to succeed. Hence, a major part of the research is spent providing approximate values for the explanatory variables (ILO, 2010). At home, Employment and Social Development Canada uses the Canadian Occupational Projection System (COPS). COPS is used to perform 10-year forecasts of the labour market at the national level by occupation, by industry and by skill levels (ESDC, 2014). The most recent set of forecasts covers the period 2013-2022. COPS relies on historical trends and also incorporates information from recent and expected developments in the labour market (ESDC, 2015k). Multiple provincial governments also perform their own set of forecasts. While not all forecast exercises are readily available, the ones that are easy to find do not share the same forecast horizon but use share the same principles as the COPS.² We will present the COPS and

² We found forecasts for Newfoundland and Labrador, Saskatchewan, Manitoba, Alberta and British Columbia. Other provinces either did not provide them or had confusing websites that made it impossible for us to find. Search engine results yielded the same information.

provincial forecasts later.

Other organisations also produce labour market forecasts. Canadian banks and the Conference Board of Canada regularly produce short term forecasts using economic theory and what are considered to be pro-cyclical variables. We won't discuss them much further as their main findings are part of ESDC's analysis of current conditions which we elaborate on later.

In trend based forecasting, consulting agencies win the award for the simplest model. Overall, their research aim to answer a simple question. As economic growth is slowing down, could labour productivity be enough to foster strong employment? In its analysis of national labour markets, the Boston Consulting Group (2014) used a total of four time series including estimates and forecasts for 25 major economies: population, labour participation rates, gross domestic product, and employment.³ By definition, labour supply includes all the economically active population or put simply, the product of total population and the participation rate. They used comparable estimates broken down by age group for different countries from the United Nations and the International Labour Organisation. To determine labour demand, they relied on a basic identity. By definition, labour productivity is the amount of output per effective unit of labour. If we assume that output is equivalent to gross domestic product and that an effective unit of labour is equivalent to an employed individual, then labour demand, or the number of job-holders, is equal to the ratio of output to labour productivity (BCG, 2014).

More recently, the McKinsey Global Institute (MGI, 2015) conducted a similar exercise. Their methodology is similar to that of the Boston Consulting Group, but their forecast horizon is longer and they perform forecasts for G20 economies and Nigeria. However, MGI also include

³ For sake of simplicity, they assumed that participation rates going forward were the same as the ones projected by the International Labour Organization until 2021 and constant hereafter.

five main industries for some of the biggest countries (excluding Canada). In relation to the question of interest, both agencies find that serious interventions are required to promote strong labour markets. Labour productivity could be a trigger but is not a panacea in itself.

2.2 Current State of the Nation

While Canada has done better than other advanced economies, technological advancements will affect the impacts on workers of shifts in population composition, globalization and skill requirements (Department of Finance Canada, 2014 ; OECD, 2014b). According to the OECD, Canada is among the best performers with respect to long-term unemployment compared to other countries.⁴ However Canada is not do well when compared to its own history. In 2014, the long-term unemployment metric reached 12.1% of unemployed individuals. This is well above the pre-crisis level of 7.3%. On youth unemployment, Canada does worse than other OECD economies. While unemployment among the 18-24 years old group barely moved in the past seven years, the proportion of young Canadian who are both unemployed and not in training has risen since the onset of the Financial Crisis (OECD, 2014b). According to official statistics on labour force participation, the nation did better than the United States in terms of discouraged workers. Moreover, there is an imbalance between supply and demand. Whereas many Canadians are still out of work or underutilized, some sectors or regions are struggling to find enough qualified workers (Department of Finance Canada, 2014 ; WEF, 2014a).

At the provincial level, Employment and Social Development Canada (ESDC) offers an extensive review of labour market conditions by province across the country. Their research, updated monthly, includes all the most up-to-date information from leading public and private Canadian institutions. As such, we will only summarise some of this agency's key findings. This

⁴ Individuals looking for jobs for more than one year.

is done in a bid to avoid redundancies that would inevitably occur should we include other sources.

Starting out west, employment in Newfoundland and Labrador fell in the second quarter of 2015 compared to a year earlier. Part-time jobs suffered the most but were mitigated by the small growth in full-time employment. The unemployment rate rose along with the number of active job-seekers who were previously out of the labour market. At the industry level, employment is on a downward trend after reaching record highs in 2013. Goods-producing industries gained in the last year mostly in agriculture, utilities and manufacturing. Construction remained relatively unchanged. Service-producing industries fell during the year despite trade and professional, scientific, and technical services reaching a quarterly high. The latter is benefiting from stronger demand from oil, gas and hydroelectricity activities. Also up is the accommodations and food services. Public administration and education services trimmed their workforce during the year, continuing on a trend that observed for over a year now (ESDC, 2015a).

Employment fell in Prince Edward Island in the second quarter of 2015 from the same period a year earlier. The number of part-time job holders grew but not nearly enough to offset the losses in full-time employment. A falling participation rate is also the cause of the falling unemployment rate in the province. Most of the observed softening is concentrated in the service-producing industries. Health care and social assistance and educational services fell the most, while growth in public administration softened the blow. In goods-producing industries, construction lost out due to falling levels of construction permits. Manufacturing helped offset those losses fuelled by stronger international exports (ESDC, 2015b).

Nova Scotia saw a marginal decline in employment numbers from 2014. At their lowest

levels since 2003, the unemployment rate fell in 2015 on the back of a lower participation rate. The boom in forestry, fishing, mining, quarrying, oil and gas was insufficient to counterbalance the negative growth in the goods-producing industries, which has persisted since 2008. Some large construction projects are expected to bring back some vigor to the sector. Manufacturing, which is also in a bad situation, should benefit from shipyard activities to build the Arctic patrol vessels, a weaker currency and a stronger economy south of the border. Employment in the service-producing industry remains stagnant. Employment gains in both professional, scientific and technical services and health care and social assistance industry clusters were counterbalanced by losses in transportation and warehousing and non-classified services (ESDC, 2015c).

New Brunswick employment fell between the second quarter of 2014 and the second quarter of 2015. Part-time employment fell significantly in the province while full-time employment remained fairly stable. The unemployment rate remained unchanged due in part to a fall in the participation rate. The outlook could improve with greater public spending and TransCanada Corp.'s Energy East project, should it be pursued. Goods-producing industries lost the most ground. Emigration to other provinces may be responsible for falling levels of housing starts, thus contributing to falling employment in construction industries. Forestry has not fully recovered from the recession. Thus forestry, fishing, mining, quarrying, oil and gas industries saw the most important decline in employment relative to their size. However, increasing demand for forest products from the U.S. and an acceleration in potash production could lead to further strengthening in that sector. Manufacturing industries went against the sectoral trend, registering double digit employment growth. This is a result of the weakening dollar and ramped up demand from our southern neighbour. Employment in service-producing industries recorded

marginal growth led by gains in education services and transportation and warehousing services. However, fiscal tightening announced in the most recent budget may hamper growth in education (ESDC, 2015d)

Registering stronger numbers than the Canadian average and Ontario, employment grew significantly in Quebec year-over-year compared to the second quarter of 2014. This is entirely attributable to growth in full-time employment in service-producing industries. Stronger growth in employment than in the labour force resulted in a fall in the unemployment rate, while the participation rate increased. At the industry level, gains in business services and in accommodation and food services led the growth in service producing industries. On the other hand, information, culture and recreation saw the biggest fall. Employment in goods-producing industries fell over the past year. With fewer new construction projects, the construction industry shrank. For its part, agriculture was the hardest hit industry. Employment in manufacturing declined moderately, but a weaker looney and a revived U.S. economy could help revive the sector (ESDC, 2015e).

Year-over-year, Ontario's growth in employment was entirely due to growth in full-time jobs. Part-time employment diminished over the same period. The unemployment rate also dropped. This is in large part due to job-seekers leaving the labour market all together. Participation rates have been in decline in the province since 2013. Goods-producing industries fuelled most of the gain in employment. The forestry, fishing, mining, quarrying, oil and gas industries saw the most significant gains in employment, followed by construction. The boom in construction is expected to be maintained as major investments in public infrastructure will take place in the upcoming years. Manufacturing and agriculture lost some ground over the year.

However, new investments, increased production activity, and new contracts are expected to bring growth back in manufacturing industries. In the service-producing industries, the finance, insurance, real estate and leasing and the educational services industries registered the largest gains over the year. However, layoff notices in multiple school boards across the province will cause a slowdown in educational services. The biggest losers between 2014 and 2015 were public administration and non-classified industries (ESDC, 2015f).

Manitoba had the strongest job growth in the country from 2014 to 2015 despite the second quarter of 2015 being virtually flat. Employment growth was entirely in part-time jobs, while full-time jobs decreased. Unemployment shrank slightly and is expected to diminish further as a number of industries record strong growth. Service-producing industries – mostly in business, building and other services, and transportation and warehousing – were responsible for most of the growth in employment year-over-year. Trade, and health care and social assistance have been on a downward trend for the past two quarters. However, employment growth in the latter is up year-over-year from the second quarter of 2014. Employment in the goods-producing sector grew at an anemic yearly rate of 0.4%. Strong demand from the United States should benefit Manitoba's manufacturing industry in the coming years. Construction also grew significantly and is expected to keep growing with major hydro projects scheduled to start this year and investments in infrastructure. Primary industries all suffered in the last four quarters with the forestry, fishing, mining, quarrying, oil, and gas industry falling the most. However, a job recovery is expected if metal mining output increases as anticipated (ESDC, 2015g).

Thanks to the service-producing industries, employment in Saskatchewan grew significantly from 2014 to 2015 despite a difficult start at the beginning of the year. The unemployment rate,

still the lowest in the country, increased since 2014 due to an increase in the number of individuals in the labour force, mostly in the last quarter. Weaker oil prices are affecting this province's growth, with analysts predicting low to negative growth for the year. Saskatchewan's goods-producing labour market is expected to be maintained afloat by the farming and potash industries. Overall, service-producing industries – mostly in health care and social assistance, and educational services – were able to more than offset the loss of jobs in stagnant goods-producing industries. However, potential downsizing in the main school divisions and secondary effects of the slowdown in goods-producing industries could adversely affect near-term prospects for service-producing industries. Employment in the goods-producing sector is depressed, and may remain so for a while. Drought conditions affected the agricultural industry. The province's manufacturing industry slashed the most jobs year-over-year of any industry anywhere in the country. As inputs are imported, profit margins are eaten up and a weaker currency is unlikely to boost external demand for Saskatchewan's manufactured products. For its part, domestic demand will not provide any relief, as it is adversely affected by the energy sector's woes. Construction remained fairly stable year-over-year. A marked decline relative to last year in building permit values and new housing starts may affect employment prospects should this trend linger. Low oil prices led to losses in resource extraction industries (ESDC, 2015h).

Alberta is currently coping with the effect of the collapse in oil price. The levels of employment remained stable between the second quarters of 2014 and the second quarters of 2015 as employment growth flattened. For their part, the job vacancy rates and wage growth edged downwards. Over the same period, the unemployment rate rose, narrowing the gap between the province's rate and the national average. Hence, job creation appears insufficient to

accommodate the higher volume of individuals seeking work. Thus, Alberta's labour markets show clear signs of slowdown due to economic uncertainty. At the industry level between 2014 and 2015, employment growth in the service-producing sector was far greater than the losses experienced in the goods-producing sector. Lower energy prices led to resource extraction industries to record the biggest fall in employment, especially in oil and gas support services. Likewise, Alberta's professional, scientific and technical services and transportation and warehousing service industries were adversely affected by oil prices. Staffing in most goods producing industries also declined. Public-sector service industries (i.e., education services, health care and social assistance and public administration) saw the strongest job creation. Retail and wholesale trades for their parts are in a very uncertain position. While data for the second quarter of 2015 show growth in employment numbers, these came after three consecutive quarters of contraction. Moreover, given signs that sales are slowing, it may prove difficult for this industry to keep growing in the near future (ESDC, 2015i).

Employment in British Columbia remains stable with employment growth almost null, mirroring what's happening in Canada as a whole. Employment growth remained largely positive due to an increase in self-employment with the number of workers in employer-employee relationships falling in both the private and public sectors. Unemployment, for its part, held steady from the second quarter of 2014 to the second quarter of 2015. Both goods-producing and service-producing industries grew year-over-year. Manufacturing accounted for all the growth in the former, led by the two largest employers: fabricated metal products and food products. Construction was down year-over-year despite British Columbia's hot real estate market. In the service-producing industry, growth in wholesale trade offset the losses in retail trade. As retail spending is still strong in the province, the losses in retail are mostly due to the

current disturbances in the Canadian retail space. Increased international travel and a lower exchange rate for the Canadian dollar fuelled job growth in air transportation and guided travel in the province. This led the growth in transportation and warehousing industries.

Accommodation and food services lost traction between 2014 and 2015. However, employment numbers for the last quarter hinted at a return fuelled by positive growth in restaurant receipts and overnight international visitor arrivals (ESDC, 2015j).

2.3 Future of Canadian Labour Markets

Overall ESDC estimates that employment growth from 2013-2022 across the country will be positive, albeit weaker than the average for the 2003-2012 period. As it stands, on the supply side, it is thought that the negative effects of an ageing population and a low fertility rate will outweigh the benefits of projected life expectancy and immigration. This is especially the case for the working age population, the 15-64 years olds, as baby boomers retire. These demographic changes will affect the labour force growth potential of the country, which is expected to be significantly lower than the average for the past decade. On the demand side, it is assumed that the impact of the financial crisis of 2008 will be a drift in the levels of potential gross domestic product in the longer term.⁵ As output picks up to its pre-crisis pace, employment should increase linearly with labour force growth, while the unemployment rate returns to pre-recession levels (ESDC, 2015l).

Obviously there is always at least one weakness in any model. With hindsight, the assumption that oil prices would keep rising from 2013 until 2022 is obviously wrong. Hence, these ESDC forecasts will never be reality. For its part, BCG predicts that Canada will

⁵ The drift assumption relies on few key components: growth returns to the U.S. economy, world oil prices keep rising to reach 150\$/barrel and the Canadian dollar remains above parity relative to the U.S. dollar. It is to be noted that those forecasts were made using information that was available in 2013, that is prior to the collapse of the oil market.

experience anemic growth of its labour supply. Both by 2020 and by 2030, this growth will be insufficient to match demand should the target be to maintain historical gross domestic product annual growth rates going forward (BCG, 2014). Over a fifty-year horizon, MGI predictions are quite bleak. If productivity growth remains at the same pace in the future as what has been observed for the past fifty years, future gross domestic product growth will be equivalent to less than half the rate of the historical growth rate. As a result, employment growth will be almost null (MGI, 2015). Both consultancies nonetheless agree on one point: compared to its peers, Canada would have a pretty average labour market performance.

At the industry level, ESDC projects that employment growth will be strongest in construction and services. Growth will dwindle in primary industries. Employment levels will only stabilize in manufacturing industries. Those shifts mostly result in marginal movements in the overall levels of employment. In the primary sector, world demand for natural resources will boost output. Mining, oil and gas winning the most, it is also the only sub-group industry that is projected to hire more over the future, counteracting the expected losses in forestry and agriculture. However, even as mining, oil and gas continues to thrive, employment growth in that sector will not be nearly as high as it was during the boom years of 2003-2012. In the manufacturing industries, strong external and domestic demand for investment- and resource-related products is expected to lead to a boom in manufacturing production. This boom will only be strong enough to stop the recent downward trend in labour demand. As a result, employment in that sector is expected to stabilise as consumption-related manufacturing keeps bleeding away. In the service sector, fiscal austerity will have a negative effect on output growth. This will be mitigated by relatively higher growth in production services compared to its historical levels. Consumer services will keep growing at their historical pace. In terms of employment, these

trends will translate into lower growth than was historically observed in all the sub-groups. Overall, the strongest growth is to be observed in professional, scientific and technical services. This is followed by healthcare, mining and related support activities, and construction. On the losing side, fishing, hunting and trapping will be the hardest hit. The other losers are concentrated in manufacturing and primary extraction (excluding mining, oil and gas operations) (ESDC, 2015m).

ESDC is not the only government entity interested in long term forecasts of labour market conditions. Starting out east, in Newfoundland and Labrador, the Department of Advanced Education and Skills (DAES, 2015) predicts a tightening of the labour market by 2025. The downsizing of major ongoing projects, the reduction of the province's workforce through emigration and fiscal tightening are all expected to contribute to a reduction of the workforce. This province does not produce complete industry specific forecasts. However, a decent representation of the trends is presented by aggregating industry-specific types of jobs. Unsurprisingly, population ageing will contribute to an expansion in healthcare and social assistance related occupations. Sales and services is also expected to expand significantly after 2018. Between 2015 and 2018, however, the number of job-holders is expected to fall. The only other winners are primary industries, which should benefit from the implementation of expected mining, oil and gas projects. On the losing side, trades, transport and equipment operators will shed a sizable portion of their workforce within the next two years.⁶ Employment in those industries is then expected to be stable until 2025 (DAES, 2015).

Further west, the Manitoba Jobs and the Economy (MJE) Department predicts more than 176

⁶ In provincial forecasts trade occupations include plumbers, technicians and the like. It is not to be confused with the trade industry, which refers to retail and wholesale trade services.

thousand jobs opening by 2020. Two thirds of those openings will fill existing positions to replace retiring workers. Like Newfoundland and Labrador, it produces no industry specific forecasts. Occupations are aggregated by relevance to each industrial sector. Hence, labour demand is set to expand the most in business, finance and administration, in sales and services, and in management related occupations. Healthcare and social services are not set to increase significantly over the forecast period (MJE, 2014).

Next in the Prairies, the Saskatchewan Ministry of the Economy (SME) produces 5-years forecast of the labour market for the province. For the period 2013-2017, the most recent set of forecasts anticipate close to 95 thousand job openings. As in Manitoba, close to two thirds of the job openings in the future will be a result of natural attrition of the labour force. Employment in the province is expected to grow more in sales and service occupations. The other sectors which are expected to see above average growth are business, finance and administration, and trades, transport and equipment operators (SME, 2013).

In Alberta, the Ministry of Jobs, Skills, Training and Labour (MJSTL, 2014) carries out the forecasting relay. Unlike the other available provinces, Alberta also carries out forecasts by industry (MJSTL, 2015). The province's occupational forecast was done in 2014 and covers the period 2013 to 2023. The province's occupational forecast by industry, done in 2015, covers the period 2015-2019. Overall, Alberta predicted in 2014 a significant worker shortage. With labour demand outpacing labour supply, the province would face one of two scenarios. Either the province would not achieve its potential for growth, or it would have to find innovative ways to attract job-seekers to its territory (MJSTL, 2014). In the 2015 forecasts, the demand for labour is also set to grow. This update seems to take into account the fall in energy prices as both the

mining, oil and gas extraction industry and its support activity industry are forecast to lose more than six percent and thirteen percent of their workforce respectively in 2016. These falls are so significant that it is not expected that either industry will return to its 2014 levels by the end of the forecast horizon in 2019. In other goods-producing industries, the MJSTL predicts that construction will be downsizing its workforce in three of the five years of the forecast. Employment growth will come from utilities and manufacturing industries. The service-producing sector is definitely the area where the MJSTL sees the best potential for growth in the next five years. Healthcare and social services followed by education services are expected to be the best performing industries in the province. They are followed by finance, insurance, real estate and leasing services. Public administration for its part will see a flat growth rate while the growth in wholesale trade will compensate for the losses in retail. Despite low energy prices, professional, scientific and technical services industries are expected to see average growth in employment once compared to other service-producing industries (MJSTL, 2015).

Finally, way out West, in British Columbia, WorkBC (2012) predicts prudent growth within the labour market. While no industrial forecast is available, it is assumed that by 2022, the healthiest industry will be healthcare and social services. Other industries could experience significant gains relative to the province's growth. Trades, transport and equipment operators and related occupations as well as natural and applied sciences and related occupations are expected to see significant growth by 2022. The mining, oil and gas extraction and its supporting industries are expected to grow significantly with the emergence of a liquefied natural gas operation in the province.

2.4 This Paper within the Literature

The aim of this paper is to bring forward a simple and comparable set of forecasts between

provinces and industries on a yearly basis.⁷ To satisfy the simplicity requirement, we opted to use the methodology developed by the Boston Consulting Group (BCG) in its 2014 paper. We briefly discussed this paper in Section 2 and we will also develop it more in depth in Section 3. Choosing simplicity also comes with its trade off. In making them simple, we sacrifice forecast accuracy. Forecasting, by definition, is the ability to read a crystal ball on a given topic holding everything else constant. Hence, an unbiased estimation can only arise after the fact. For that reason, we are not highly concerned with the lack of accuracy in our work.

The comparability requirement stems from one major observation that was made during the literature review. Since forecasting labour markets is traditionally the job of governmental organisations, they tend to perform this exercise when the need arises. Hence, there is no coordination between the release, the frequency, or the depth of their respective publications, the obvious implication being that the set of assumptions used by different governments are simply incompatible. As is the case with oil prices, one agency thought its assumptions to be reasonable in 2012 while another has, with hindsight, found out that it needs to be completely reversed. Those methodological disparities make provincial forecasts impossible to compare. Lastly, this paper improves on the literature as it also provides industry specific forecasts for each province. This endeavour has not been undertaken to our knowledge by any provincial government with the exception of the government of Alberta. Private forecasters, like the Conference Board of Canada produce industry specific estimates, at a cost.

3. Methodology

The scope of this paper is to produce annual linear trend-based forecasts of labour supply and

⁷ The Conference Board of Canada already produces forecasts for all the provinces for a variety of economic indicators including employment. End users can have access to those forecasts provided that their willingness to pay matches the board's pricing scheme.

demand from 2014 to 2035. Geographically, this paper extends to Canada and the ten provinces and excludes the territories. For each geographical unit we also conduct annual forecasts for three industrial aggregates as well as 26 industries. The industries are at the two-digit or three-digit level code of the 2007 National Industry Classification System (NAICS) as shown below in Table 1.

3.1 Datasets

This study uses Statistics Canada CANSIM tables on the labour force, population estimates and forecasts (until 2035), labour productivity and gross domestic product at basic prices in chained 2007 dollars. The selected time series cover Canada and the ten provinces from 1997 until 2013 for data disaggregated by age group and for 28 industrial aggregates derived from the North American Industry Classification System (NAICS) of 2007 (the full list of which is available in Table 1, below). While most CANSIM tables used for this research have data that extends to the early 1980's and sometimes even the 1970's, no equivalence was found for gross domestic product and labour productivity time series between terminated CANSIM tables and the ones used in this study. That is due to changes in the definitions of certain industrial aggregates between older CANSIM tables which use NAICS 2002 and the newer tables using NAICS 2007, and the lack of sufficiently disaggregated data to build continuous time series if it was possible. As a result, the information set of realized observations spans a total of 16 years only. The lack of longer time series restrains our ability to use breaks in trends to create alternative scenarios.

Table 1 – Selected Industrial Aggregates and North American Industrial Classification System 2007 Codes

NAICS	Industrial Aggregate
11-91	Total, all industries
11-33	Goods-producing sector

111-112,1100,1151-1152	Agriculture
21,113-114,1153,2100	Forestry, fishing, mining, quarrying, oil and gas
113-1153	Forestry and logging with support activities
114	Fishing, hunting and trapping
21-2100	Mining, quarrying, and oil and gas extraction
21-2100, 22, 31-33	Industrial production
22	Utilities
23	Construction
31-33	Manufacturing
321,327,331-339	Durables
311-316,322-326	Non-durables
41-91	Services-producing sector
41,44-45	Trade
41	Wholesale trade
44-45	Retail trade
48-49	Transportation and warehousing
52-53	Finance, insurance, real estate and leasing
52	Finance and insurance
53	Real estate and leasing
54	Professional, scientific and technical services
55,56	Business, building and other support services
61	Educational services
62	Health care and social assistance
51,71	Information, culture and recreation
72	Accommodation and food services
81	Other services (excluding public administration)
91	Public administration

More specifically, this study uses employment numbers by province and by industrial aggregate for people of both sexes and by working age (15 years and over) from *Table 282-0008: Labour force survey estimates (LFS), by North American Industry Classification System (NAICS), sex and age group (annual)*. The same table also provided estimates, by province and by industry, of the number of persons in the labour force for both sexes and by age group.⁸ For Canada and industrial aggregates at the national level, data on real gross domestic product in chained 2007 dollars came from *Table 379-00311, Gross domestic product (GDP) at basic*

⁸ Table 282-0008 only has four age groups available: 15 years old and over, 15 to 24 years old, 25 to 54 years old and 55 years old and over. The present paper uses all four age groups to construct the labour supply curves.

prices, by North American Industry Classification System (NAICS), monthly. This table presents, for each month, a GDP estimate for the preceding 12 months. We chose to only use the December point estimate to represent the year. For the ten provinces and industrial aggregates at the provincial level, data on real gross domestic product at basic prices came from *Table 379-0030: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories (annual)*. Labour productivity, understood as total compensation per job (dollars), for Canada and the provinces and for the industrial aggregates come from *Table 383-0030: Labour statistics by business sector industry and by non-commercial activity consistent with the industry accounts, provinces and territories (annual)*. Population estimates for individuals of both sexes by five-year age groups between the ages of 15 and 69 for Canada and the provinces come from *Table 051-0001: Estimates of population, by age group and sex for July 1, Canada, provinces and territories (annual)*. Population forecasts for individuals of both sexes by five-year age groups between the ages of 15 and 69 for Canada and the provinces from 2014 until 2035 come from *Table 052-0005: Projected population, by projection scenario, age and sex, as of July 1, Canada, provinces and territories (annual)*. Two of Statistics Canada's population forecast scenarios were retained to provide the basis for alternative scenarios. These are, in the agency's nomenclature, the low growth scenario and the M1 medium growth scenario.⁹ Details of the assumptions underlying each scenario are available in Table 2 below. The medium growth (M1) scenario was preferred over other medium growth scenarios so that the interprovincial migration trend assumption is the same for both low and medium growth scenarios.

⁹ Statistics Canada produces five medium growth scenarios differentiated by their assumptions and abbreviations (M1 to M5). For more information on the assumptions, see footnotes to CANSIM table 052-0005 on Statistics Canada's website.

Table 2 – Statistics Canada Population Forecasts Selected Scenarios' Assumptions

		Low Growth Scenario	Medium Growth Scenario (M1)	High Growth Scenario
Canadian total fertility rate	Reaches (birth per woman)	1.53	1.67	1.88
	Constant after	2021/2022	2021/2022	2021/2022
Canadian life expectancy	Males/female (years)	85.9 / 87.1	87.5 / 89.1	89.9 / 91.9
	Reached by	2062/2063	2062/2063	2062/2063
Interprovincial migration trend (from – to)	Based on	1991/1992 - 2010/2011	1991/1992 - 2010/2011	1991/1992 - 2010/2011
National immigration rate	reaches	0.5%	0.75%	0.90%
	Constant after	2022/2023	2022/2023	2022/2023
Annual number of non-permanent residents	reaches	733,600	864,600	1,144,300
	Constant after	2014	2021	2031
National net emigration rate		0.19%	0.22%	0.25%

For more information on the assumptions please see footnotes to CANSIM table 052-0005.

3.2 Data Manipulations

Several data manipulations occurred in order to create the forecasts. As Statistics Canada values are rounded, the following manipulations may introduce upward or downward biases in individual estimates. Over the entire time frame, we consider that these biases should cancel out. Gross domestic product by industry underwent the most transformations to ensure that the industry definitions are consistent for both the employment and the gross domestic product time series. First, GDP estimates for the waste management and remediation services industry was subtracted from the industrial production industrial aggregate data. This was done as waste management GDP is aggregated within industrial production in the GDP time series but not in the employment time series. Second, time series for the crop and animal production industry and

time series for the support activities for crop and animal production industry were summed up to form the Agriculture aggregate. Agriculture was present in the employment time series but absent from the GDP time series. Third, GDP estimates for the forestry and logging industry and the same estimates for support activities for the forestry industry were combined to form Forestry and logging with support activities. Fourth, trade industries resulted from the summation of GDP estimates for both wholesale trade and retail trade services. Fifth, finance and insurance and real estate services and rental and leasing services were summed up to form the finance, insurance, real estate and leasing service industry. Sixth, management of companies and enterprises services and Administrative and support, waste management and remediation services were added to form Business, building and other support services. Lastly, Information and cultural services and Arts, entertainment and recreation services form the information, culture and recreation industry. As for the employment and labour force time series, only one industrial grouping was created. Industrial production industries were created by adding together employment (labour force) data for the mining, quarrying, and oil and gas extraction industries, the utility industries and the manufacturing industries. A comprehensive list of all the industries, and their respective NAICS codes was provided above in Table 1.

3.3 Assumptions and Model

This paper uses the linear trend-based methodology developed by the Boston Consulting Group (BCG, 2014). As it is not an econometric-based model, many of the assumptions underpinning the model are left at the discretion of the researcher. The lack of standardization inevitably introduces a bias in the results. In order to measure the labour supply deficit each year by 2035, we first need forecasts of labour supply and labour demand. Contrary to static models, the market curves do not represent quantities as a function of prices. Instead, supply and demand

curves represent quantities of persons as a function of time in order to clearly represent the evolution of labour market conditions in the eleven geographic units and twenty-eight NAICS-consistent industries. As we do consider wages as embedded in the trends, we do not actively use wages as a determinant for neither labour demand nor labour supply. Forecasting trends in wages risk introducing noises to the system that would unnecessarily complicate calculations and could introduce a bias. Unfortunately, ignoring wage movements also imply that we cannot interpret our forecasts as a prediction of the rise or fall of wages in the future.

3.3.1 Labour Demand

In order to create labour demand forecasts we used gross domestic product and people in employment time series. Labour demand can be understood as being the number of individuals who actually hold a job. Hence, like BCG (2014), we start from the following relation:

$$\text{Gross Domestic Product}_{i,j,t} = \frac{\text{Gross Domestic Product}_{i,j,t}}{\text{People Employed}_{i,j,t}} \times \text{People Employed}_{i,j,t}$$

Equation 1 – Basic Labour Demand Relation

where “*i*” is either Canada or any of the ten provinces, “*j*” is any of the twenty-eight industrial aggregates and “*t*” is time in years. Equation 1 can then be rearranged to obtain:

$$\text{People Employed}_{i,j,t} = \frac{\text{Gross Domestic Product}_{i,j,t}}{\text{Labour Productivity}_{i,j,t}}$$

Equation 2 – Labour Demand

where labour productivity is understood to be the ratio of gross domestic product to the number of people employed and where the number of people employed is an accurate reflection of the demand for labour. We find future levels of gross domestic product and labour productivity by using the historical compounded annual growth rates (CAGR)¹⁰ over the 1997-2013 and 2003-

¹⁰ $CAGR_{i,t} = \left(\frac{x_{i,t+n}}{x_{i,t}} \right)^{1/n} - 1$, where ‘*x*’ is the variable for which we want the CAGR, ‘*i*’ is the geographical unit, ‘*t*’ time in years, and ‘*n*’ the number of years between the first and last observation.

2013 periods and extrapolating those trends until 2035. Then, we use the ratio of those values to find future levels of people employed.

The primary assumption is that future labour demand can be appropriately approximated by the number of people in employment. As we are using seasonally adjusted data, seasonal trends in employment are not an issue. Furthermore, we assume that any outstanding biases due to unfilled vacancies and multiple job-holders are not severe enough to render the model invalid. The labour demand forecasts also assume that there is no feedback effect from gross domestic product to labour supply. This assumption translates into the use of trend based forecasting instead of econometric models. Proper gross domestic product forecasting often uses labour supply as a determinant. As part of the model involves forecasting labour supply, trend based forecasting helps avoid such feedback. Finally, as the data for labour productivity is defined as total compensation per job, it ensures that there is no interaction between gross domestic product and labour productivity as far as the data are concerned.

3.3.2 Labour Supply

Labour supply forecasts are more straightforward. For those, we use data on the number of people in the labour force, population estimates and population forecasts by age group. As the number of people in the labour force can be taken to be an accurate depiction of total labour supply, we are able to build forecasts using the following relation:

$$People\ in\ the\ Labour\ Force_{i,j,t} = \sum_{a=1}^3 Participation\ Rate_{a,i,j,t} \times Population\ Forecast_{a,i,t}$$

Equation 3 – Labour Supply

where “a” is any of the three age groups, “i” is either Canada or any of the ten provinces, “j” is

any of the twenty-eight industrial aggregates and “ t ” is time in years.¹¹ For each geographic unit and industry studied, the participation rate is defined as the ratio of people in the labour force in a given industry to the number of people in the overall population in a given year. In order to limit the number of forecast scenarios to a manageable set, participation rate forecasts were only done using the compounded annual growth rate from the 2003-2013 trend. We did not use the full dataset as participation rates of the youth and 55 and over age groups increased drastically in the late 1990’s and early 2000’s and subsequently stabilized in the late 2000’s.¹² Using the full dataset risks forcing unreasonable assumptions. The low and medium growth population forecasts scenarios are what support the labour supply scenarios.

The primary assumption is that future participation rates and population forecasts are uncorrelated. As we use a historical trend to forecast participation rates, we can therefore treat participation rates and population forecasts as independent. Obviously, all the assumptions underpinning Statistics Canada population forecast scenarios also apply to our Labour supply forecasts. The complete list of assumptions for the low and medium growth scenarios can be found above in Table 2.

3.3.3 Excess Labour

Finally, we present the results in terms of labour surpluses and shortages by the 2035 horizon. Considering that we studied two growth scenarios for each of labour supply and labour demand, there are thus four possible forecasts for surpluses and shortages. The first scenario relies on a slow population growth assumption for its labour supply and the 1997-2013 trends for

¹¹ As labour force data were only available for the age groups 15-24 years old, 25-54 years old and 55 years old and over, population estimates by five year age groups were added to create all three age groups.

¹² According to Statistics Canada, participation rates for the 55 and over rose to 56 percent in 2013 compared to only 39 percent in 1997 and 48 percent in 2003. That means the CAGR for the period 1997-2003 is above 5 percent while the CAGR for the period 2003-2013 is slightly over 1.7 percent.

labour demand. The second scenario posits low growth in labour supply and labour demand determinants follow their 2003-2013 trends. The third scenario hypothesizes that the labour supply growth follows the medium trend scenario and the determinants of labour demand follow their respective 2003-2013 trends. The fourth Scenario assumes the medium population growth assumption for its labour supply and the 1997-2013 trends for the determinants of labour demand. If we assume that, the forecasts are slightly more optimistic. We are able to build forecasts of excess labour supply using the following relation:

$$Excess\ Labour_{i,j,t} = \frac{Labour\ Supply_{i,j,t} - Labour\ Demand_{i,j,t}}{Labour\ Supply_{i,j,t}} \times 100$$

Equation 4 – Excess Labour

where “i” is either Canada or any of the ten provinces, “j” is any of the twenty-eight industrial aggregates and “t” is time in years. Following BCG (2014), we consider three possible interpretations. If there is positive excess labour above five percentage points inclusively, there is excess labour. If there is positive excess labour above zero but below five percentage points exclusively, there is a technical shortage of labour. If the numerical value is below zero, there is a shortage of labour.

4. Results

4.1 Comparative Analysis for Canada: BCG’s Predictions against Ours

The labour supply forecasts presented in this paper are consistent with the findings of similar research (BCG, 2014) as shown in Table 3, below. BCG estimates that there should be a technical shortage of labour by 2020 under both scenarios considered for the forecast of labour demand. Our forecasts agree with the Boston Consulting Group’s findings. However, our results are slightly more conservative regardless of the specified assumption imposed on labour supply. Both BCG’s and our analysis support the idea of a labour shortage by 2030, should we assume

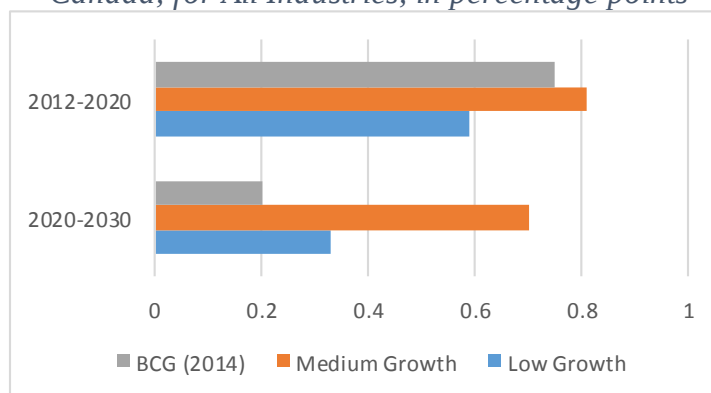
the GDP growth and labour productivity growth of the past decade(s) persist. Interestingly, by 2030, BCG's labour shortage predictions fall in between ours.

Table 3 - Comparison between BCG (2014) and our Results on Labour Shortages in Canada in 2020 and in 2030.

Growth in Labour Demand	Labour Shortage in 2020 (percentage of labour supply)		Labour Shortage in 2030 (percentage of labour supply)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
	(10-year growth rate)	(20-year growth rate)†	(10-year growth rate)	(20-year growth rate)†
(BCG, 2014, p. 17)	5	3	-6	-11
Low Growth in Labour Supply	2	0	-7	-14
Medium Growth in Labour Supply	4	1	-1	-8

† Our analysis relies on the 16-year trend from 1997 to 2013 as more historical data was not available from our sources. Differences between BCG's forecasts and ours are discussed below.

Figure 1 – Labour Supply Annual Growth Rate for Canada, for All Industries, in percentage points



A number of factors can explain the disparities between the BCG forecasts and our forecasts. First, all the data used for this research comes from Statistics Canada whereas the Boston Consulting Group used data from the International Labour Organisation (ILO) and the Economist Intelligence Unit. The latter data providers are keen on building datasets that offer comparable information for all the countries in their datasets. Hence the data they collect from national agencies, including Statistic Canada, is subject to modifications which could affect the

results. Moreover, participation rates by age group have not been computed the same way in this research as they have been for BCG. In this paper, we forecasted participation rates using a linear forecast based on the 2003-2013 trend observed for each available age groups. BCG relied on forecasts developed by the ILO which are based on the Phillips curve relation (ILO, 2010). To keep forecasts consistent within our paper, we took the decision not to use a Phillips curve relation. We believe it makes no sense to use this equation to forecast industrial aggregates.

Second, there are differences, other than the participation rates, that characterize labour supply. BCG considers only one labour supply scenario, which appears to be based on one of Statistics Canada medium population growth scenarios, whereas this paper considers two. Furthermore, the age groups considered are also different from one paper to the other. BCG built their labour supply forecasts more thoroughly using five years age-group forecasts. Due to data restrictions, our forecasts are based on three age groups. This is taking away from the accuracy of our forecasts and also has an impact on the labour supply annual growth rates as depicted above in Figure 1.

4.2 General Observations and Provincial Forecasts

Only 16 of the 29 industrial aggregates considered had enough data for all the geographical areas to produce complete forecasts until 2035. Missing information for the labour force disaggregated by age group was responsible for most of the unavailable forecasts. Of the 12 industrial aggregates for which there was insufficient data, 8 were goods-producing. Specific to the 12 goods-producing industrial aggregates considered, 5 out of the 8 incomplete datasets lacked data for more than two thirds of the geographical areas. Forecast scenarios for Industrial Production industries (NAICS 21-2100, 22, 31-33) were only feasible for Canada as a whole. This result is linked to missing labour force information at the provincial level, most likely due

to confidentiality restrictions, for the Mining Quarrying, and Oil and Gas Extraction industries (NAICS 21-2100) and the Utilities industries (NAICS 22) which are part of the Industrial Production industries. For its part, Fishing, Hunting and Trapping industries (NAICS 114) only had enough data to produce forecasts for Nova Scotia. Forestry and Logging with Support Activities industries (NAICS 113, 1153) were also heavily plagued by lack of data. Only Canada, Quebec and British Columbia had enough data to conduct simulations in that industrial group. Moreover, forecasts for the Durable Manufacturing industries (NAICS 321,327,331-339) and the Non-Durable Manufacturing industries (NAICS 311-316,322-326) were not feasible for Manitoba. Lastly, among the goods-producing industries, the Agriculture industrial group (NAICS 111-112, 1100, 1151-1152) could not be forecasted in Newfoundland and Labrador. As for the service-producing industries, there was not enough data for Newfoundland, Prince Edward Island and New Brunswick to forecast Real Estate and Leasing industries (NAICS 53). Forecasting was also impossible for Newfoundland and Prince Edward Island for the following industrial groups: Finance, Insurance, Real Estate and Leasing industries (NAICS 52-53), Finance and Insurance (NAICS 52), and Wholesale Trade (NAICS 41).

In total, 220 out of 1276 forecasts for excess labour could not be done due to the lack of data. The unreported levels of employment by age groups, labour force participants by age groups, or gross domestic product are most often a result of suppression of the data due to confidentiality issues or unreliability of the data. Thus, the lack of data most likely stems from the relative marginality of the impacted industries relative to their respective geographical area's economy.

At the most aggregate level, for all industries, the four labour excess forecast scenarios depict a problematic future. Figure 2 – Forecasts of Labour Excess for Canada and the Provinces Assuming Low Labour Supply Growth and 1997-2013 Labour Demand Growth Scenario below, show graphically

those results. Visually, the first elements that draw one's attention are the two lines that cross the figures. The first one, labelled CA, represents the excess labour forecast curve for Canada that was developed using the above methodology. The second one, labelled Σ CA, is a weighted average of provincial excess labour forecasts. Regardless of the set of assumptions on the future growth of the labour demand and supply curves, all four national forecasts point out to a clear shortage of labour by the end of the forecast horizon. By 2035, Scenario 1 in Figure 2, which relies on a slow population growth assumption for its labour supply and the 1997-2013 trends for labour demand, predicts a labour shortage of 22% of labour supply. By contrast, the weighted average labour excess forecast sits in red territory at around -23% of labour supply. The difference between the two estimates is approximately a negative 4%. Scenario 4 in Figure 5, which relies on a medium population growth assumption for its labour supply and the same assumption as above for labour demand, predicts a shortage of 13% of labour supply. By contrast, the weighted average labour excess forecast sits in red territory at around 14% of labour supply. In this case, the difference between the two estimates is approximately a negative 6%.

If we assume that the determinants of labour demand follow their respective 2003-2013 trend, the forecasts are slightly more optimistic. Scenario 3 in Figure 4 indicates a national labour shortage of approximately 4% of labour supply. That is if we assume labour supply grow following the medium trend scenario. Whereas Scenario 2 in Figure 3, where we hypothesize low growth in labour supply, would result in a labour shortage of approximately 13% of labour supply.

Of note is that by 2035, both Scenarios 2 and 4 indicate a labour shortage at the national level of 13% of labour supply while relying on completely different assumptions. This forecast is also

in the middle of the range of estimates for labour shortages by 2035. The range is closed at the lower bound by Scenario 1 at -22% of labour supply and closed at the upper bound by Scenario 3 at -4% of labour supply. As early as 2020, we predict that labour supply will be just enough to meet labour demand, meaning no excess labour. That would be the case under scenario 1. That is if labour supply follows the low growth assumption and labour demand grows following the stronger 1997-2013 trends. Likewise, an equilibrium could be reached as far away as 2027 under scenario 3. This scenario entails medium growth in labour supply and the weaker 2003-2013 economic trends defining labour demand growth.

Figure 2 – Forecasts of Labour Excess for Canada and the Provinces Assuming Low Labour Supply Growth and 1997-2013 Labour Demand Growth Scenario (Scenario 1)

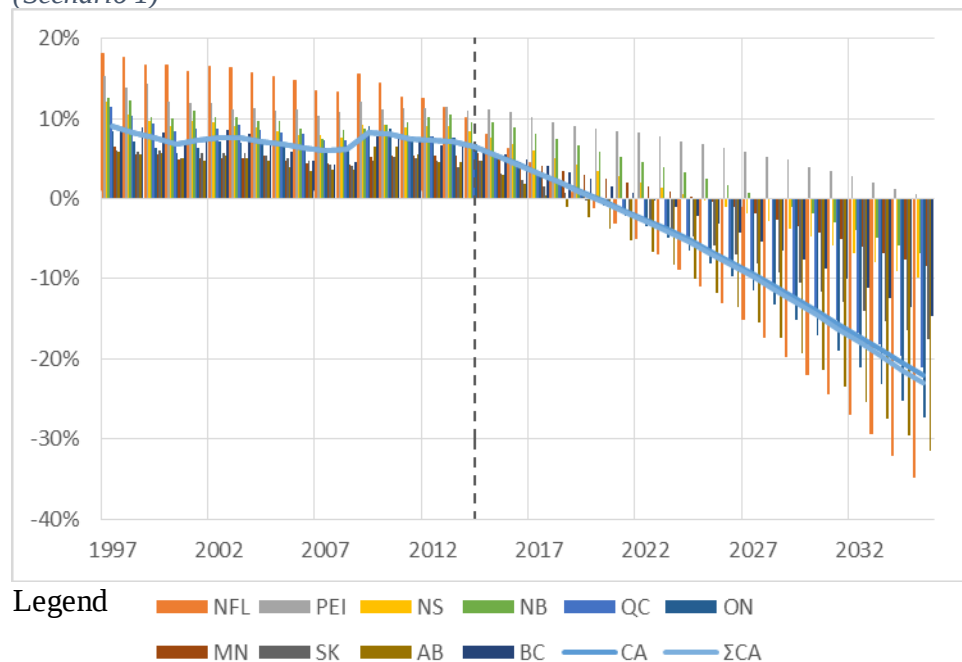


Figure 3 – Forecasts of Labour Excess for Canada and the Provinces Assuming Low Labour Supply Growth and 2003-2013 Labour Demand Growth Scenario (Scenario 2)

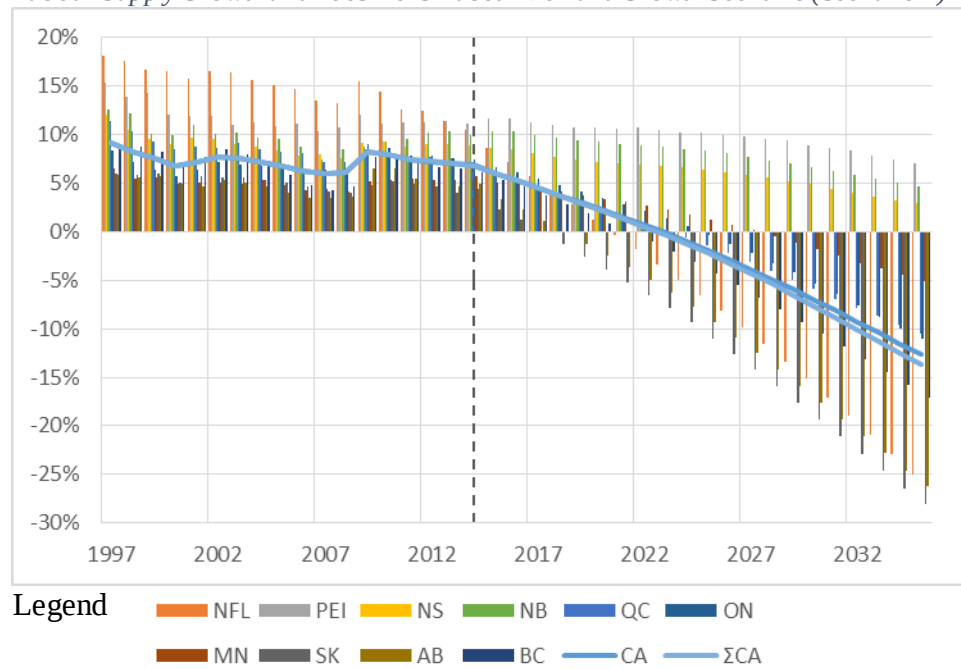


Figure 4 – Forecasts of Labour Excess for Canada and the Provinces Assuming Medium Labour Supply Growth and 2003-2013 Labour Demand Growth Scenario (Scenario 3)

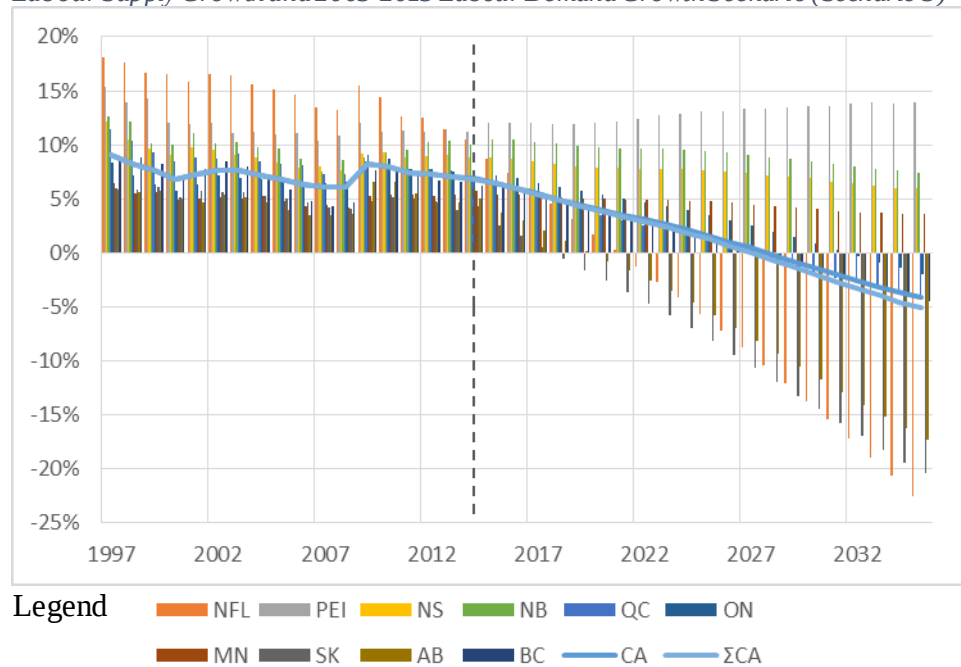
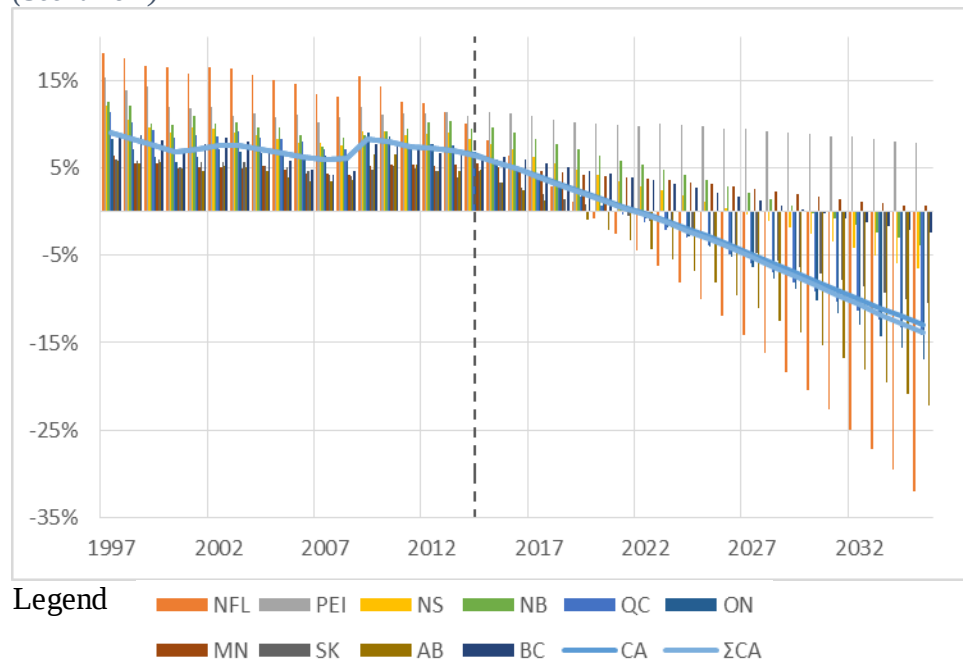


Figure 5 – Forecasts of Labour Excess for Canada and the Provinces Assuming Medium Labour Supply Growth and 1997-2013 Labour Demand Growth Scenario (Scenario 4)



Based only on the movements in all industries, the provinces can be categorized into three distinct groups. The first group includes the provinces that always have smaller labour shortages (sometimes labour surpluses) compared to Canada. Those provinces are Prince Edward Island, Nova Scotia, New Brunswick, and Manitoba. As shown in the appendices below, those provinces are among the most sparsely populated in the nation. Statistics Canada also forecasts that the Atlantic Provinces' population will shrink for the duration of the forecast. In terms of equilibrium, Prince Edward Island will never reach it for the period of our forecast. Nova Scotia could reach one as soon as 2025 should labour demand grow following the stronger trends from the 1997-2013 period, regardless of the assumptions imposed on labour supply. Should labour demand in this province follow the weaker 2003-2013 trends, then there would be no shortage of labour in the province. New Brunswick is in the same situation as Nova Scotia. The same combination of assumptions would either yield an equilibrium as soon as 2028, or excess labour

at or above 5% of labour supply by 2035.

With the exception of Manitoba, all these provinces have historically low levels of GDP growth. Thus, it appears that these three coastal provinces will do worse than the rest of the nation. Manitoba's economy, for its part, has grown almost at the same level as the national average for the 1997-2013 period and outperformed the national average by nearly six tenths of a percentage point for the 2003-2013 period. While its population was below the national average for the 1997-2013 period, Statistics Canada expects that this province will significantly outperform the national average for the duration of the forecasts. Furthermore, our predictions indicate that an equilibrium between labour supply and demand could be reached as soon as 2024 or never reached. Under the assumption that population growth follows the slower trend, an equilibrium could be reached by 2024 or 2027. The result only depends on the strength of labour demand, with the 1997-2013 growth assumptions resulting in the earliest year. Under the assumption that labour supply follows a medium growth path, then there would only be a technical shortage. As a result, all trends considered for labour demand would be sustainable in this case. As the province consistently outperforms the national average in our forecasts, Manitoba must have the healthiest economy and labour markets in the nation. In general, it appears, that this group of provinces will need significant restructuring of their economies to bring both GDP growth and health in their labour Markets. Only Manitoba should be concerned about getting more individuals in the active workforce as its economic growth appears strong in the current conditions.

The second group includes Newfoundland and Labrador and Alberta. These two provinces are known for being oil-rich. As a result, both have experienced significant GDP growth in the

past decades. Running on the assumption that the economic growth experienced in the past will subsist in the future, our predictions include an equilibrium in the labour market that could be reached as soon as 2017 for Alberta and 2018 for Newfoundland. By 2035, our forecasts also anticipate labour shortages in those provinces well above the national average as is depicted in Figures 2 to 5, above. This hints at the growth of labour demand determinants being unsustainable in the very near future. The main difference between the two provinces lies in the labour supply. Alberta has enjoyed strong population growth in the past decades. It is also expected that the province will enjoy positive population growth well above the national average until 2035. Newfoundland and Labrador, on the other hand, has seen its population age and decline since 1997. Statistics Canada also expects the province's population to shrink further over the forecast horizon should nothing be done to reverse the trend, thus amplifying Newfoundland's labour shortages.

For this group of provinces, several readjustments in the future will be needed as economic growth proves to be unsustainable in the current conditions. We should point out that our data fall short of including the impact of the ongoing oil price tumble on these provinces' economies, thus, limiting the insight we can gather on the future state of the labour markets in both provinces.

The third group consists of Quebec, Ontario, Saskatchewan and British Columbia. This collection is defined by labour shortage results being above or below national trends depending on the combination of assumptions. The importance of Quebec, Ontario, and British Columbia to the country cannot be understated. Together, they represented nearly 75% of the nation's population and more than two thirds of the national output in 2013. With the exception of British

Columbia, GDP growth in this set was slightly below the national average. Likewise, Statistics Canada expects population growth to be below the national average for all these provinces except British Columbia. Considering those conditions, it is easily understandable that these provinces' forecasts would stay relatively close to the national forecasts. For Quebec and Ontario, we predict a labour shortage by 2035 and both could reach a market equilibrium as soon as 2019. This equilibrium would only occur should labour demand determinants follow their stronger 1997-2013 trends and labour supply follow the slow growth scenario. At the other end of the spectrum, an equilibrium could occur as late as 2027 and 2031, for each province respectively, should labour demand determinants follow their 2003-2013 trends and labour supply follow a medium growth scenario.

For British Columbia, our calculations indicate that the province will face a labour deficit in 2035. Like the previous two provinces, this coastal province could reach an equilibrium in its labour market as soon as 2021 or as late as 2029 respectively under the same assumptions. Saskatchewan for its part should be in a deficit of labour by 3035. More like its neighbour Alberta, we expect that an equilibrium could be reached by 2017, at the earliest, or as late as 2020. This is much unlike the other provinces in the group which all exhibit a wide range of years by which an equilibrium could be reached. Fundamentally, this result stems from the strong growth of Saskatchewan's labour demand fundamentals, which are slightly above the national average. Likewise, on the labour supply side, the province's population growth is expected to remain close to the national average. These elements, combined with the relatively small size of the population relative to other provinces, ensure that the range of predictions for an equilibrium remains narrow. As for the other provinces, their sheer size, both economically and in terms of population, imply that their forecasts results remain relatively close to the national

average.

4.3 Industrial Forecasts, and Limitations

At the industry level, we first attempted to observe the consistency of our estimates for each projected labour excess scenario. Figure 6, below, demonstrates graphically this exercise for all industries at the national level for the year 2035. We posit that if, by the end of the forecast horizon most of our estimates for any given scenario remain fairly close, then the forecasts themselves present comparable results across industries. First, included in the figure as a reference point, is the excess labour observed in 2013, which was around 7.1% of labour supply. The second bar, labelled Estimate A, is the labour shortage in 2035 based on the forecasts of the observed trends for the industrial aggregate comprising all industries for Canada. The third bar, labelled estimate B, is based on the summation of the ten provincial forecasts for the industrial comprising all industries. The fourth orange bar, labelled Estimate C, is made of the sum of the projected estimates for the goods-producing and the services-producing industrial aggregates for Canada. The fifth grey bar, labelled Estimate D, is an estimate of labour excess composed of the sum across all provinces of the sum of projected estimates for the goods-producing and the services-producing industrial aggregates for each province. Finally, the sixth bar, labelled Estimate E, is the sum of projected labour shortfalls in 2035 for each industry at the 2-digits level NAICS code for Canada.

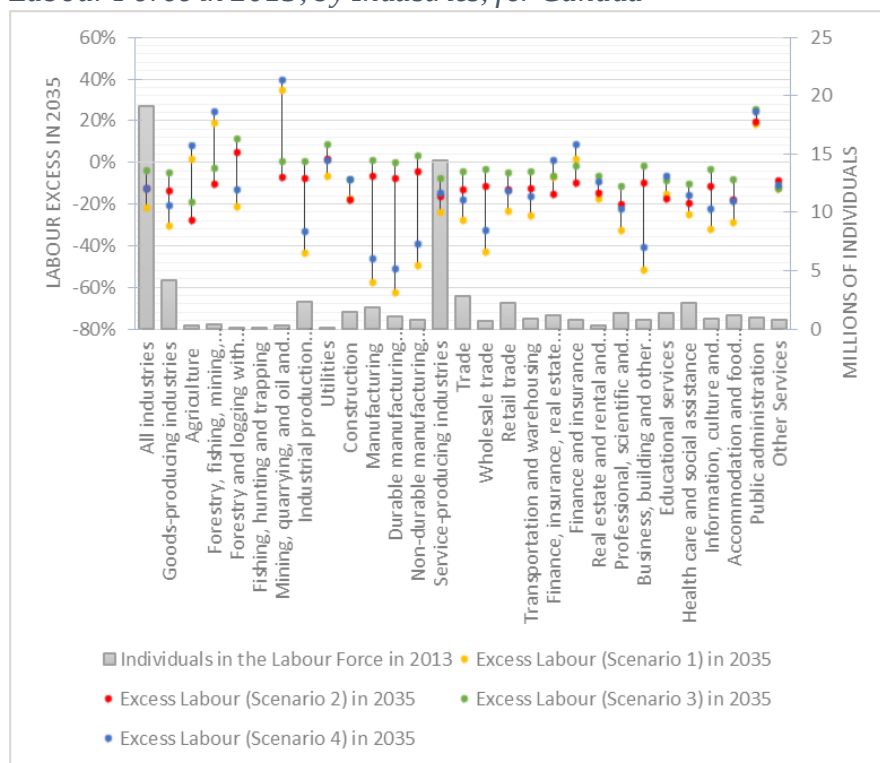
The first thing that we note is that all the estimates are negative, regardless of the preferred scenario. Clearly, observed economic trends are not sustainable in the future. Secondly, estimates C and D, which are based on the two sectoral aggregates, tend to provide more extreme values than any other estimates.

Figure 6 – Different Aggregate Measures of Excess Labour in Canada in 2035



We do not quite clearly understand why this is the case. Indeed, the broader measure covering all industries, used for estimates A and B, provide more liberal forecasts. Those forecasts are also fairly close to the reasonably conservative estimates in E which have been conceived with a bottom-up approach. Perhaps the last set of estimates is more prone to errors as all the data has been rounded one way or another. This would in turn invalidate our assumption that errors due to rounding would cancel out in the data. In the same way, estimates based on the sectoral aggregates might miss or amplify some of the subtle changes that occurred within each industry. Those changes might have been captured in the industrial aggregates for all industries or missed in all estimates except for C and D. Overall, the estimates are not necessarily comparable as the range of forecasts remains large.

Figure 7 - Labour Excess in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Canada



While remaining broadly consistent with the observations made at the national level in the previous section, the predicted labour shortages by industry stand out by the wide range of values they take across the specified scenarios. As shown for Canada in Figure 7 above, the range of values that our forecasts take in 2035, shown as the black line linking the dots, increases significantly as the number of people in the labour force in 2013, in grey and read on the right vertical axis, diminishes. That is especially true of goods-producing industries, which represented a small portion of the total labour force in 2013. With the exception of utilities and construction industries, all industrial aggregates display wide ranges for labour excess forecasts that are significantly larger than other industrial aggregates. Both utilities and construction industries have had pretty steady growth since 1997, which explains why the ranges are so (wonderfully) narrow. One possible explanation is that the skills required to work in those industries are fairly technical, making it hard for individuals to enter them. Furthermore, the cost

of entering the utility sector for a potential employer is high. Hence, this market remains occupied by large, sometimes state owned, incumbents, thus creating limitations on the size of the labour market for this industry.

Of note, labour excess forecasts in 2035 are largely positive for the mining, quarrying, and oil and gas extraction industries. This result stems from the fact that GDP and labour productivity growth during the 1997-2013 period was more subdued than labour supply growth. Hence, labour supply growth outstripped labour demand growth leading to massive excess labour estimates. In contrast, high oil prices in the first decade of the new century boosted GDP growth and labour demand significantly. Basing our labour demand forecasts on the 2003-2013 trends thus leads to labour shortages.

As stated earlier, our data do not take into account the recent slump in oil prices. Thus, should the current levels of oil prices persist in the future, the trends used to conduct the forecasts are certainly over-stating the potential for growth in this industry. This could lead to a narrower and always positive range of values for labour excess. This would be a clear indication that the labour market for non-renewable resources extraction is healthy enough to maintain historical GDP growth levels in the future.

Manufacturing forecasts, for their part, display much volatility despite being one of the largest goods-producing employers at the two-digit level NAICS code. We attribute this volatility to the chronicled downturn this industry faced in recent years and especially in Ontario. A stagnant labour productivity growth in this industry and a decline in the share of total GDP that manufacturing output represented imply that future levels of labour demand are declining. Labour supply, for its part saw declining participation rates across age groups which outpaced

the decline in employment. That trend, compounded with population growth trends, indicate that future job-seekers will stay clear of this industry in a bid to obtain higher paying and possibly more stable jobs. Therefore, we predict that the labour market for manufacturing industries will shrink at a faster pace than would be required to maintain historical levels of GDP growth in that sector.

Services-producing industries generally have narrower forecast ranges than their goods-producing counterparts. Furthermore, the long term labour excess estimates are more evenly spread out in their respective range than comparable estimates for goods-producing industries. Nonetheless, we also observe that a smaller labour force in 2013 is related to larger range of estimates and polarization of the estimates at the extremes of the range.

In the services-producing sector, public administration stands out as an outlier with labour excess forecasts in 2035 hovering around twenty percent of labour supply. This result can be explained by several factors. First, the number of public administrations is limited. As each level of government has clearly defined responsibilities, they never have to compete to offer services. As a result, demographic growth is the most important driver of labour demand for that industry. Secondly, when it comes to public services, evaluating output and productivity is a convoluted process. As most public services are either offered free of charge or at a price that is insufficient to recover all costs, pricing them can only be done by approximation. This may introduce a downward bias in the growth of determinants of labour demand. As a result, future need for employees is likely to be underestimated. Lastly, governments by nature have to be present everywhere and for as long as there are people living in those areas. As a result of this stability, labour supply has always been strong for that industry. Forecasting labour supply forward has

shown the same strength. The mix of an underestimated labour demand and steady labour supply explain the overwhelmingly positive numbers more than the trends that were used.

The finance and insurance industry (NAICS 52-53) is another interesting case. The industrial aggregate could itself be in an uncertain state by 2035. Our calculations offer as many predictions of labour excess as predictions of labour shortages with a range. The two negative estimates share the common assumption that the labour demand determinants will follow the 2003-2013 trends. As the financial sector grew considerably more in that period than in the 1997-2013 period, labour demand forecasts are necessarily stronger using the former set of assumptions. The stability of the forecasts around zero boils down to the oligopolistic nature, imposed by law, of the industry. With a small number of incumbents and stringent barriers to enter the market, the firms present are not fighting to retain their market share. As a result, the growth of labour within the industry is more measured and steady than in other industries. Hence, the historical GDP growth trends could well prove sustainable in the future should the impact of weak oil prices not propagate to the financial service sector.

All other service-producing industries will likely be unable to maintain their historical growth trends in the coming years. Even in a scenario where labour demand determinants follow their 1997-2013 trends, the slowest growth, and labour supply follows the assumptions for low population growth, most services will face a labour shortage by 2035. As a result, historical labour demand trends are clearly unsustainable in those industries in the long run.

Our calculations broadly concur with ESDC estimates that employment growth from 2013-2022 across the country will be positive. On the supply side, there is further agreement that the negative effects of an ageing population and a low fertility rate will outweigh the benefits of

projected life expectancy and immigration. Those demographic fluctuations will affect the labour force growth potential of the country, which is expected to be significantly lower than the average for the past decade. On the demand side, we also expect the impact of the financial crisis of 2008 to be a drift in the levels of the potential gross domestic product in the longer term if we assume that the 1997-2013 trends prevail. This will translate into a proportional drift in labour demand in the future. However, like ESDC, our calculations do not take into account the impact of oil prices on the economy. At the industry level, the ESDC anticipates that employment growth will be strongest in construction and services. Our results point to the same trends but we would add Mining, quarrying, oil and gas extraction as well to the list. Both analyses agree that employment growth in primary industries will be negative in the coming years. However, we disagree with the ESDC results that employment levels in manufacturing industries will only stabilize. Our estimates indicate that they will fall year over year for the entire duration of the forecasts. In the service sector, the ESDC expects that fiscal austerity will have a negative effect on output growth. In terms of employment, lower growth is to be expected compared to historical trends in all the sub-groups. Our analysis does not support those conclusions. We expect employment in services-producing industries to grow at a faster pace than historical trends. Like the ESDC, we also expect some of the strongest growth to be observed in professional, scientific and technical services as well as business, building and support services.

Where data availability is not an issue, all the above discussion also applies to industrial aggregates within provinces. The appendices below provide a detailed look at each province. Appendix 1 shows the labour excess range by 2035 by industry in a similar fashion to Figure 7. The estimates by province vary widely depending on the size of the industry, with the smaller ones offering ridiculous results such as the business, building and support services in

Newfoundland and Labrador. In 2013, Statistics Canada estimated that there were roughly 7,100 individuals engaged in the labour force for this industry. This very small market led to our labour excess calculations to fall in a range of roughly 150 percentage points.

ESDC expects that employment in Newfoundland and Labrador will fall in the second quarter of 2015 compared to a year earlier. Our results indicate that this will be a short term issue. On the supply side, the greater problem for this province is population ageing and the exodus of its youth. Those elements could lead, according to our calculations, to a shrinking workforce in the province which will be insufficient to fulfil the number of available jobs. As those observations are conditional to labour demand determinants following either their 1997-2013 or 2003-2013 trends, our results are a strong indication that historical economic growth trends are unsustainable in the province. Furthermore, recent economic development indicates that employment in goods-producing industries gained the most compared to service-producing industries. This trend is likely to be reversed as labour shortages will be more pronounced in service-producing industries.

Manufacturing industries are a special case for Newfoundland and Labrador. Our results indicate that workers will be redundant in that industry by 2035 as demand for labour dwindles faster than supply. However, our results support Newfoundland's DAES forecasts that a tightening of labour market conditions will occur within the province by 2025.

In Prince Edward Island, our calculations indicate that the softening of labour market conditions is likely to continue in the long term. While we expect the population to keep growing in the province, labour demand determinants need to pick up pace if the province wants to avoid high levels of structural unemployment across most industries. We expect growth in both labour

supply and demand in Nova Scotia. However, growth in the former will outpace the latter in several industries mostly in Service-producing industries. This indicates that services-producing industries are not sufficiently developed in the province and could benefit from some incentives to develop. With the exception of the impact of anticipated projects, labour demand in the forestry, fishing, mining, quarrying, and oil and gas industries will not grow sufficiently to absorb the labour force. The state of manufacturing industries will remain uncertain. The trends used for our forecasts are too volatile to make any relevant predictions.

In New Brunswick our outlook predicts stable levels of employment at the aggregate level. Ignoring the possible impact of greater public spending and TransCanada Corp.'s Energy East project, labour demand should remain stagnant assuming that economic growth follows its 2003-2013 trend. We consider it very unlikely that labour demand determinants would follow their respective 1997-2013 trends considering the weak economic fundamentals of the province and the net emigration that characterizes population growth. As a result, the outlook for the province remains weak for the duration of the forecasts across all industries.

Our calculations predict that employment in Quebec and Ontario will grow almost linearly, the 2008 financial crisis resulting in a drift of the trend. The problem will come from labour supply, which is expected to weaken in the foreseeable future. At the industry level, goods-producing industries in general as well as construction and manufacturing industries should face labour shortages by the end of the forecast horizon. This highlights the strength of the construction industry in both provinces, as well as the fall in participation rates of the population in the manufacturing industry. Agriculture and forestry activities are the only industries for which we anticipate unhealthy excess labour as output growth fails to raise labour demand.

Our calculations match the Manitoba Jobs and the Economy (MJE) Department predictions of roughly sixty thousand new jobs opening by 2020. Our estimates also broadly support the MJE estimations that the greatest potential for growth is located within business services, and in management related occupations. Most service industries will, at current trends, be facing a labour shortage with the exception of the information, culture and recreation services industry. This last group could face an unhealthy labour surplus by the end of the forecast horizon. In goods-producing industries, labour demand for forestry, fishing, mining, quarrying, and oil and gas extraction will not grow nearly enough to absorb the supply of labour, leading to surprising labour excesses. However, as the labour force for this industry included only 7,200 individuals in 2013, it is more likely that our projections suffer from the small size of the industry. With major hydro projects scheduled to start this year and investments in infrastructure, this industry is one of the healthiest among the provinces. As a result, demand is strong and our forecasts using the 2003-2013 trends for the determinants of labour demand reveal this to be the case. However, labour demand appears considerably more modest if we assume that GDP and labour productivity growth follow the 1997-2013 trends. Using those trends, the construction industry could face a surplus of labour. It should be noted, again, that the small size of the province's population leads to more volatility in the estimates. Hence, we cannot read too deeply into the significance of the labour shortages or surpluses.

The recent health of Saskatchewan's services-producing industries is on par to sustain the province's labour market until 2035, as the Saskatchewan Ministry of the Economy predicts. However, our estimates reveal that historical growth trends are unlikely to be sustainable in the future as population growth tumbles. The resulting labour supply being unable to sustain growth

in labour demand means that most industries will face a shortage of labour in the future. However, the manufacturing industries' weakness is expected to lead to excess labour in the province regardless of the assumptions imposed. This is an accurate reflection of the challenges manufacturers faced in the province and the unlikeliness that a weak dollar could even benefit exports. Our forecasts nonetheless agree to a certain extent with the Saskatchewan Ministry of the Economy's projections on the future of services-producing industries in the province. Our calculations indicate that this sector of Saskatchewan's economy is the most likely to suffer weak population growth. This is an indication that the potential for growth is there, but must be harvested.

The Alberta Ministry of Jobs, Skills, Training and Labour expects labour demand to outpace labour supply even with low oil prices. Our results agree to that effect despite the fact that our analysis ignores the impact of the recent oil price shock. Noticeably, the ministry predicted that the mining, oil and gas extraction industry and its support activity industry are forecast to lose more than six percent and thirteen percent of their workforce respectively in 2016. As the provincial government's assumptions take into account more recent information, it doesn't come as a surprise that our forecasts do not show any signs of fatigue between 2014 and 2016 for this industry. Moreover, as the number of people seeking or holding employment in this industry more than doubled between 1997 and 2013, we project vast labour surpluses. Furthermore, we do not see any hint that the construction industry will slow down. Our predictions instead anticipate that the growth in labour demand will be such that the industry will be in crisis by 2035 should our assumptions hold – which they don't. While we were not able to produce a forecast for utility industry, our calculations support the ministry's conclusion that manufacturing industries will provide growth in employment. Under any set of assumptions, we

forecast significant labour shortages. We also agree with the provincial government on the idea that the services-producing sector has the best potential for growth in the next five years. However, we believe that the strongest growth will come from public administration, as historical trends show that this industry had the most significant growth in labour demand. This counters the province's forecasts that growth in public administration will be flat for the next five years. Healthcare and social services, followed by education services, are expected to be the best performing industries in the province. Trends in all other services-producing industries indicate that historical growth rates are unsustainable unless a way is found to boost population growth in the province.

Finally, in British Columbia, our calculations support WorkBC predictions of prudent growth within the labour market. Mild labour supply growth and strong growth in labour demand determinants will lead to significant labour shortages in most industries by 2035. At current trends, we also see potential for a complete labour market equilibrium as early as 2021, which is not viable. Within industries, our calculations also concur with WorkBC's estimations that healthcare and social services have some of the strongest potential for employment growth. Notably, we expect growth in public administration's labour supply to weaken significantly. At current trends, this service-producing industry would be faced with a labour surplus by 2035. The vast ranges of forecast estimates in goods-producing industries don't lead us to believe that trends are stable enough to provide any form of insights for that sector of British Columbia's economy.

From our analysis, it is evident that the forecasts suffer from a lack of reliability. Estimates for industries with a small workforce, relative to the overall economy, are more likely to be

highly volatile. We would like to posit that higher volatility in the forecasts for goods-producing industries and certain services-producing industries could be linked to the automation of repetitive tasks. However, this would be far-fetched as we do not have enough evidence from the trends used to support that assertion. For instance, employment in manufacturing industries is perceived to have become more precarious as a result of loss of competitiveness and automation of repetitive tasks. However, as we point out in our review of the literature, there is no evidence that automation in the United States necessarily resulted in any productivity gains. Moreover, the share of manufacturing output relative to aggregate GDP fell in recent years in Canada. As a result, there appears to be just as much evidence in Canada to show that automation may be responsible for loss of jobs. This should lead to massive labour excesses in the medium to long term as employees become redundant. However, our results indicate a strong potential for labour shortage, thus providing no support to the idea that automation will be an important factor.

5. Conclusion

The aim of this paper was to bring forward a simple and comparable set of forecasts between provinces and industries on a yearly basis. Using a simple trend-based methodology, we attempted to see how sustainable these trends are in the future, and compare our results to government agencies and a consulting firm's estimations. We did achieve the simplicity requirement by using the Boston Consulting Group's methodology from its 2014 paper. However, such a methodology has limitations that cloud the final product. In small population cases, the trend-based methodology fails to distinguish proper trends from noises in the data. This leads to estimates that vary considerably depending on the set of assumptions used. Therefore, we believe that such a methodology is more appropriate to provide very high-level indications on the future, holding everything constant. In terms of comparability, our results were

consistent with the rest of the literature surveyed when the assumptions did not include more recent information than we had. The calculations for Alberta, for instance, are inaccurate and not comparable to the province's estimations; the Alberta government had corrected its assumptions to include the impact of the oil price shock on its economy. Due to data limitations, we were not able to get that level of information and, hence, our results suffered.

Our analysis also points to the conclusion that despite a lack of coordination between provincial agencies, their forecasts are still pretty much comparable as is if no macroeconomic shock occurs. This goes against our intuition that forecasts would be unbalanced regardless of the state of the economy at any given time. Lastly, this paper succeeded in improving on the literature as it also provides industry specific forecasts for each province. Our results show that GDP growth rates are unsustainable in most industries across the country. Demographic challenges and weak labour productivity bear much of the responsibility. However, we failed to see any evidence that automation could lead to labour redundancies within industry. Perhaps technological progress will never be able to fully replace the automotive industry worker, the cashier at the grocery or the articling lawyer. Our forecasts can nevertheless provide some basis for further work on forecasting within provinces. Likewise, they inform us on some of the likely challenges provincial governments could face. However, we caution on the use of long forecast horizons like ours. Calculations on a fifteen year horizon ignore the basic fact that the flow of information will drastically change future outlooks.

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Appendix

Appendix I – Labour Excess Estimates Range by Province and by Industry in 2035

Figure 8 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Newfoundland and Labrador

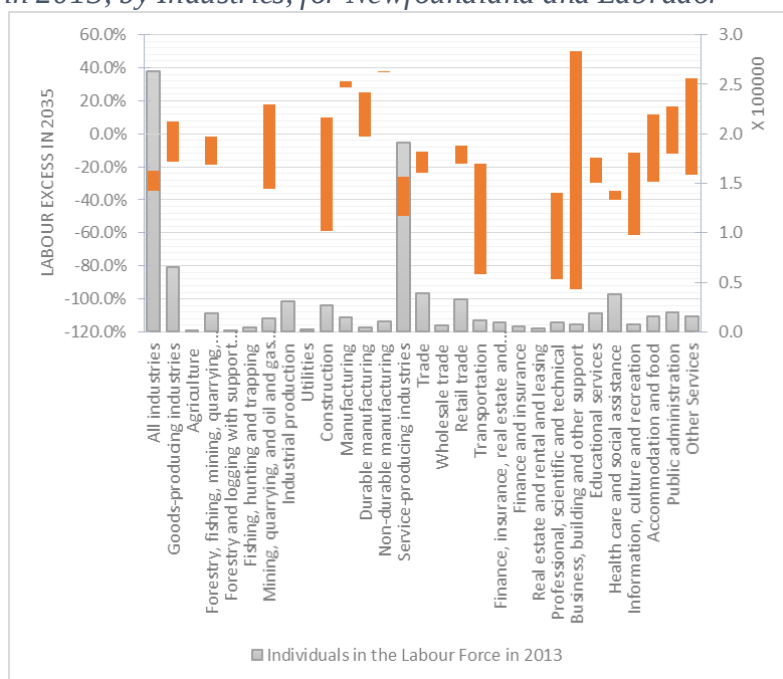


Figure 9 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Prince Edward Island

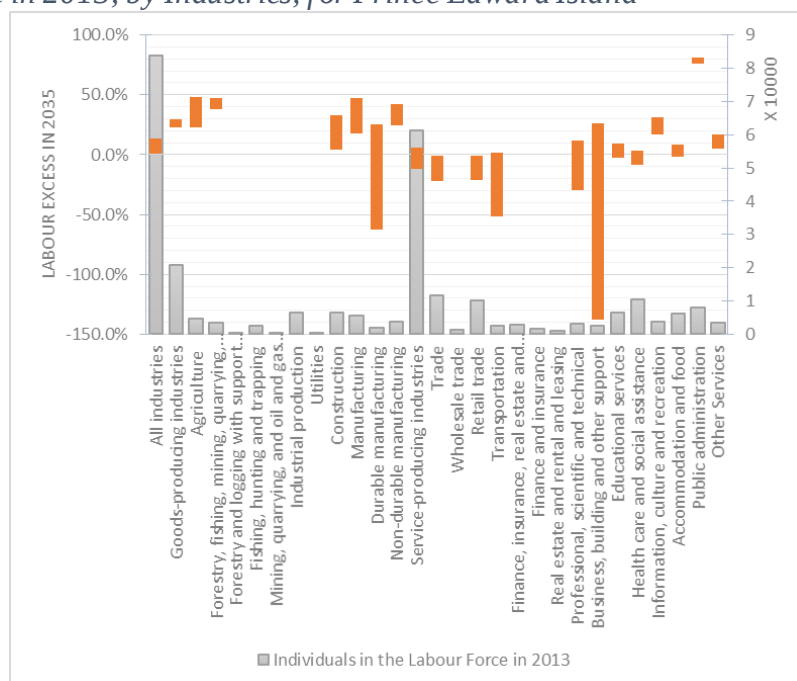


Figure 10 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Nova Scotia

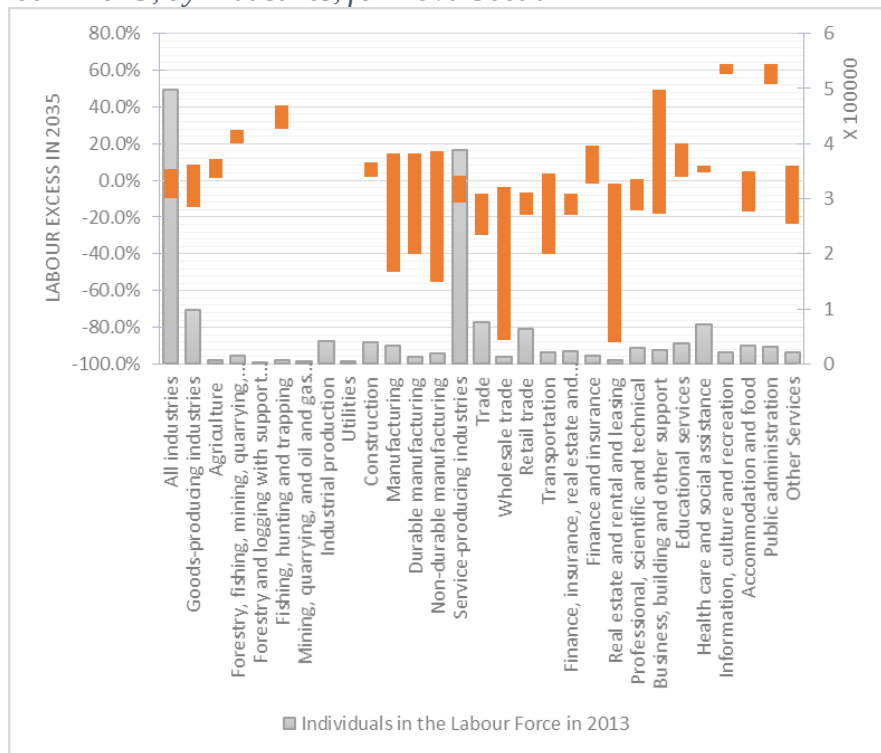


Figure 11 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for New Brunswick

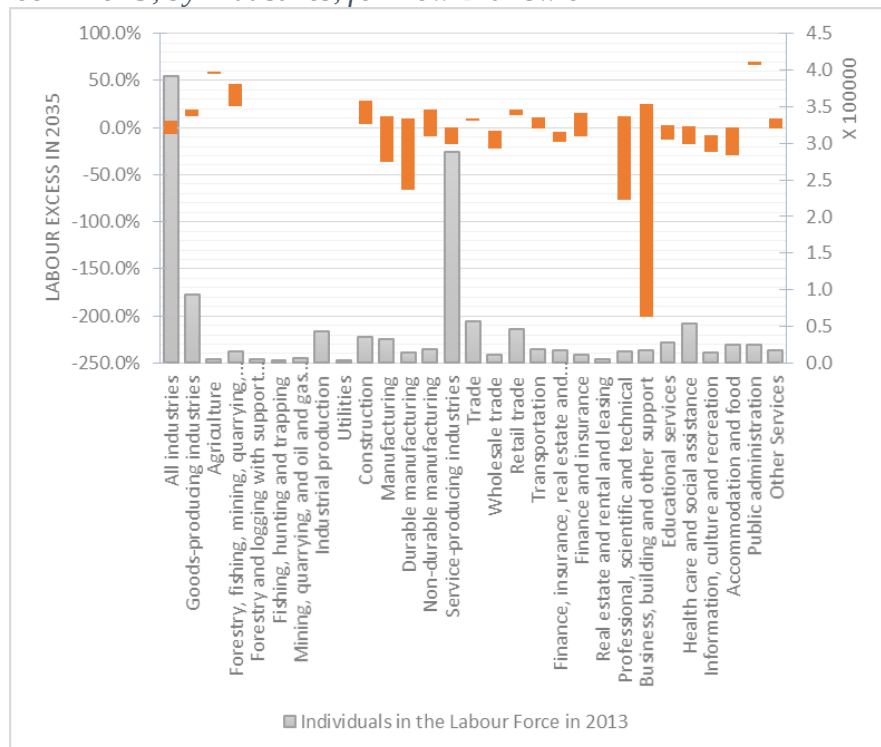


Figure 12 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Quebec

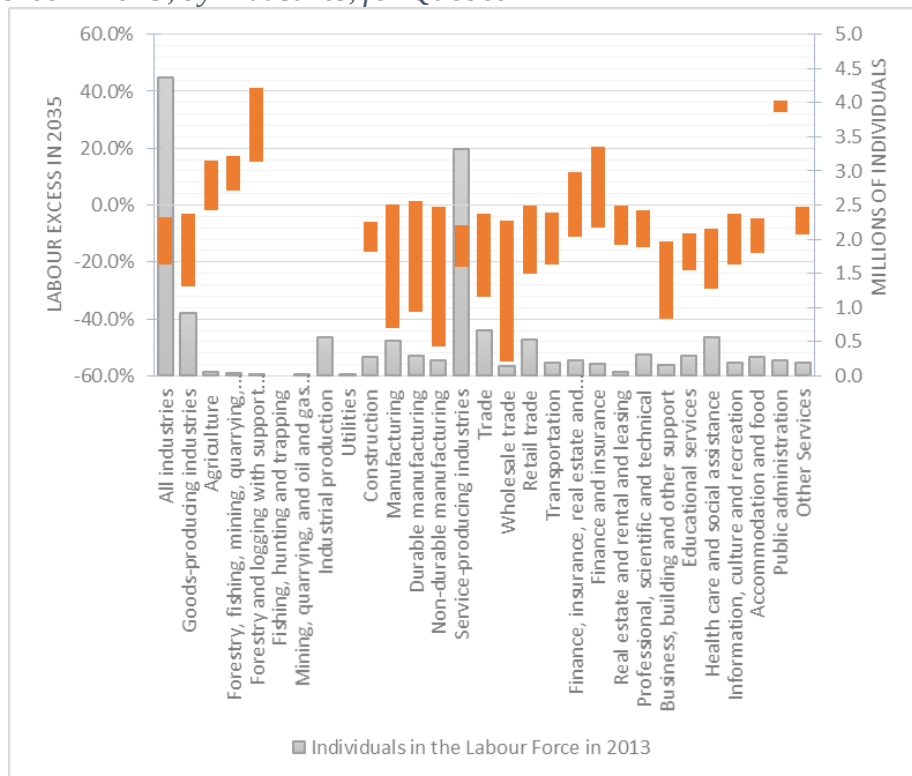


Figure 13 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Ontario

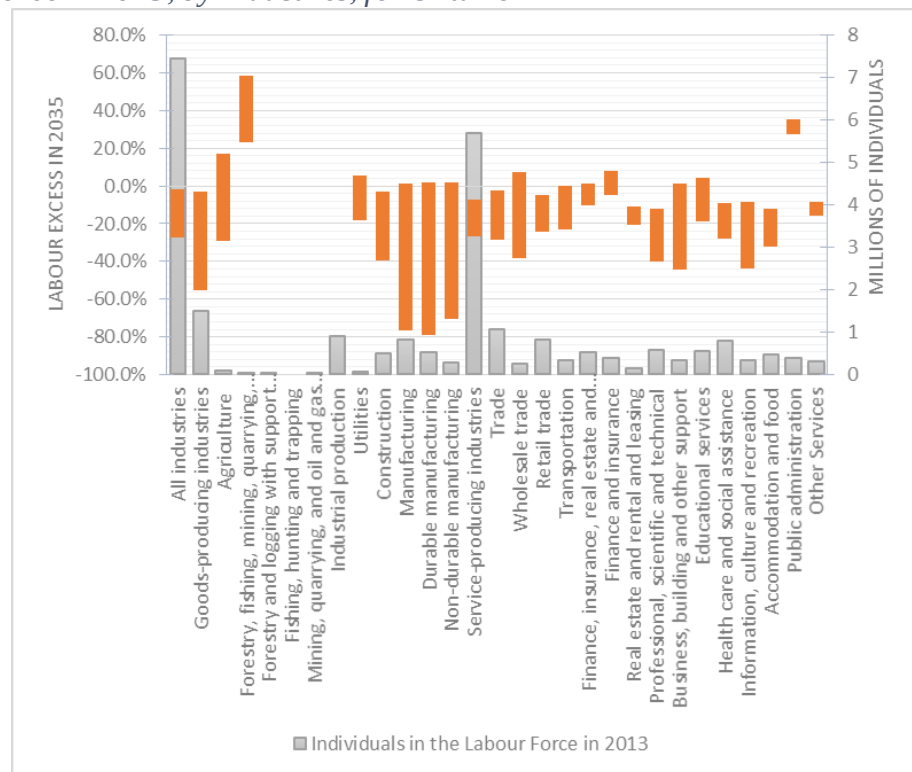


Figure 14 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Manitoba

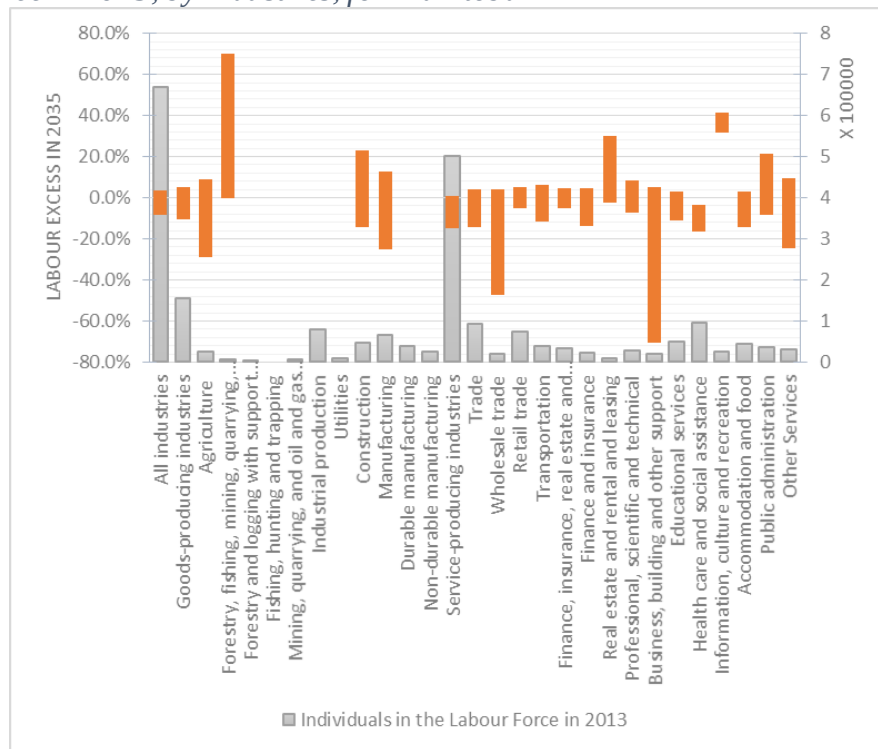


Figure 15 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Saskatchewan

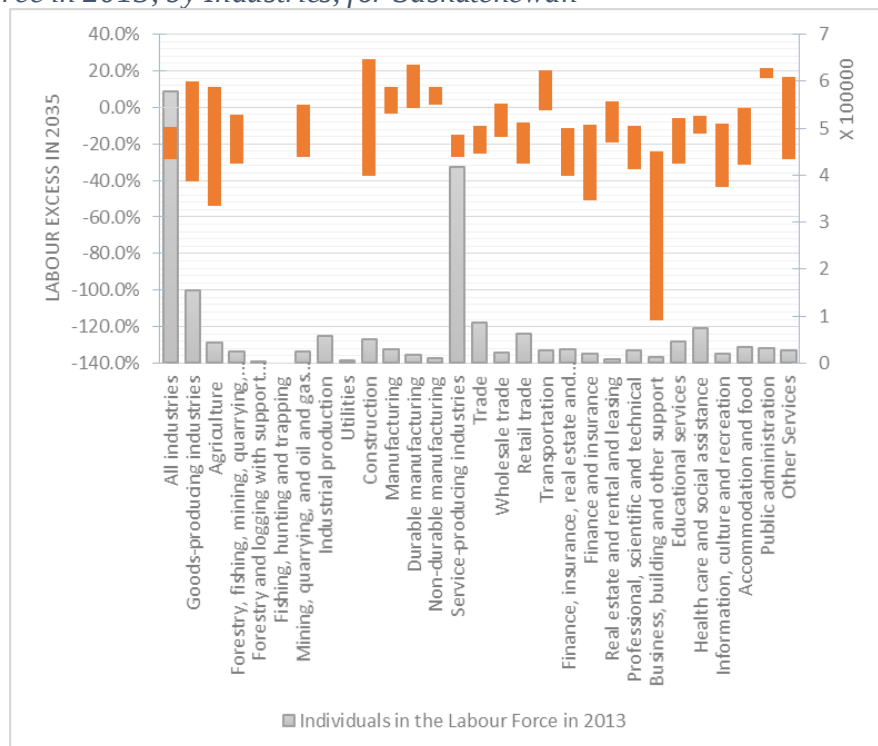


Figure 16 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for Alberta

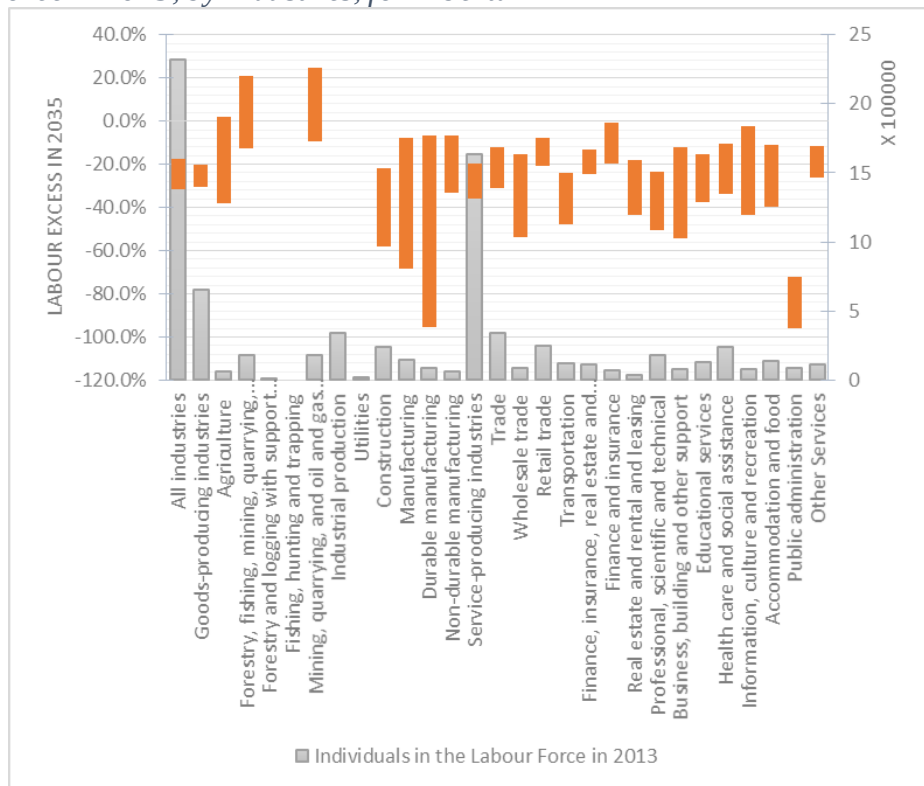
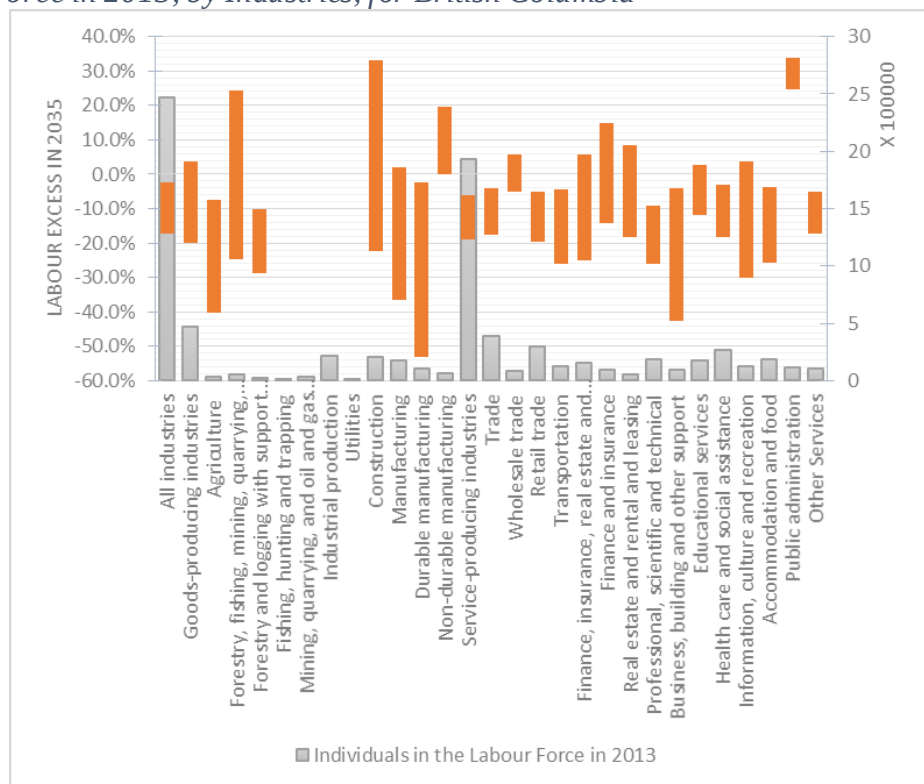


Figure 17 - Labour Excess Range (Orange) in 2035 and Number of Individuals in the Labour Force in 2013, by Industries, for British Columbia



Appendix II – Variables Estimates and Results for Canada

Table 4 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Canada

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.90	2.44	0.65	0.80
Goods-producing industries	0.89	1.57	1.00	1.05
Agriculture	3.44	2.99	3.97	4.75
Forestry, fishing, mining, quarrying, oil and gas	1.09	1.19	-1.62	-0.12
Forestry and logging with support activities	-1.12	0.11	3.26	3.39
Fishing, hunting and trapping	0.04	0.17	4.30	3.58
Mining, quarrying, and oil and gas extraction	1.20	1.25	-3.99	-1.75
Industrial production	0.06	0.94	1.80	1.35
Utilities	2.43	1.42	1.42	0.07
Construction	3.66	4.06	-0.17	0.22
Manufacturing	-1.30	0.27	1.44	1.24
Durable manufacturing industries	-1.03	0.52	1.53	1.20
Non-durable manufacturing industries	-1.62	-0.04	1.38	1.32
Service-producing industries	2.40	2.86	0.71	0.88
Trade	2.74	3.37	1.74	1.80
Wholesale trade	2.77	3.41	2.01	1.49
Retail trade	2.71	3.32	1.65	1.86
Transportation and warehousing	1.85	2.18	0.96	0.79
Finance, insurance, real estate and leasing	2.92	3.12	0.93	1.46
Finance and insurance	2.77	2.90	0.67	1.30
Real estate and rental and leasing	3.00	3.24	1.31	1.43
Professional, scientific and technical services	2.50	3.98	-0.51	0.49
Business, building and other support services	1.80	3.53	0.23	0.45
Educational services	2.33	1.99	0.06	-0.18
Health care and social assistance	2.07	2.20	-0.57	-0.65
Information, culture and recreation	1.75	3.28	0.87	1.60
Accommodation and food services	1.75	6.11	0.46	4.35
Public administration	2.16	2.25	1.40	1.41

Table 5 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Canada

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	2003-2013	2013	2003-2013	2013	2003-2013
All industries	61.35	-0.67	85.11	0.07	56.47	1.74
Goods-producing industries	9.53	-2.13	19.48	-1.36	12.63	0.45
Agriculture	1.07	-2.67	1.12	-2.50	1.80	-0.98
Forestry, fishing, mining, quarrying, oil and gas	0.82	0.37	1.93	1.18	1.16	4.18
Forestry and logging with support activities	0.14	-4.70	0.26	-6.13	0.21	-2.36
Fishing, hunting and trapping	-	-	0.10	-5.49	0.12	1.21
Mining, quarrying, and oil and gas extraction	0.66	3.20	1.57	4.05	0.84	7.52
Industrial production	4.10	-4.95	11.25	-2.93	6.77	0.06
Utilities	0.22	2.67	0.74	-0.80	0.41	4.45
Construction	4.20	2.45	6.76	2.85	3.74	2.23
Manufacturing	3.22	-6.27	8.94	-3.88	5.52	-0.92
Durable manufacturing industries	2.04	-5.49	5.35	-3.75	3.15	-0.68
Non-durable manufacturing industries	1.18	-7.47	3.59	-4.07	2.37	-1.23
Service-producing industries	48.28	-0.55	63.83	0.54	42.63	2.16
Trade	15.88	-0.60	10.80	-0.23	7.76	2.08
Wholesale trade	1.18	-2.05	3.06	-0.48	2.04	1.91
Retail trade	14.70	-0.47	7.74	-0.13	5.73	2.15
Transportation and warehousing	1.39	-0.20	4.20	-0.72	3.33	1.88
Finance, insurance, real estate and leasing	1.70	-2.65	5.55	0.93	3.87	2.51
Finance and insurance	1.17	-1.23	4.17	0.91	2.30	3.89
Real estate and rental and leasing	0.53	-5.16	1.37	0.98	1.57	0.79
Professional, scientific and technical services	2.41	1.32	6.79	1.81	4.33	2.75
Business, building and other support services	2.76	-1.61	3.28	0.25	2.57	2.75
Educational services	2.19	0.88	6.47	1.01	4.35	2.33
Health care and social assistance	3.62	0.76	10.83	1.46	6.97	2.73
Information, culture and recreation	3.91	-0.96	3.52	-0.31	2.01	2.26
Accommodation and food services	10.91	-0.04	3.95	0.33	1.92	0.99

Public administration	1.10	-2.97	4.97	0.32	2.82	2.33
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Table 6 – Observed and Expected Population Compounded Annual Growth Rates in Canada

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	25.85	1.18	-0.02	0.36
15 to 24 Years Old	4.86	0.86	-0.15	0.30
25 to 54 Years Old	14.86	0.53	-0.09	0.34
55 to 69 Years Old	6.36	3.41	0.23	0.43

Table 7 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Canada

	Population Employed in 2013 (in millions)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	17.73	1.25	0.54
Goods-producing industries	3.88	-0.11	-2.56
Agriculture	0.31	-0.50	0.13
Forestry, fishing, mining, quarrying, oil and gas	0.37	2.75	-6.98
Forestry and logging with support activities	0.05	-4.25	-2.46
Fishing, hunting and trapping	0.02	-4.08	-6.23
Mining, quarrying, and oil and gas extraction	0.30	5.41	-3.09
Industrial production	2.18	-1.70	-3.95
Utilities	0.14	1.00	1.03
Construction	1.32	3.84	2.21
Manufacturing	1.73	-2.69	-3.37
Durable manufacturing industries	1.04	-2.52	-3.29
Non-durable manufacturing industries	0.70	-2.95	-3.79
Service-producing industries	13.85	1.67	1.74
Trade	2.71	0.98	-0.04
Wholesale trade	0.61	0.75	0.74
Retail trade	2.09	1.05	-0.03
Transportation and warehousing	0.86	0.88	1.48

Finance, insurance, real estate and leasing	1.12	1.97	-
Finance and insurance	0.80	2.09	2.29
Real estate and rental and leasing	0.32	1.67	-
Professional, scientific and technical services	1.35	3.03	3.25
Business, building and other support services	0.71	1.56	3.19
Educational services	1.29	2.27	1.53
Health care and social assistance	2.18	2.66	2.17
Information, culture and recreation	0.78	0.87	0.05
Accommodation and food services	1.13	1.28	5.14
Public administration	0.77	0.75	2.78

Table 8 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Canada

	Active Population in 2013 (in millions)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	Medium Growth (in percentage points)
All industries	19.1	0.37	0.73
Goods-producing industries	4.1	-1.79	-0.63
Agriculture	0.3	-3.33	-1.52
Forestry, fishing, mining, quarrying, oil and gas	0.4	3.50	2.24
Forestry and logging with support activities	0.1	-8.49	-4.42
Fishing, hunting and trapping	0.0	-	-
Mining, quarrying, and oil and gas extraction	0.3	9.00	5.17
Industrial production	2.3	-4.09	-1.92
Utilities	0.1	1.81	1.31
Construction	1.4	4.98	3.08
Manufacturing	1.8	-5.81	-2.88
Durable manufacturing industries	1.1	-5.54	-2.73
Non-durable manufacturing industries	0.7	-6.16	-3.09
Service-producing industries	14.4	1.43	1.13
Trade	2.8	0.37	0.56
Wholesale trade	0.6	0.13	0.41
Retail trade	2.2	0.47	0.61

Transportation and warehousing	0.9	0.27	0.48
Finance, insurance, real estate and leasing	1.1	2.22	1.56
Finance and insurance	0.8	2.87	1.90
Real estate and rental and leasing	0.3	1.33	1.07
Professional, scientific and technical services	1.4	3.70	2.37
Business, building and other support services	0.8	1.36	1.08
Educational services	1.3	2.47	1.70
Health care and social assistance	2.2	3.20	2.09
Information, culture and recreation	0.8	0.17	0.45
Accommodation and food services	1.2	0.37	0.59
Public administration	1.0	1.27	1.05

Table 9 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Canada

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013		1997-2013	
		Trend		Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.07	-1.88	-12.57	6.35	3.53
Goods-producing industries	6.20	-2.56	-13.60	23.85	34.18
Agriculture	4.75	-8.24	-27.93	-16.77	-47.02
Forestry, fishing, mining, quarrying, oil and gas	7.76	-0.87	-10.75	69.41	87.57
Forestry and logging with support activities	14.71	10.15	4.88	-12.23	-43.02
Fishing, hunting and trapping	25.64	-	-	-	-
Mining, quarrying, and oil and gas extraction	5.20	-0.82	-7.32	63.22	83.10
Industrial production	4.97	-0.74	-7.55	23.65	35.30
Utilities	1.78	0.61	1.44	0.25	0.78
Construction	7.84	-4.38	-17.89	13.70	16.81
Manufacturing	5.18	-0.14	-6.58	7.92	8.63
Durable manufacturing industries	4.73	-1.03	-7.70	8.16	9.59
Non-durable manufacturing industries	5.85	1.34	-4.51	11.11	13.68
Service-producing industries	4.05	-5.38	-16.49	-6.32	-18.42

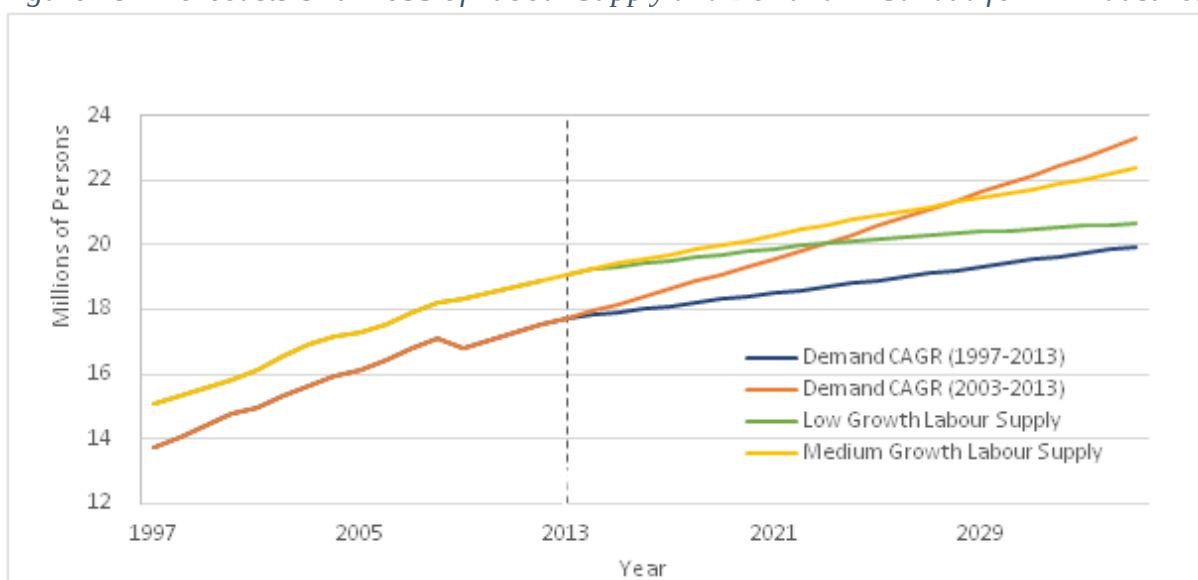
Trade	4.53	-4.40	-13.21	7.58	9.47
Wholesale trade	4.10	-2.52	-11.36	-2.40	-11.11
Retail trade	4.66	-4.82	-13.45	7.81	10.35
Transportation and warehousing	4.10	-2.68	-12.64	-10.19	-28.21
Finance, insurance, real estate and leasing	2.36	-4.93	-15.12	-	-
Finance and insurance	2.17	-3.12	-9.74	-5.67	-14.76
Real estate and rental and leasing	2.80	-6.01	-19.32	-	-
Professional, scientific and technical services	3.46	-6.94	-20.45	-9.76	-26.33
Business, building and other support services	8.25	-0.14	-9.70	-21.25	-55.78
Educational services	3.76	-5.29	-17.60	3.44	-0.34
Health care and social assistance	1.99	-7.27	-19.66	-1.30	-7.73
Information, culture and recreation	5.89	-3.12	-11.70	6.55	6.75
Accommodation and food services	6.72	-7.41	-18.14	-68.17	-
Public administration	20.53	21.17	19.57	-0.13	168.74
					-24.71

Table 10 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Canada

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.07	1.60	-4.13	9.55	10.77
Goods-producing industries	6.20	0.95	-5.16	26.45	39.07
Agriculture	4.75	-5.10	-19.39	-13.38	-37.20
Forestry, fishing, mining, quarrying, oil and gas	7.76	2.54	-2.73	70.44	88.47
Forestry and logging with support activities	14.71	12.98	11.36	-8.70	-33.28
Fishing, hunting and trapping	25.64	-	-	-	-
Mining, quarrying, and oil and gas extraction	5.20	2.63	0.49	64.48	84.34
Industrial production	4.97	2.66	0.16	26.23	39.94
Utilities	1.78	3.87	8.25	3.52	7.63
Construction	7.84	-0.59	-8.45	16.83	23.47
Manufacturing	5.18	3.21	1.02	11.01	15.14
Durable manufacturing industries	4.73	2.38	0.03	11.26	16.08
Non-durable manufacturing industries	5.85	4.61	2.87	14.06	19.78
Service-producing industries	4.05	-1.77	-7.76	-2.69	-9.54
Trade	4.53	-0.88	-4.73	10.70	16.25

Wholesale trade	4.10	0.92	-3.31	1.04	-3.08
Retail trade	4.66	-1.29	-4.86	10.92	17.14
Transportation and warehousing	4.10	0.64	-4.72	-6.63	-19.19
Finance, insurance, real estate and leasing	2.36	-1.39	-6.70	-	-
Finance and insurance	2.17	0.41	-1.77	-2.05	-6.43
Real estate and rental and leasing	2.80	-2.61	-10.74	-	-
Professional, scientific and technical services	3.46	-3.23	-11.32	-5.94	-16.75
Business, building and other support services	8.25	3.14	-1.87	-17.29	-44.66
Educational services	3.76	-1.68	-8.81	6.75	7.16
Health care and social assistance	1.99	-3.57	-10.68	2.20	0.36
Information, culture and recreation	5.89	0.44	-3.27	9.78	13.79
Accommodation and food services	6.72	-3.52	-8.38	-62.07	-146.53
Public administration	20.53	23.90	25.53	3.34	-15.46

Figure 18 – Forecasts Until 2035 of Labour Supply and Demand in Canada for All Industries



Appendix III – Variables Estimates and Results for Newfoundland and Labrador

Table 11 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Newfoundland and Labrador

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.26	3.20	0.31	1.89
Goods-producing industries	0.52	5.84	-1.97	4.24
Agriculture	7.53	3.94	9.08	2.86
Forestry, fishing, mining, quarrying, oil and gas	-1.18	9.79	-2.69	8.78
Forestry and logging with support activities	-4.84	-2.37	-	2.63
Fishing, hunting and trapping	0.55	2.38	7.63	6.83
Mining, quarrying, and oil and gas extraction	-1.18	10.56	-8.56	4.48
Industrial production	-1.06	6.14	-2.92	5.09
Utilities	1.42	0.66	0.07	0.39
Construction	10.93	7.65	2.34	1.81
Manufacturing	-0.54	2.10	1.27	3.77
Durable manufacturing industries	0.20	6.09	-0.52	3.94
Non-durable manufacturing industries	-1.03	0.83	1.95	3.90
Service-producing industries	2.16	2.33	1.63	1.10
Trade	3.94	4.14	3.60	3.41
Wholesale trade	5.30	4.79	3.93	2.65
Retail trade	3.36	3.86	3.19	3.35
Transportation and warehousing	1.49	1.00	3.19	0.69
Finance, insurance, real estate and leasing	3.00	-	1.78	-
Finance and insurance	2.30	1.17	0.13	0.60
Real estate and rental and leasing	3.31	-	3.31	-
Professional, scientific and technical services	2.46	4.24	0.39	0.71
Business, building and other support services	2.43	4.36	4.68	0.33
Educational services	1.67	1.15	0.49	0.45
Health care and social assistance	1.06	1.76	-0.56	0.03
Information, culture and recreation	1.86	3.23	3.44	3.23
Accommodation and food services	2.18	2.87	1.87	0.92
Public administration	1.09	1.29	0.54	-0.51

Table 12 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Newfoundland and Labrador

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	2003-2013	2013	2003-2013	2013	2003-2013
All industries	57.21	0.48	79.18	0.09	47.68	2.80
Goods-producing industries	10.36	2.53	19.51	0.67	14.08	5.00
Agriculture	-	-	0.46	-3.84	0.43	-
Forestry, fishing, mining, quarrying, oil and gas	2.14	1.69	6.23	0.42	3.71	4.02
Forestry and logging with support activities	-	-	-	-	-	-
Fishing, hunting and trapping	-	-	1.28	-8.55	1.73	0.60
Mining, quarrying, and oil and gas extraction	1.81	-	4.81	7.71	1.81	7.54
Industrial production	-	-	9.75	0.60	-	-
Utilities	-	-	0.87	0.27	-	-
Construction	5.59	10.36	7.88	5.30	5.27	7.20
Manufacturing	1.81	-6.69	4.08	-3.88	4.41	3.47
Durable manufacturing industries	0.82	-4.12	1.28	-1.44	1.38	6.28
Non-durable manufacturing industries	0.99	-8.37	2.79	-4.81	3.02	2.42
Service-producing industries	43.90	0.02	58.34	0.20	32.13	2.07
Trade	15.29	2.37	10.26	-0.97	6.74	3.01
Wholesale trade	1.15	-	1.92	0.55	1.04	0.34
Retail trade	14.14	2.05	8.33	-1.29	5.61	3.43
Transportation and warehousing	0.82	-6.84	3.71	-2.25	2.59	0.34
Finance, insurance, real estate and leasing	0.99	3.56	2.98	1.43	1.90	-0.53
Finance and insurance	-	-	2.01	1.50	1.04	1.69
Real estate and rental and leasing	-	-	0.96	1.28	0.86	-2.63
Professional, scientific and technical services	1.48	-1.20	3.16	2.55	1.55	1.22
Business, building and other support services	1.15	-11.79	2.20	-1.27	1.38	6.28
Educational services	1.81	-3.72	6.73	1.80	2.85	0.81
Health care and social assistance	4.11	4.52	13.23	1.51	5.70	1.05
Information, culture and recreation	3.62	1.24	1.97	-1.84	0.78	-5.56
Accommodation and food	9.21	1.16	3.48	-0.79	2.16	5.60

services						
Public administration	1.97	-2.35	6.69	0.58	3.20	2.99

Table 13 – Observed and Expected Population Compounded Annual Growth Rates in Newfoundland and Labrador

Age Group	Population in 2013 (x 10,000)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.39	-0.14	-1.52	-1.42
15 to 24 Years Old	0.06	-2.15	-1.63	-1.41
25 to 54 Years Old	0.22	-0.92	-1.87	-1.78
55 to 69 Years Old	0.12	3.71	-0.88	-0.83

Table 14 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Newfoundland and Labrador

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	7.41	1.16	1.32
Goods-producing industries	1.72	0.18	0.89
Agriculture	0.38	0.83	-3.70
Forestry, fishing, mining, quarrying, oil and gas	0.25	-0.39	-0.49
Forestry and logging with support activities	-	-	-
Fishing, hunting and trapping	0.21	-0.46	-0.44
Mining, quarrying, and oil and gas extraction	0.03	-	-5.01
Industrial production	0.56	-	1.88
Utilities	0.04	0.00	8.01
Construction	0.56	2.68	2.23
Manufacturing	0.49	-2.17	0.99
Durable manufacturing industries	0.16	-3.13	-1.18
Non-durable manufacturing industries	0.33	-1.66	2.32
Service-producing industries	5.69	1.49	1.45
Trade	1.09	0.77	1.19
Wholesale trade	0.11	-1.66	1.13
Retail trade	0.98	1.20	1.10

Transportation and warehousing	0.24	-0.80	0.36
Finance, insurance, real estate and leasing	0.27	2.54	-
Finance and insurance	0.17	1.96	-0.60
Real estate and rental and leasing	0.10	3.63	-
Professional, scientific and technical services	0.30	1.84	4.14
Business, building and other support services	0.21	-0.91	4.69
Educational services	0.63	2.97	2.38
Health care and social assistance	1.01	2.75	2.22
Information, culture and recreation	0.30	1.44	1.78
Accommodation and food services	0.54	1.62	0.89
Public administration	0.33	0.00	0.58

Table 15 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Newfoundland and Labrador

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	Medium Growth (in percentage points)
All industries	8.37	0.94	1.29
Goods-producing industries	2.08	0.56	0.89
Agriculture	0.47	1.05	1.40
Forestry, fishing, mining, quarrying, oil and gas	0.34	0.80	1.11
Forestry and logging with support activities	0.02	-	-
Fishing, hunting and trapping	0.27	-	-
Mining, quarrying, and oil and gas extraction	0.05	-	-
Industrial production	0.66	-	-
Utilities	0.04	-	-
Construction	0.66	2.10	2.45
Manufacturing	0.57	-0.30	0.02
Durable manufacturing industries	0.19	-2.95	-2.61
Non-durable manufacturing industries	0.38	-0.10	0.20
Service-producing industries	6.14	1.06	1.41
Trade	1.16	0.07	0.43

Wholesale trade	0.13	-	-
Retail trade	1.03	0.57	0.93
Transportation and warehousing	0.27	-1.59	-1.25
Finance, insurance, real estate and leasing	0.28	2.87	3.23
Finance and insurance	0.18	-	-
Real estate and rental and leasing	0.11	-	-
Professional, scientific and technical services	0.32	1.74	2.11
Business, building and other support services	0.25	-0.68	-0.32
Educational services	0.66	2.63	2.98
Health care and social assistance	1.04	2.24	2.61
Information, culture and recreation	0.37	1.83	2.19
Accommodation and food services	0.62	1.01	1.40
Public administration	0.81	2.50	2.82

Table 16 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Newfoundland and Labrador

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	11.42	-6.52	-25.05	-26.81	-72.16
Goods-producing industries	16.90	-0.38	-16.66	-15.95	-51.96
Agriculture	27.78	-	-	-	-
Forestry, fishing, mining, quarrying, oil and gas	12.50	-3.54	-18.91	-97.11	-287.12
Forestry and logging with support activities	-	-	-	-	-
Fishing, hunting and trapping	20.00	-	-	-	-
Mining, quarrying, and oil and gas extraction	8.03	-13.10	-33.56	-199.97	-698.56
Industrial production	13.14	-	-	-	-
Utilities	4.00	-	-	-	-
Construction	19.48	-22.48	-75.91	-0.29	-21.94
Manufacturing	19.33	22.49	30.95	21.87	29.93
Durable manufacturing industries	12.24	14.40	24.21	-19.15	-38.96
Non-durable manufacturing	22.77	27.95	36.98	37.13	50.92

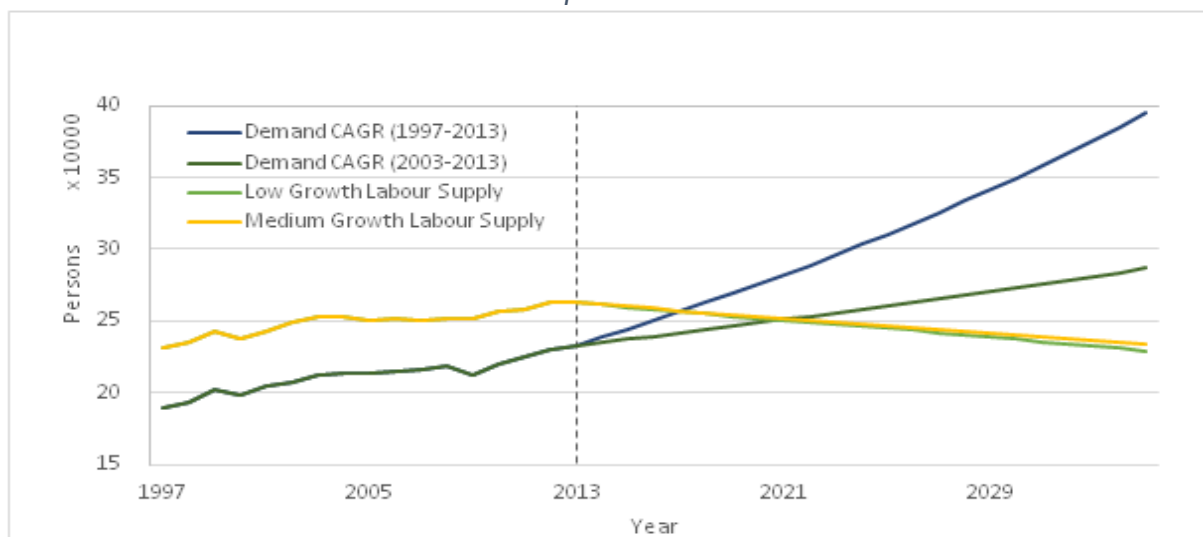
industries					
Service-producing industries	6.59	-10.51	-28.36	-30.69	-74.57
Trade	5.57	-5.59	-13.50	-29.75	-65.59
Wholesale trade	6.56	-	-	-	-
Retail trade	5.39	-4.43	-9.73	-28.63	-60.81
Transportation and warehousing	9.48	-4.96	-20.18	-60.63	-162.20
Finance, insurance, real estate and leasing	5.32	-15.72	-37.18	-	-
Finance and insurance	1.72	-	-	-	-
Real estate and rental and leasing	11.11	-	-	-	-
Professional, scientific and technical services	4.17	-16.81	-38.31	-56.38	-136.11
Business, building and other support services	12.68	29.13	49.34	-33.20	-61.09
Educational services	5.24	-12.32	-29.42	-18.26	-42.23
Health care and social assistance	3.16	-17.18	-37.48	-22.71	-49.61
Information, culture and recreation	12.00	-5.95	-15.02	-68.53	-169.35
Accommodation and food services	12.18	7.89	9.63	-26.61	-61.91
Public administration	31.96	23.30	14.83	38.83	43.76

Table 17 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Newfoundland and Labrador

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013	Trend
		In 2025	In 2035	In 2025	In 2035
All industries	11.42	-5.63	-22.56	-25.75	-68.73
Goods-producing industries	16.90	0.41	-14.56	-15.04	-49.23
Agriculture	27.78	-	-	-	-
Forestry, fishing, mining, quarrying, oil and gas	12.50	-2.70	-16.78	-95.50	-280.18
Forestry and logging with support activities	-	-	-	-	-
Fishing, hunting and trapping	20.00	-	-	-	-
Mining, quarrying, and oil and gas extraction	8.03	-12.05	-30.52	-197.19	-680.36
Industrial production	13.14	-	-	-	-
Utilities	4.00	-	-	-	-
Construction	19.48	-21.44	-72.06	0.56	-19.26
Manufacturing	19.33	23.00	31.84	22.38	30.84
Durable manufacturing industries	12.24	14.96	25.20	-18.37	-37.14
Non-durable manufacturing industries	22.77	28.42	37.79	37.54	51.55
Service-producing industries	6.59	-9.55	-25.72	-29.56	-70.98

Trade	5.57	-4.70	-10.68	-28.65	-61.49
Wholesale trade	6.56	-	-	-	-
Retail trade	5.39	-3.55	-7.02	-27.56	-56.84
Transportation and warehousing	9.48	-4.12	-18.21	-59.35	-157.90
Finance, insurance, real estate and leasing	5.32	-14.68	-34.23	-	-
Finance and insurance	1.72	-	-	-	-
Real estate and rental and leasing	11.11	-	-	-	-
Professional, scientific and technical services	4.17	-15.75	-35.54	-54.96	-131.38
Business, building and other support services	12.68	29.65	50.04	-32.23	-58.88
Educational services	5.24	-11.29	-26.91	-17.17	-39.46
Health care and social assistance	3.16	-16.11	-34.46	-21.58	-46.32
Information, culture and recreation	12.00	-4.91	-11.27	-66.88	-160.58
Accommodation and food services	12.18	8.66	11.81	-25.55	-58.01
Public administration	31.96	23.96	16.36	39.36	44.77

Figure 19 – Forecasts Until 2035 of Labour Supply and Demand in Newfoundland and Labrador for All Industries



Appendix IV – Variables Estimates and Results for Prince Edward Island

Table 18 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Prince Edward Island

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.84	2.25	0.67	0.76
Goods-producing industries	0.94	2.22	0.76	1.99
Agriculture	-0.51	-0.84	-1.33	-0.21
Forestry, fishing, mining, quarrying, oil and gas	3.05	2.46	3.46	2.46
Forestry and logging with support activities	-6.14	-5.14	-	-4.57
Fishing, hunting and trapping	4.11	3.72	4.60	3.72
Mining, quarrying, and oil and gas extraction	0.51	-3.26	-	-5.68
Industrial production	1.02	3.38	-	-
Utilities	6.68	3.45	6.68	-
Construction	1.60	2.37	-1.05	0.98
Manufacturing	0.40	3.38	2.62	3.89
Durable manufacturing industries	0.43	2.46	3.68	2.46
Non-durable manufacturing industries	0.69	4.31	2.39	5.06
Service-producing industries	2.15	2.31	0.65	0.39
Trade	2.82	3.34	2.04	2.04
Wholesale trade	3.30	2.53	5.04	4.09
Retail trade	2.67	3.63	1.46	1.91
Transportation and warehousing	1.73	-0.05	2.55	-0.88
Finance, insurance, real estate and leasing	2.94	-	0.38	-
Finance and insurance	2.44	1.51	0.47	-0.18
Real estate and rental and leasing	3.14	-	-0.47	-
Professional, scientific and technical services	1.27	2.91	-0.56	-0.32
Business, building and other support services	2.23	5.36	3.16	1.19
Educational services	2.84	2.26	-0.13	-0.45
Health care and social assistance	2.14	2.33	-0.60	-0.26
Information, culture and recreation	0.16	2.83	-1.26	0.85
Accommodation and food services	0.81	1.61	-0.79	-0.12
Public administration	1.59	1.93	1.59	2.66

Table 19 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Prince Edward Island

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	71.82	0.27	89.21	0.20	64.05	2.95
Goods-producing industries	13.53	0.05	21.95	-1.48	19.35	3.27
Agriculture	4.16	2.97	4.21	-0.97	5.34	2.06
Forestry, fishing, mining, quarrying, oil and gas	1.04	-6.65	3.69	-1.53	4.00	3.27
Forestry and logging with support activities	-	-	-	-	-	-
Fishing, hunting and trapping	-	-	2.63	-2.64	3.67	2.37
Mining, quarrying, and oil and gas extraction	-	-	0.70	7.39	-	-
Industrial production	-	-	7.73	-2.86	-	-
Utilities	-	-	0.53	0.20	-	-
Construction	4.16	2.97	7.20	0.97	5.67	3.89
Manufacturing	4.16	-2.16	6.50	-3.69	4.34	4.09
Durable manufacturing industries	1.04	-3.92	2.28	-3.53	1.00	0.34
Non-durable manufacturing industries	2.60	-3.26	4.21	-3.78	3.00	4.49
Service-producing industries	55.17	-0.14	66.20	0.78	43.70	2.73
Trade	16.13	-1.16	10.18	0.38	8.67	1.14
Wholesale trade	-	-	1.58	-0.85	1.00	-3.65
Retail trade	16.13	-0.57	8.60	0.62	7.67	2.01
Transportation and warehousing	1.04	0.05	2.81	-2.01	3.00	-1.20
Finance, insurance, real estate and leasing	1.56	4.19	3.34	1.32	2.34	4.87
Finance and insurance	-	-	2.28	1.01	1.00	-
Real estate and rental and leasing	1.04	-	1.05	0.20	1.33	3.27
Professional, scientific and technical services	2.08	0.05	4.21	2.05	1.67	1.40
Business, building and other support services	4.16	-1.12	2.11	-1.33	1.67	1.40
Educational services	2.08	0.05	8.25	2.09	4.67	4.87
Health care and social assistance	5.20	5.29	12.64	1.39	7.34	3.27
Information, culture and recreation	5.72	1.01	3.34	0.74	2.34	4.87
Accommodation and food services	13.01	-0.34	5.27	2.05	2.34	1.90

Public administration	2.08	-2.16	10.01	0.03	7.01	6.11
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Table 20 – Observed and Expected Population Compounded Annual Growth Rates in Prince Edward Island

Age Group	Population in 2013 (in millions)	Observed Growth (1997-2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.11	0.73	-0.10	0.28
15 to 24 Years Old	0.02	-0.06	-0.31	0.17
25 to 54 Years Old	0.06	-0.16	-0.18	0.21
55 to 69 Years Old	0.03	3.73	0.18	0.46

Table 21 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Prince Edward Island

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	7.41	1.16	1.32
Goods-producing industries	1.72	0.18	0.89
Agriculture	0.38	0.83	-3.70
Forestry, fishing, mining, quarrying, oil and gas	0.25	-0.39	-0.49
Forestry and logging with support activities	-	-	-
Fishing, hunting and trapping	0.21	-0.46	-0.44
Mining, quarrying, and oil and gas extraction	0.03	-	-5.01
Industrial production	0.56	-	1.88
Utilities	0.04	0.00	8.01
Construction	0.56	2.68	2.23
Manufacturing	0.49	-2.17	0.99
Durable manufacturing industries	0.16	-3.13	-1.18
Non-durable manufacturing industries	0.33	-1.66	2.32
Service-producing industries	5.69	1.49	1.45
Trade	1.09	0.77	1.19
Wholesale trade	0.11	-1.66	1.13
Retail trade	0.98	1.20	1.10
Transportation and	0.24	-0.80	0.36

warehousing			
Finance, insurance, real estate and leasing	0.27	2.54	-
Finance and insurance	0.17	1.96	-0.60
Real estate and rental and leasing	0.10	3.63	-
Professional, scientific and technical services	0.30	1.84	4.14
Business, building and other support services	0.21	-0.91	4.69
Educational services	0.63	2.97	2.38
Health care and social assistance	1.01	2.75	2.22
Information, culture and recreation	0.30	1.44	1.78
Accommodation and food services	0.54	1.62	0.89
Public administration	0.33	0.00	0.58

Table 22 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Prince Edward Island

	Active Population in 2013 (x 1,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	83.7	0.94	1.29
Goods-producing industries	20.8	0.56	0.89
Agriculture	4.7	1.05	1.40
Forestry, fishing, mining, quarrying, oil and gas	3.4	0.80	1.11
Forestry and logging with support activities	0.2	-	-
Fishing, hunting and trapping	2.7	-	-
Mining, quarrying, and oil and gas extraction	0.5	-	-
Industrial production	6.6	-	-
Utilities	0.4	-	-
Construction	6.6	2.10	2.45
Manufacturing	5.7	-0.30	0.02
Durable manufacturing industries	1.9	-2.95	-2.61
Non-durable manufacturing industries	3.8	-0.10	0.20
Service-producing industries	61.4	1.06	1.41
Trade	11.6	0.07	0.43
Wholesale trade	1.3	-	-

Retail trade	10.3	0.57	0.93
Transportation and warehousing	2.7	-1.59	-1.25
Finance, insurance, real estate and leasing	2.8	2.87	3.23
Finance and insurance	1.8	-	-
Real estate and rental and leasing	1.1	-	-
Professional, scientific and technical services	3.2	1.74	2.11
Business, building and other support services	2.5	-0.68	-0.32
Educational services	6.6	2.63	2.98
Health care and social assistance	10.4	2.24	2.61
Information, culture and recreation	3.7	1.83	2.19
Accommodation and food services	6.2	1.01	1.40
Public administration	8.1	2.50	2.82

Table 23 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Prince Edward Island

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	11.47	0.10	7.11	8.52	3.93
Goods-producing industries	17.31	0.21	23.99	14.36	11.17
Agriculture	19.15	0.23	22.98	55.72	71.95
Forestry, fishing, mining, quarrying, oil and gas	26.47	0.37	43.42	37.93	44.64
Forestry and logging with support activities	-	-	-	-	-
Fishing, hunting and trapping	22.22	-	-	-	-
Mining, quarrying, and oil and gas extraction	40.00	-	-	-	-
Industrial production	15.15	-	-	-	-
Utilities	0.00	-	-	-	-
Construction	15.15	0.11	3.99	15.12	12.85
Manufacturing	14.04	0.28	43.31	-4.70	-13.93
Durable manufacturing industries	15.79	0.15	19.25	-7.46	-25.29
Non-durable manufacturing industries	13.16	0.23	38.48	-23.37	-47.24

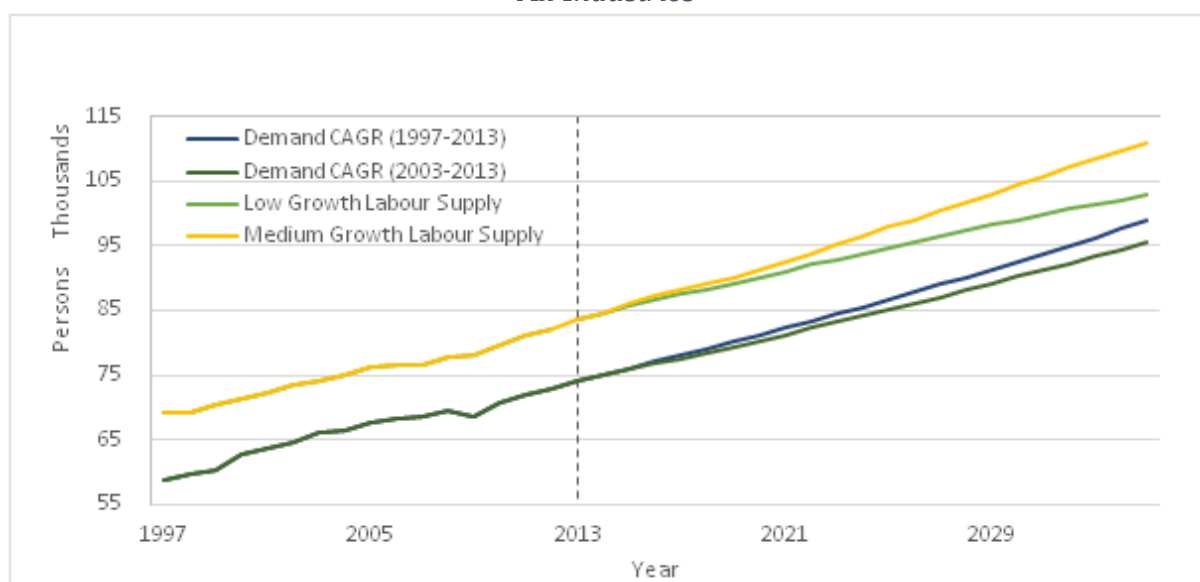
Service-producing industries	7.33	0.04	-1.70	4.06	-0.89
Trade	6.03	-0.01	-9.41	-6.64	-20.10
Wholesale trade	15.38	-	-	-	-
Retail trade	4.85	-0.02	-9.15	-0.44	-6.94
Transportation and warehousing	11.11	0.05	-6.01	-9.26	-36.96
Finance, insurance, real estate and leasing	3.57	0.09	10.14	-	-
Finance and insurance	5.56	-	-	-	-
Real estate and rental and leasing	9.09	-	-	-	-
Professional, scientific and technical services	6.25	0.07	4.23	-21.53	-56.42
Business, building and other support services	16.00	0.19	20.06	-57.52	-167.95
Educational services	4.55	0.01	-2.69	7.69	9.55
Health care and social assistance	2.88	-0.02	-8.36	3.78	3.34
Information, culture and recreation	18.92	0.22	25.52	19.02	19.86
Accommodation and food services	12.90	0.05	0.73	13.22	15.15
Public administration	59.26	0.69	76.31	67.07	73.12

Table 24 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Prince Edward Island

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013	Trend
		In 2025	In 2035	In 2025	In 2035
All industries	11.47	0.13	13.92	11.45	10.97
Goods-producing industries	17.31	0.24	29.25	16.85	17.32
Agriculture	19.15	0.26	28.64	57.06	74.01
Forestry, fishing, mining, quarrying, oil and gas	26.47	0.39	47.10	39.54	48.24
Forestry and logging with support activities	-	-	-	-	-
Fishing, hunting and trapping	22.22	-	-	-	-
Mining, quarrying, and oil and gas extraction	40.00	-	-	-	-
Industrial production	15.15	-	-	-	-
Utilities	0.00	-	-	-	-
Construction	15.15	0.13	10.98	17.76	19.19
Manufacturing	14.04	0.30	47.09	-1.71	-6.33
Durable manufacturing industries	15.79	0.18	25.14	-3.95	-16.16
Non-durable manufacturing industries	13.16	0.25	42.49	-19.98	-37.66
Service-producing industries	7.33	0.07	5.86	7.20	6.60

Trade	6.03	0.02	-1.10	-3.05	-10.97
Wholesale trade	15.38	-	-	-	-
Retail trade	4.85	0.02	-0.86	2.95	1.18
Transportation and warehousing	11.11	0.08	1.67	-5.98	-27.04
Finance, insurance, real estate and leasing	3.57	0.12	16.67	-	-
Finance and insurance	5.56	-	-	-	-
Real estate and rental and leasing	9.09	-	-	-	-
Professional, scientific and technical services	6.25	0.10	11.64	-17.24	-44.32
Business, building and other support services	16.00	0.21	26.19	-52.12	-147.41
Educational services	4.55	0.04	4.68	10.58	16.04
Health care and social assistance	2.88	0.01	-0.11	6.98	10.70
Information, culture and recreation	18.92	0.25	31.09	21.73	25.86
Accommodation and food services	12.90	0.09	8.78	16.53	22.03
Public administration	59.26	0.70	77.88	67.99	74.90

Figure 20 – Forecasts Until 2035 of Labour Supply and Demand in Prince Edward Island for All Industries



Appendix V – Variables Estimates and Results for Nova Scotia

Table 25 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Nova Scotia

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.06	2.00	0.55	0.92
Goods-producing industries	-0.52	1.54	0.14	1.32
Agriculture	1.80	1.11	4.05	2.97
Forestry, fishing, mining, quarrying, oil and gas	-4.81	1.19	-2.87	2.97
Forestry and logging with support activities	-4.70	1.24	1.90	4.41
Fishing, hunting and trapping	-0.19	2.63	2.09	4.18
Mining, quarrying, and oil and gas extraction	-6.55	0.54	-9.64	1.84
Industrial production	-1.54	0.72	0.81	1.47
Utilities	-0.95	0.30	-7.19	-4.22
Construction	1.92	3.11	-1.21	0.14
Manufacturing	-0.11	1.15	3.61	2.37
Durable manufacturing industries	2.61	3.12	5.38	3.68
Non-durable manufacturing industries	-1.72	0.24	2.63	1.94
Service-producing industries	1.58	2.16	0.77	0.85
Trade	1.60	2.69	1.76	2.12
Wholesale trade	1.38	2.17	3.17	1.38
Retail trade	1.73	3.02	1.53	2.49
Transportation and warehousing	-0.63	0.62	-0.13	-0.41
Finance, insurance, real estate and leasing	2.73	2.76	2.82	2.52
Finance and insurance	1.92	1.88	1.29	2.13
Real estate and rental and leasing	3.05	3.13	4.41	1.72
Professional, scientific and technical services	1.63	2.46	-2.53	-1.18
Business, building and other support services	0.28	4.79	-0.02	0.63
Educational services	1.71	1.56	0.85	-0.12
Health care and social assistance	2.03	2.62	-0.53	0.11
Information, culture and recreation	0.12	1.95	-1.32	1.03
Accommodation and food services	0.48	1.50	0.44	0.71
Public administration	0.97	0.85	2.54	1.34

Table 26 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Nova Scotia

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	53.95	3.46	82.90	0.22	63.48	-0.33
Goods-producing industries	10.93	1.88	17.39	-0.91	8.46	-1.51
Agriculture	0.97	-0.80	0.89	-2.15	0.92	-2.62
Forestry, fishing, mining, quarrying, oil and gas	1.73	-0.49	2.62	-0.97	1.00	-4.07
Forestry and logging with support activities	0.31	-4.60	0.44	-6.44	-	-
Fishing, hunting and trapping	0.97	-0.12	1.39	-0.72	0.50	-3.55
Mining, quarrying, and oil and gas extraction	0.46	2.74	0.78	4.52	-	-
Industrial production	4.58	-	7.87	-2.52	-	-
Utilities	0.36	-	0.97	5.76	-	-
Construction	4.12	5.06	6.77	2.28	4.10	5.50
Manufacturing	3.76	0.55	6.12	-3.89	2.09	-7.82
Durable manufacturing industries	1.73	1.66	2.51	-3.15	0.84	-8.35
Non-durable manufacturing industries	2.03	-0.29	3.63	-4.35	1.26	-7.45
Service-producing industries	42.10	3.93	64.17	0.56	49.91	-0.69
Trade	6.51	1.17	11.51	0.04	16.58	-0.74
Wholesale trade	1.27	-0.94	2.35	-1.59	1.09	-1.62
Retail trade	5.24	1.76	9.15	0.51	15.58	-0.62
Transportation and warehousing	3.05	-0.07	3.43	-1.39	1.51	5.52
Finance, insurance, real estate and leasing	2.80	1.65	4.11	-0.23	1.17	-3.07
Finance and insurance	1.27	2.66	3.16	1.19	0.67	-2.70
Real estate and rental and leasing	1.58	1.22	0.94	-3.68	0.50	-3.55
Professional, scientific and technical services	3.25	6.01	5.20	3.61	1.93	4.16
Business, building and other support services	3.61	7.98	3.87	0.45	3.43	-5.81
Educational services	4.93	6.12	6.72	-0.18	2.34	-0.25
Health care and social assistance	8.49	6.63	12.74	1.84	4.61	2.26
Information, culture and recreation	2.19	12.09	3.19	0.53	3.94	1.11
Accommodation and food services	1.47	-0.85	4.39	1.04	10.89	0.14

Public administration	3.56	3.83	5.86	0.59	0.84	-5.29
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Table 27 – Observed and Expected Population Compounded Annual Growth Rates in Nova Scotia

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.70	0.30	-0.90	-0.74
15 to 24 Years Old	0.12	-0.34	-1.11	-0.81
25 to 54 Years Old	0.38	-0.61	-1.00	-0.83
55 to 69 Years Old	0.20	3.25	-0.61	-0.53

Table 28 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Nova Scotia

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	45.38	0.51	0.89
Goods-producing industries	8.53	-0.67	0.93
Agriculture	0.53	-2.17	-4.92
Forestry, fishing, mining, quarrying, oil and gas	1.12	-1.99	3.68
Forestry and logging with support activities	0.22	-6.48	-2.28
Fishing, hunting and trapping	0.55	-2.24	-0.04
Mining, quarrying, and oil and gas extraction	0.35	3.42	8.76
Industrial production	3.87	-2.33	-0.27
Utilities	0.46	6.72	1.78
Construction	3.35	3.18	4.57
Manufacturing	3.06	-3.59	-1.49
Durable manufacturing industries	1.31	-2.63	0.62
Non-durable manufacturing industries	1.75	-4.24	-2.50
Service-producing industries	36.85	0.80	0.85
Trade	7.30	-0.16	0.00
Wholesale trade	1.20	-1.74	0.99
Retail trade	6.10	0.20	-0.39
Transportation and	1.96	-0.50	-0.12

warehousing			
Finance, insurance, real estate and leasing	2.21	-0.09	0.95
Finance and insurance	1.50	0.62	0.41
Real estate and rental and leasing	0.71	-1.31	1.97
Professional, scientific and technical services	2.78	4.27	0.96
Business, building and other support services	2.35	0.30	2.61
Educational services	3.67	0.86	1.88
Health care and social assistance	6.94	2.58	2.83
Information, culture and recreation	1.93	1.46	0.15
Accommodation and food services	2.90	0.03	1.82
Public administration	1.86	-1.53	-2.01

Table 29 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Nova Scotia

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	49.9	0.21	0.36
Goods-producing industries	9.8	-1.02	-0.88
Agriculture	0.6	-2.59	-2.45
Forestry, fishing, mining, quarrying, oil and gas	1.5	-1.89	-1.75
Forestry and logging with support activities	0.3	-	-
Fishing, hunting and trapping	0.8	-1.58	-1.44
Mining, quarrying, and oil and gas extraction	0.4	-	-
Industrial production	4.2	-	-
Utilities	0.5	-	-
Construction	3.9	2.56	2.72
Manufacturing	3.3	-3.37	-3.25
Durable manufacturing industries	1.4	-2.35	-2.23
Non-durable manufacturing industries	1.9	-4.07	-3.95
Service-producing industries	38.8	0.53	0.67
Trade	7.7	-0.85	-0.68
Wholesale trade	1.3	-2.34	-2.19

Retail trade	6.4	-0.47	-0.30
Transportation and warehousing	2.1	-0.79	-0.62
Finance, insurance, real estate and leasing	2.3	-0.67	-0.54
Finance and insurance	1.5	0.43	0.58
Real estate and rental and leasing	0.7	-1.61	-1.50
Professional, scientific and technical services	2.9	3.42	3.57
Business, building and other support services	2.6	2.87	2.98
Educational services	3.8	1.59	1.71
Health care and social assistance	7.1	2.68	2.81
Information, culture and recreation	2.1	5.09	5.21
Accommodation and food services	3.3	-0.48	-0.28
Public administration	3.0	0.65	0.78

Table 30 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Nova Scotia

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	9.04	6.37	2.94	1.96	-5.59
Goods-producing industries	13.05	10.38	5.96	-8.48	-33.46
Agriculture	17.19	14.95	8.97	39.60	51.40
Forestry, fishing, mining, quarrying, oil and gas	23.29	25.61	24.99	-46.16	-158.76
Forestry and logging with support activities	18.52	-	-	-	-
Fishing, hunting and trapping	29.49	36.35	39.28	16.87	0.93
Mining, quarrying, and oil and gas extraction	16.67	-	-	-	-
Industrial production	8.51	-	-	-	-
Utilities	4.17	-	-	-	-
Construction	14.10	7.94	1.93	-8.16	-31.79
Manufacturing	8.11	10.15	12.52	-16.41	-40.62
Durable manufacturing industries	6.43	8.96	12.22	-35.06	-80.89
Non-durable manufacturing industries	9.79	11.59	13.25	-9.81	-29.07

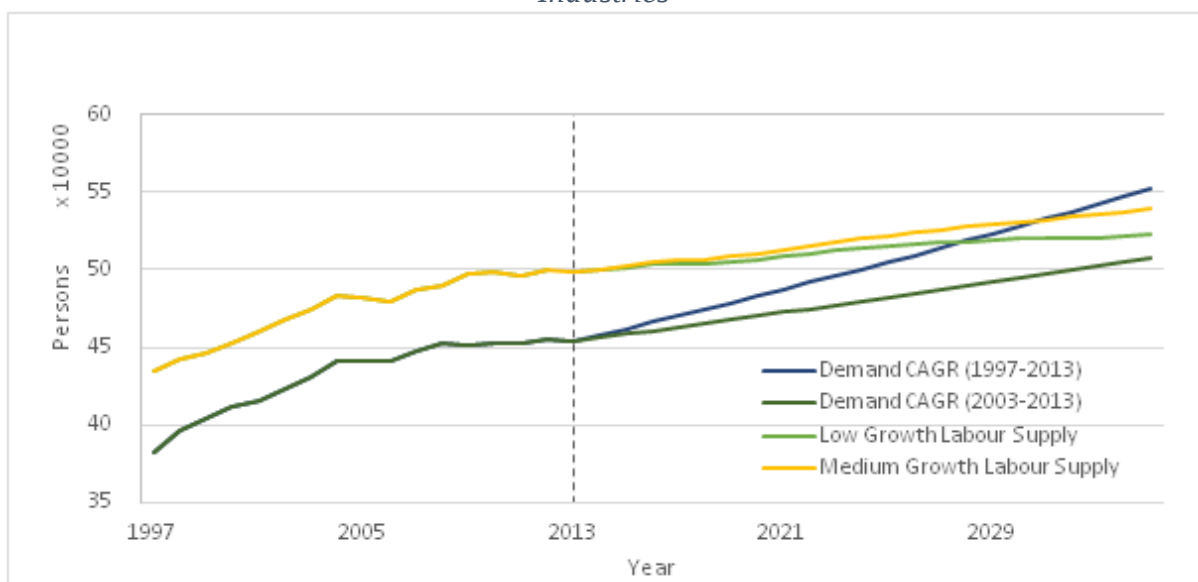
Service-producing industries	4.98	2.30	-0.83	1.70	-1.97
Trade	4.70	-3.55	-10.99	-5.63	-15.10
Wholesale trade	6.25	0.42	-7.35	-38.34	-96.13
Retail trade	4.39	-3.87	-10.75	3.23	2.72
Transportation and warehousing	6.22	2.06	0.03	-2.46	-8.58
Finance, insurance, real estate and leasing	2.64	-2.51	-10.67	-16.12	-39.09
Finance and insurance	2.60	1.26	-1.52	3.70	3.02
Real estate and rental and leasing	2.74	1.75	-3.95	-45.41	-113.26
Professional, scientific and technical services	2.80	-5.49	-16.43	28.34	42.70
Business, building and other support services	9.62	29.21	48.19	7.04	14.63
Educational services	3.93	10.51	18.06	-0.99	-2.27
Health care and social assistance	2.12	3.45	4.17	0.61	-1.06
Information, culture and recreation	8.96	32.18	58.03	41.92	68.42
Accommodation and food services	11.31	3.35	0.72	-19.57	-46.64
Public administration	38.82	53.52	62.18	56.16	66.02

Table 31 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Nova Scotia

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	9.04	7.63	5.97	3.28	-2.30
Goods-producing industries	13.05	11.57	8.82	-7.03	-29.39
Agriculture	17.19	16.05	11.86	40.38	52.94
Forestry, fishing, mining, quarrying, oil and gas	23.29	26.62	27.32	-44.19	-150.74
Forestry and logging with support activities	18.52	-	-	-	-
Fishing, hunting and trapping	29.49	37.21	41.14	17.99	3.97
Mining, quarrying, and oil and gas extraction	16.67	-	-	-	-
Industrial production	8.51	-	-	-	-
Utilities	4.17	-	-	-	-
Construction	14.10	9.23	5.31	-6.65	-27.25
Manufacturing	8.11	11.27	14.90	-14.95	-36.79
Durable manufacturing industries	6.43	10.06	14.52	-33.43	-76.15
Non-durable manufacturing industries	9.79	12.72	15.70	-8.40	-25.43
Service-producing industries	4.98	3.60	2.25	3.01	1.15

Trade	4.70	-2.00	-6.93	-4.05	-10.90
Wholesale trade	6.25	1.83	-3.78	-36.38	-89.61
Retail trade	4.39	-2.30	-6.67	4.69	6.31
Transportation and warehousing	6.22	3.38	3.72	-1.07	-4.58
Finance, insurance, real estate and leasing	2.64	-1.17	-7.41	-14.61	-35.00
Finance and insurance	2.60	2.65	1.65	5.05	6.06
Real estate and rental and leasing	2.74	2.75	-1.46	-43.93	-108.16
Professional, scientific and technical services	2.80	-4.08	-12.83	29.30	44.47
Business, building and other support services	9.62	29.97	49.39	8.05	16.61
Educational services	3.93	11.56	20.17	0.20	0.36
Health care and social assistance	2.12	4.66	6.86	1.85	1.78
Information, culture and recreation	8.96	32.95	59.04	42.59	69.18
Accommodation and food services	11.31	5.00	5.02	-17.53	-40.30
Public administration	38.82	54.11	63.24	56.71	66.97

Figure 21 – Forecasts Until 2035 of Labour Supply and Demand in Nova Scotia for All Industries



Appendix VI – Variables Estimates and Results for New Brunswick

Table 32 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for New Brunswick

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	0.96	1.89	0.70	1.10
Goods-producing industries	-1.23	0.74	-1.09	0.61
Agriculture	1.61	4.02	4.04	6.34
Forestry, fishing, mining, quarrying, oil and gas	-2.22	-2.93	-3.15	-2.40
Forestry and logging with support activities	-0.06	0.96	3.29	3.60
Fishing, hunting and trapping	-0.78	1.04	-1.20	2.67
Mining, quarrying, and oil and gas extraction	-3.97	-5.44	-9.78	-7.56
Industrial production	-1.28	0.40	0.58	0.99
Utilities	0.48	0.28	0.48	-1.46
Construction	-1.40	1.33	-5.27	-1.40
Manufacturing	-1.06	1.38	2.06	2.67
Durable manufacturing industries	0.65	2.09	3.71	2.48
Non-durable manufacturing industries	-1.97	0.86	1.22	2.81
Service-producing industries	1.76	2.29	1.38	1.29
Trade	1.77	2.96	1.51	2.69
Wholesale trade	0.08	2.12	-0.20	1.17
Retail trade	2.99	3.54	2.73	3.42
Transportation and warehousing	-0.09	0.64	0.46	0.75
Finance, insurance, real estate and leasing	3.04	2.85	2.26	1.79
Finance and insurance	1.86	2.09	0.16	1.46
Real estate and rental and leasing	3.59	3.20	5.04	1.14
Professional, scientific and technical services	1.78	3.14	3.21	1.48
Business, building and other support services	1.04	5.47	4.09	2.13
Educational services	1.46	1.05	-0.44	-0.31
Health care and social assistance	1.94	2.04	0.39	-0.20
Information, culture and recreation	1.87	3.16	1.05	1.79
Accommodation and food services	0.42	0.88	0.24	-0.32
Public administration	1.47	1.79	2.23	2.92

Table 33 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in New Brunswick

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	60.24	-0.53	83.13	0.22	51.75	2.82
Goods-producing industries	10.51	-0.30	20.25	-0.38	13.80	3.08
Agriculture	0.99	-1.98	0.95	-3.17	1.26	4.59
Forestry, fishing, mining, quarrying, oil and gas	1.10	-1.73	3.36	0.66	2.58	4.28
Forestry and logging with support activities	-	-	1.11	-4.30	0.88	2.12
Fishing, hunting and trapping	-	-	0.75	2.37	0.69	2.59
Mining, quarrying, and oil and gas extraction	0.66	-	1.53	6.32	0.95	7.77
Industrial production	-	-	10.01	-2.00	5.61	-
Utilities	-	-	1.04	-0.51	0.57	-
Construction	4.27	4.28	7.44	3.72	5.29	5.10
Manufacturing	3.83	-3.40	7.44	-3.23	4.10	-0.04
Durable manufacturing industries	2.19	-0.94	3.10	-3.62	1.76	-0.14
Non-durable manufacturing industries	1.64	-5.88	4.34	-2.94	2.33	0.42
Service-producing industries	46.00	-0.82	61.35	0.41	37.00	2.73
Trade	14.02	-0.09	11.06	0.04	6.93	4.28
Wholesale trade	0.66	-5.05	2.84	0.72	1.32	1.30
Retail trade	13.36	0.24	8.19	-0.22	5.61	5.14
Transportation and warehousing	0.99	-4.14	4.27	-1.23	3.03	3.49
Finance, insurance, real estate and leasing	0.88	-7.48	4.14	1.61	2.08	0.56
Finance and insurance	0.66	-1.98	3.07	2.46	1.13	1.43
Real estate and rental and leasing	-	-	1.08	-0.46	0.95	-0.40
Professional, scientific and technical services	1.75	3.00	3.26	-1.66	2.27	0.15
Business, building and other support services	3.07	-6.98	3.65	-1.89	2.40	1.10
Educational services	1.97	0.34	6.91	1.95	3.34	2.92
Health care and social assistance	4.82	4.82	12.20	0.98	7.50	3.94
Information, culture and recreation	3.83	-0.70	2.64	1.33	1.58	0.97
Accommodation and food services	10.08	0.24	4.31	1.10	1.76	-1.52

Public administration	1.42	-2.35	5.77	1.78	3.40	6.12
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Table 34 – Observed and Expected Population Compounded Annual Growth Rates in New Brunswick

Age Group	Population in 2013 (in millions)	Observed Growth (1997-2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.56	0.17	-0.86	-0.71
15 to 24 Years Old	0.09	-0.97	-0.98	-0.70
25 to 54 Years Old	0.31	-0.69	-0.98	-0.83
55 to 69 Years Old	0.16	3.43	-0.57	-0.49

Table 35 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for New Brunswick

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	35.12	0.26	1.25
Goods-producing industries	7.81	-0.14	-0.56
Agriculture	0.45	-2.34	1.15
Forestry, fishing, mining, quarrying, oil and gas	1.21	0.96	-5.06
Forestry and logging with support activities	0.41	-3.24	-5.46
Fishing, hunting and trapping	0.24	0.43	-
Mining, quarrying, and oil and gas extraction	0.56	6.44	-5.13
Industrial production	3.85	-1.85	-1.28
Utilities	0.41	0.00	-0.83
Construction	2.85	4.08	1.79
Manufacturing	2.88	-3.06	-0.08
Durable manufacturing industries	1.29	-2.95	0.25
Non-durable manufacturing industries	1.59	-3.15	-0.22
Service-producing industries	27.31	0.37	1.75
Trade	5.46	0.26	1.45
Wholesale trade	1.08	0.28	1.15
Retail trade	4.38	0.25	1.78
Transportation and	1.80	-0.54	-0.18

warehousing			
Finance, insurance, real estate and leasing	1.64	0.76	1.14
Finance and insurance	1.16	1.70	0.65
Real estate and rental and leasing	0.47	-1.38	1.10
Professional, scientific and technical services	1.40	-1.39	3.16
Business, building and other support services	1.59	-2.93	5.08
Educational services	2.72	1.92	1.49
Health care and social assistance	5.22	1.54	3.88
Information, culture and recreation	1.30	0.80	3.00
Accommodation and food services	2.29	0.18	0.65
Public administration	1.55	-0.74	-0.15

Table 36 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for New Brunswick

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	39.2	-0.02	0.11
Goods-producing industries	9.4	-0.10	0.02
Agriculture	0.6	0.49	0.59
Forestry, fishing, mining, quarrying, oil and gas	1.6	1.03	1.14
Forestry and logging with support activities	0.5	-	-
Fishing, hunting and trapping	0.4	-	-
Mining, quarrying, and oil and gas extraction	0.7	-	-
Industrial production	4.4	-	-
Utilities	0.4	-	-
Construction	3.5	3.25	3.40
Manufacturing	3.3	-3.21	-3.09
Durable manufacturing industries	1.4	-3.08	-2.95
Non-durable manufacturing industries	1.9	-3.00	-2.89
Service-producing industries	28.9	0.00	0.13
Trade	5.8	0.35	0.49
Wholesale trade	1.2	-0.27	-0.14

Retail trade	4.6	0.68	0.82
Transportation and warehousing	1.9	-0.32	-0.21
Finance, insurance, real estate and leasing	1.7	0.30	0.43
Finance and insurance	1.2	1.17	1.31
Real estate and rental and leasing	0.5	-	-
Professional, scientific and technical services	1.5	-1.35	-1.21
Business, building and other support services	1.8	-2.28	-2.16
Educational services	2.8	1.17	1.30
Health care and social assistance	5.4	1.35	1.49
Information, culture and recreation	1.4	-0.11	0.04
Accommodation and food services	2.5	-0.44	-0.26
Public administration	2.4	2.24	2.36

Table 37 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in New Brunswick

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	10.41	8.32	4.67	-3.15	-18.32
Goods-producing industries	16.47	17.79	17.19	21.89	24.59
Agriculture	22.41	43.30	58.58	13.66	10.46
Forestry, fishing, mining, quarrying, oil and gas	21.94	23.31	23.08	63.31	80.09
Forestry and logging with support activities	21.15	-	-	-	-
Fishing, hunting and trapping	31.43	-	-	-	-
Mining, quarrying, and oil and gas extraction	17.65	-	-	-	-
Industrial production	12.30	-	-	-	-
Utilities	4.65	-	-	-	-
Construction	19.03	12.54	3.47	33.07	40.89
Manufacturing	12.20	11.17	9.10	-27.75	-76.96
Durable manufacturing industries	9.15	8.00	6.31	-35.75	-91.17
Non-durable manufacturing industries	14.52	16.17	17.34	-19.86	-59.22

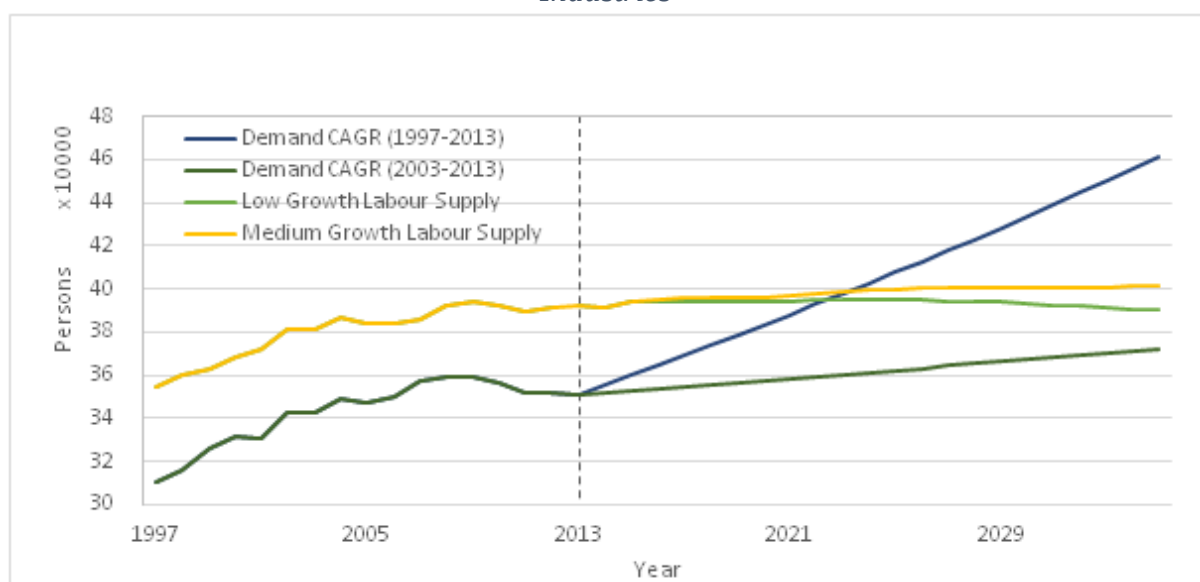
Service-producing industries	5.44	2.09	-2.74	-15.33	-38.73
Trade	5.37	5.99	7.32	-8.25	-20.03
Wholesale trade	6.09	0.31	-6.06	-10.52	-28.14
Retail trade	5.19	8.43	13.62	-9.79	-20.47
Transportation and warehousing	4.26	6.73	8.71	2.62	1.21
Finance, insurance, real estate and leasing	2.38	-2.55	-8.12	-7.31	-17.50
Finance and insurance	2.52	-3.53	-9.25	8.56	12.98
Real estate and rental and leasing	4.08	-	-	-	-
Professional, scientific and technical services	8.50	8.90	9.17	-56.51	-144.99
Business, building and other support services	10.67	17.07	22.84	-114.78	-341.64
Educational services	3.89	-3.42	-12.94	1.67	-2.95
Health care and social assistance	2.79	1.31	-1.34	-29.74	-67.33
Information, culture and recreation	8.45	-2.06	-11.93	-32.23	-79.96
Accommodation and food services	9.49	1.12	-3.60	-4.64	-14.93
Public administration	36.21	55.39	66.78	52.08	62.11

Table 38 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in New Brunswick

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013	Trend
		In 2025	In 2035	In 2025	In 2035
All industries	10.41	9.39	7.41	-1.95	-14.92
Goods-producing industries	16.47	18.70	19.43	22.75	26.63
Agriculture	22.41	43.79	59.49	14.41	12.44
Forestry, fishing, mining, quarrying, oil and gas	21.94	24.12	24.99	63.70	80.59
Forestry and logging with support activities	21.15	-	-	-	-
Fishing, hunting and trapping	31.43	-	-	-	-
Mining, quarrying, and oil and gas extraction	17.65	-	-	-	-
Industrial production	12.30	-	-	-	-
Utilities	4.65	-	-	-	-
Construction	19.03	13.55	6.32	33.85	42.63
Manufacturing	12.20	12.19	11.65	-26.28	-71.99
Durable manufacturing industries	9.15	9.08	9.21	-34.15	-85.24
Non-durable manufacturing industries	14.52	17.12	19.52	-18.50	-55.01
Service-producing industries	5.44	3.24	0.23	-13.98	-34.71

Trade	5.37	7.08	10.06	-6.99	-16.48
Wholesale trade	6.09	1.52	-3.07	-9.18	-24.53
Retail trade	5.19	9.48	16.19	-8.53	-16.90
Transportation and warehousing	4.26	7.68	10.89	3.62	3.57
Finance, insurance, real estate and leasing	2.38	-1.29	-5.02	-5.99	-14.14
Finance and insurance	2.52	-2.21	-6.02	9.73	15.56
Real estate and rental and leasing	4.08	-	-	-	-
Professional, scientific and technical services	8.50	9.98	12.13	-54.66	-137.00
Business, building and other support services	10.67	18.00	24.87	-112.38	-330.00
Educational services	3.89	-2.17	-9.69	2.86	0.01
Health care and social assistance	2.79	2.44	1.68	-28.25	-62.35
Information, culture and recreation	8.45	-0.76	-8.25	-30.55	-74.05
Accommodation and food services	9.49	2.51	0.43	-3.17	-10.46
Public administration	36.21	55.88	67.60	52.60	63.06

Figure 22 – Forecasts Until 2035 of Labour Supply and Demand in New Brunswick for All Industries



Appendix VII – Variables Estimates and Results for Quebec

Table 39 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Quebec

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.49	2.15	0.41	0.63
Goods-producing industries	0.45	1.47	1.06	1.31
Agriculture	2.31	2.02	2.48	2.84
Forestry, fishing, mining, quarrying, oil and gas	-0.20	0.57	1.89	2.24
Forestry and logging with support activities	0.83	3.29	5.80	6.79
Fishing, hunting and trapping	-1.37	0.09	-	-
Mining, quarrying, and oil and gas extraction	-0.50	-0.14	-1.62	-0.33
Industrial production	-0.53	0.66	1.75	1.70
Utilities	1.99	1.41	1.56	1.12
Construction	3.51	4.21	-0.98	-0.45
Manufacturing	-1.27	0.31	1.25	1.46
Durable manufacturing industries	-0.03	1.31	1.77	1.84
Non-durable manufacturing industries	-2.76	-0.77	0.59	1.08
Service-producing industries	1.94	2.47	0.33	0.52
Trade	2.12	3.06	1.46	1.49
Wholesale trade	1.87	2.92	1.42	0.96
Retail trade	2.36	3.18	1.65	1.73
Transportation and warehousing	1.18	1.70	0.81	0.83
Finance, insurance, real estate and leasing	2.68	2.66	0.94	1.68
Finance and insurance	2.43	2.51	0.23	1.43
Real estate and rental and leasing	2.83	2.75	2.46	2.08
Professional, scientific and technical services	2.14	4.03	-1.56	-0.02
Business, building and other support services	1.73	3.80	-0.93	0.37
Educational services	1.58	1.19	0.17	-0.43
Health care and social assistance	1.53	1.47	-1.20	-1.78
Information, culture and recreation	0.87	2.43	-0.91	0.15
Accommodation and food services	1.25	2.00	-0.27	0.23
Public administration	2.00	2.22	1.75	1.94

Table 40 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Quebec

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	64.63	-0.42	85.68	0.11	50.60	2.14
Goods-producing industries	9.34	-3.01	19.29	-1.50	11.23	0.74
Agriculture	0.98	-1.08	0.90	-2.66	1.14	2.15
Forestry, fishing, mining, quarrying, oil and gas	0.30	-4.15	0.71	-3.86	0.63	1.07
Forestry and logging with support activities	0.15	-7.07	0.32	-6.25	0.33	-0.17
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	0.21	-1.08	0.37	-0.58	0.27	2.76
Industrial production	-	-	12.33	-2.90	6.41	-0.26
Utilities	0.16	-	0.73	-0.86	0.36	5.49
Construction	3.91	5.63	5.72	3.52	3.32	2.52
Manufacturing	4.00	-7.50	11.23	-3.09	5.78	-0.63
Durable manufacturing industries	2.18	-7.46	6.30	-2.36	3.18	0.46
Non-durable manufacturing industries	1.82	-7.54	4.92	-3.94	2.60	-1.84
Service-producing industries	52.13	0.02	64.29	0.70	38.07	2.70
Trade	19.37	0.35	10.65	-0.56	7.21	1.91
Wholesale trade	1.12	-3.12	3.14	0.06	1.84	0.31
Retail trade	18.25	0.62	7.52	-0.81	5.37	2.50
Transportation and warehousing	1.33	-1.45	3.77	-0.70	2.83	1.81
Finance, insurance, real estate and leasing	1.34	-4.77	5.07	1.51	3.00	1.79
Finance and insurance	0.82	-3.60	4.00	1.60	2.06	3.89
Real estate and rental and leasing	0.53	-6.17	1.06	1.13	0.95	-1.53
Professional, scientific and technical services	2.71	2.33	6.87	2.69	3.49	6.04
Business, building and other support services	2.55	1.96	3.07	0.96	2.24	3.04
Educational services	1.77	-2.17	6.46	0.74	3.62	1.49
Health care and social assistance	4.25	-0.85	12.46	2.26	6.43	3.19
Information, culture and recreation	3.90	0.78	3.81	0.53	1.90	4.19
Accommodation and food services	11.67	1.27	3.59	-0.24	1.87	2.92

Public administration	1.06	-5.61	5.16	-0.20	2.79	4.36
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Table 41 – Observed and Expected Population Compounded Annual Growth Rates Quebec

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	5.99	0.75	-0.23	0.04
15 to 24 Years Old	1.07	0.23	-0.12	0.19
25 to 54 Years Old	3.40	0.05	-0.30	0.05
55 to 69 Years Old	1.57	3.13	-0.17	-0.06

Table 42 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Quebec

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	403.22	1.08	1.43
Goods-producing industries	86.18	-0.60	0.85
Agriculture	5.45	-0.16	-1.22
Forestry, fishing, mining, quarrying, oil and gas	3.14	-2.04	0.45
Forestry and logging with support activities	1.36	-4.70	1.61
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	1.69	1.13	0.14
Industrial production	53.50	-2.24	-0.31
Utilities	3.15	0.42	0.81
Construction	25.78	4.53	4.36
Manufacturing	48.66	-2.48	-0.62
Durable manufacturing industries	27.34	-1.76	0.49
Non-durable manufacturing industries	21.32	-3.33	-1.79
Service-producing industries	317.04	1.60	1.63
Trade	63.71	0.65	0.89
Wholesale trade	13.96	0.45	0.97
Retail trade	49.75	0.70	1.18
Transportation and	17.73	0.37	1.62

warehousing			
Finance, insurance, real estate and leasing	22.71	1.72	1.72
Finance and insurance	17.27	2.20	1.51
Real estate and rental and leasing	5.44	0.36	1.82
Professional, scientific and technical services	30.36	3.75	3.00
Business, building and other support services	15.08	2.68	3.48
Educational services	28.44	1.41	1.67
Health care and social assistance	55.70	2.77	2.07
Information, culture and recreation	18.77	1.80	0.22
Accommodation and food services	24.94	1.53	2.02
Public administration	17.14	0.24	0.86

Table 43 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Quebec

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	436.5	0.27	0.53
Goods-producing industries	92.7	-1.32	-1.06
Agriculture	5.9	-0.56	-0.36
Forestry, fishing, mining, quarrying, oil and gas	3.7	-2.14	-1.94
Forestry and logging with support activities	1.8	-3.67	-3.49
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	1.8	0.99	1.24
Industrial production	56.4	-	-
Utilities	3.2	-	-
Construction	28.6	3.47	3.77
Manufacturing	51.3	-2.97	-2.71
Durable manufacturing industries	28.7	-2.16	-1.91
Non-durable manufacturing industries	22.7	-3.89	-3.63
Service-producing industries	331.4	0.82	1.09
Trade	67.2	0.01	0.27
Wholesale trade	14.7	-0.31	-0.03

Retail trade	52.5	0.19	0.45
Transportation and warehousing	18.6	-0.21	0.03
Finance, insurance, real estate and leasing	23.3	1.12	1.40
Finance and insurance	17.7	1.74	2.01
Real estate and rental and leasing	5.6	-0.10	0.18
Professional, scientific and technical services	31.6	3.21	3.47
Business, building and other support services	16.5	1.43	1.70
Educational services	29.5	0.53	0.81
Health care and social assistance	56.8	2.02	2.31
Information, culture and recreation	19.9	1.12	1.39
Accommodation and food services	27.0	0.68	0.96
Public administration	23.0	0.75	0.99

Table 44 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Quebec

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.63	-1.41	-10.47	-5.60	-18.98
Goods-producing industries	7.07	-0.55	-8.98	-19.68	-49.97
Agriculture	6.84	1.78	-1.77	13.55	19.47
Forestry, fishing, mining, quarrying, oil and gas	15.36	13.86	13.43	-16.44	-50.43
Forestry and logging with support activities	22.29	30.12	38.61	-50.84	- 151.58
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	7.14	6.77	4.29	17.19	22.98
Industrial production	5.11	-	-	-	-
Utilities	2.17	-	-	-	-
Construction	9.95	-2.33	-12.83	-0.37	-8.90
Manufacturing	5.22	-0.20	-5.76	-25.81	-60.52
Durable manufacturing industries	4.64	-0.02	-4.32	-31.32	-71.83
Non-durable manufacturing industries	5.96	-0.09	-6.78	-20.99	-51.16

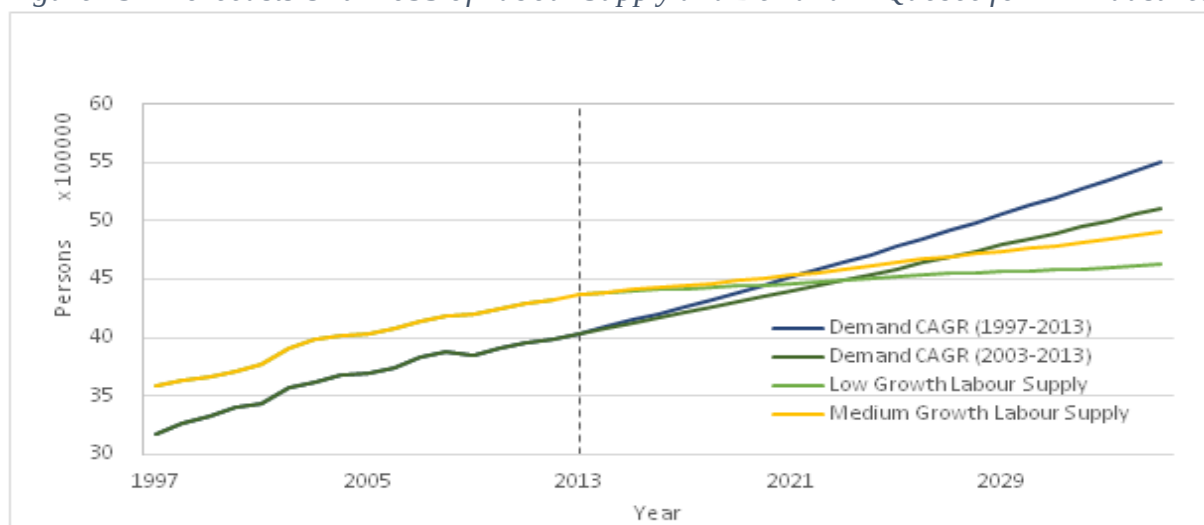
Service-producing industries	4.32	-4.63	-13.43	-4.98	-14.13
Trade	5.18	-3.68	-8.97	-6.68	-14.83
Wholesale trade	5.03	-2.64	-12.06	-9.23	-25.61
Retail trade	5.22	-3.17	-5.99	-9.23	-17.67
Transportation and warehousing	4.73	-0.68	-8.30	-16.76	-42.10
Finance, insurance, real estate and leasing	2.66	-3.38	-11.05	-3.35	-11.00
Finance and insurance	2.37	-2.05	-7.80	5.98	7.26
Real estate and rental and leasing	3.55	-1.89	-6.69	-21.24	-46.75
Professional, scientific and technical services	3.98	-1.96	-7.88	6.57	8.09
Business, building and other support services	8.83	-4.99	-19.18	-15.33	-41.57
Educational services	3.50	-5.63	-16.89	-8.89	-23.59
Health care and social assistance	1.95	-5.81	-15.03	2.51	1.02
Information, culture and recreation	5.73	-3.15	-9.07	14.41	22.53
Accommodation and food services	7.53	-6.24	-11.33	-12.52	-23.69
Public administration	25.54	29.47	33.32	24.03	23.60

Table 45 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Quebec

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.63	1.16	-4.20	-2.93	-12.24
Goods-producing industries	7.07	2.00	-2.88	-16.65	-41.58
Agriculture	6.84	3.71	2.65	15.24	22.96
Forestry, fishing, mining, quarrying, oil and gas	15.36	15.68	17.29	-13.98	-43.71
Forestry and logging with support activities	22.29	31.46	41.04	-47.95	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	7.14	8.97	9.38	19.14	27.07
Industrial production	5.11	-	-	-	-
Utilities	2.17	-	-	-	-
Construction	9.95	0.41	-5.85	2.32	-2.16
Manufacturing	5.22	2.39	0.20	-22.56	-51.48
Durable manufacturing industries	4.64	2.55	1.49	-27.94	-62.26
Non-durable manufacturing industries	5.96	2.50	-0.71	-17.86	-42.57
Service-producing industries	4.32	-1.98	-6.99	-2.32	-7.65

Trade	5.18	-1.14	-2.84	-4.07	-8.36
Wholesale trade	5.03	0.07	-5.39	-6.34	-18.13
Retail trade	5.22	-0.71	-0.13	-6.62	-11.16
Transportation and warehousing	4.73	1.72	-2.60	-13.97	-34.62
Finance, insurance, real estate and leasing	2.66	-0.64	-4.46	-0.62	-4.41
Finance and insurance	2.37	0.60	-1.68	8.43	12.52
Real estate and rental and leasing	3.55	0.78	-0.15	-18.07	-37.76
Professional, scientific and technical services	3.98	0.63	-1.92	8.95	13.16
Business, building and other support services	8.83	-2.44	-12.61	-12.53	-33.76
Educational services	3.50	-2.84	-9.99	-6.02	-16.30
Health care and social assistance	1.95	-2.99	-8.19	5.11	6.90
Information, culture and recreation	5.73	-0.55	-3.01	16.57	26.84
Accommodation and food services	7.53	-3.59	-4.81	-9.71	-16.44
Public administration	25.54	31.19	36.72	25.88	27.50

Figure 23 – Forecasts Until 2035 of Labour Supply and Demand in Quebec for All Industries



Appendix VIII – Variables Estimates and Results for Ontario

Table 46 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Ontario

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	1.42	2.38	0.39	0.71
Goods-producing industries	-0.90	0.64	0.54	0.61
Agriculture	2.65	2.35	1.86	3.28
Forestry, fishing, mining, quarrying, oil and gas	-0.33	-0.18	-2.44	0.12
Forestry and logging with support activities	-2.12	-0.22	0.82	1.65
Fishing, hunting and trapping	1.15	-4.57	-	-
Mining, quarrying, and oil and gas extraction	-0.17	-0.16	-3.66	-0.28
Industrial production	-1.74	-0.07	1.35	0.97
Utilities	2.30	1.34	2.23	0.60
Construction	1.31	2.98	-0.84	-0.15
Manufacturing	-2.38	-0.26	1.08	0.93
Durable manufacturing industries	-2.44	-0.25	0.96	0.81
Non-durable manufacturing industries	-2.26	-0.38	1.30	1.04
Service-producing industries	2.23	3.00	0.43	0.82
Trade	2.32	3.73	1.42	2.15
Wholesale trade	2.66	4.00	2.13	1.93
Retail trade	1.92	3.41	0.92	1.98
Transportation and warehousing	1.78	2.02	0.43	0.08
Finance, insurance, real estate and leasing	2.55	3.05	0.28	0.93
Finance and insurance	2.64	3.13	0.29	0.99
Real estate and rental and leasing	2.48	3.00	0.44	0.91
Professional, scientific and technical services	1.86	4.15	-0.62	1.00
Business, building and other support services	1.37	3.43	-0.34	0.31
Educational services	2.85	2.14	-0.34	-0.46
Health care and social assistance	2.27	2.36	-0.32	-0.58
Information, culture and recreation	2.11	3.77	1.46	2.20
Accommodation and food services	1.39	1.96	-0.24	-0.02
Public administration	2.27	2.19	1.57	1.35

Table 47 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Ontario

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	58.95	-1.13	86.91	0.11	57.65	1.40
Goods-producing industries	8.16	-3.28	18.63	-2.52	11.83	-0.73
Agriculture	0.86	-3.02	0.77	-0.80	1.26	0.43
Forestry, fishing, mining, quarrying, oil and gas	0.22	7.42	0.50	0.18	0.39	5.60
Forestry and logging with support activities	0.08	-	0.06	-7.42	0.07	-
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	0.14	-	0.43	2.12	0.30	6.34
Industrial production	3.67	-	11.54	-4.24	7.46	-1.28
Utilities	0.23	2.22	0.72	-1.86	0.43	3.03
Construction	3.54	0.23	6.25	1.75	3.03	0.17
Manufacturing	3.30	-6.52	10.39	-4.57	6.72	-1.72
Durable manufacturing industries	2.24	-5.48	6.70	-4.61	4.10	-1.45
Non-durable manufacturing industries	1.06	-8.36	3.69	-4.50	2.62	-2.12
Service-producing industries	46.22	-1.05	66.16	0.92	44.45	1.98
Trade	14.21	-1.88	10.75	0.08	8.10	2.26
Wholesale trade	0.84	-4.86	3.09	-0.69	2.23	2.98
Retail trade	13.37	-1.65	7.66	0.40	5.88	2.01
Transportation and warehousing	1.25	0.22	4.15	-0.28	3.56	2.83
Finance, insurance, real estate and leasing	2.05	-1.58	6.67	1.02	4.68	3.86
Finance and insurance	1.42	-0.84	5.18	1.11	2.94	4.96
Real estate and rental and leasing	0.64	-3.04	1.48	0.70	1.74	2.24
Professional, scientific and technical services	2.33	0.73	7.52	1.52	4.97	1.37
Business, building and other support services	3.37	-1.64	3.83	0.66	2.73	3.28
Educational services	2.55	2.46	6.76	2.29	4.45	2.05
Health care and social assistance	3.01	-0.21	10.18	1.58	6.86	2.67
Information, culture and recreation	4.09	-1.36	3.73	-0.16	2.02	0.48
Accommodation and food services	10.30	0.01	3.90	0.79	1.97	1.51

Public administration	1.15	-2.53	5.21	1.20	2.59	0.75
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Table 48 – Observed and Expected Population Compounded Annual Growth Rates Ontario

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	9.96	1.37	-0.10	0.31
15 to 24 Years Old	1.88	1.40	-0.51	-0.01
25 to 54 Years Old	5.73	0.70	-0.17	0.30
55 to 69 Years Old	2.39	3.34	0.33	0.56

Table 49 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Ontario

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	687.94	1.03	1.14
Goods-producing industries	141.78	-1.43	-1.21
Agriculture	8.68	0.78	-3.46
Forestry, fishing, mining, quarrying, oil and gas	3.84	2.16	-4.43
Forestry and logging with support activities	0.61	-2.92	-1.07
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	3.17	3.63	-3.50
Industrial production	86.38	-3.05	-1.27
Utilities	5.48	0.07	4.18
Construction	46.06	2.16	3.28
Manufacturing	77.73	-3.42	-1.59
Durable manufacturing industries	49.82	-3.36	-
Non-durable manufacturing industries	27.91	-3.51	-
Service-producing industries	546.17	1.79	1.96
Trade	101.91	0.89	1.43
Wholesale trade	23.48	0.53	2.11
Retail trade	78.43	1.00	0.52
Transportation and warehousing	33.17	1.35	0.84

Finance, insurance, real estate and leasing	51.89	2.26	1.63
Finance and insurance	38.41	2.35	1.79
Real estate and rental and leasing	13.48	2.04	1.69
Professional, scientific and technical services	57.12	2.49	2.65
Business, building and other support services	31.63	1.72	2.08
Educational services	51.74	3.20	1.97
Health care and social assistance	78.52	2.60	2.87
Information, culture and recreation	31.68	0.65	1.93
Accommodation and food services	42.89	1.63	1.91
Public administration	28.22	0.69	1.87

Table 50 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Ontario

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	744.1	0.19	0.58
Goods-producing industries	150.0	-2.20	-1.83
Agriculture	9.0	-0.56	-0.22
Forestry, fishing, mining, quarrying, oil and gas	4.2	2.99	3.36
Forestry and logging with support activities	0.7	-	-
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	3.5	3.59	3.96
Industrial production	90.7	-3.57	-3.22
Utilities	5.6	-0.09	0.27
Construction	49.6	1.25	1.68
Manufacturing	81.7	-3.91	-3.56
Durable manufacturing industries	52.3	-3.85	-3.50
Non-durable manufacturing industries	29.4	-3.99	-3.63
Service-producing industries	570.3	0.86	1.26
Trade	107.1	0.16	0.54
Wholesale trade	24.6	0.33	0.68
Retail trade	82.6	0.17	0.56

Transportation and warehousing	34.6	0.79	1.15
Finance, insurance, real estate and leasing	53.1	1.70	2.07
Finance and insurance	39.3	2.02	2.39
Real estate and rental and leasing	13.8	1.10	1.45
Professional, scientific and technical services	59.2	1.39	1.79
Business, building and other support services	34.7	0.99	1.37
Educational services	54.1	2.20	2.61
Health care and social assistance	80.2	1.71	2.11
Information, culture and recreation	33.7	-0.40	0.00
Accommodation and food services	46.0	0.37	0.80
Public administration	38.2	0.91	1.33

Table 51 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Ontario

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.54	-0.30	-11.08	-1.61	-13.76
Goods-producing industries	5.49	-1.70	-12.28	-4.44	-17.87
Agriculture	3.88	-8.65	-29.14	35.13	49.83
Forestry, fishing, mining, quarrying, oil and gas	8.57	15.62	23.48	62.11	82.37
Forestry and logging with support activities	8.96	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	8.12	8.99	7.43	61.30	80.70
Industrial production	4.72	-0.07	-7.27	-24.43	-59.92
Utilities	1.44	-0.67	-2.23	-63.10	-147.63
Construction	7.10	-2.54	-13.18	-16.80	-43.70
Manufacturing	4.80	0.41	-6.68	-24.75	-61.20
Durable manufacturing industries	4.76	0.28	-6.42	-	-
Non-durable manufacturing industries	4.91	1.10	-5.99	-	-
Service-producing industries	4.22	-4.97	-17.05	-7.15	-21.53

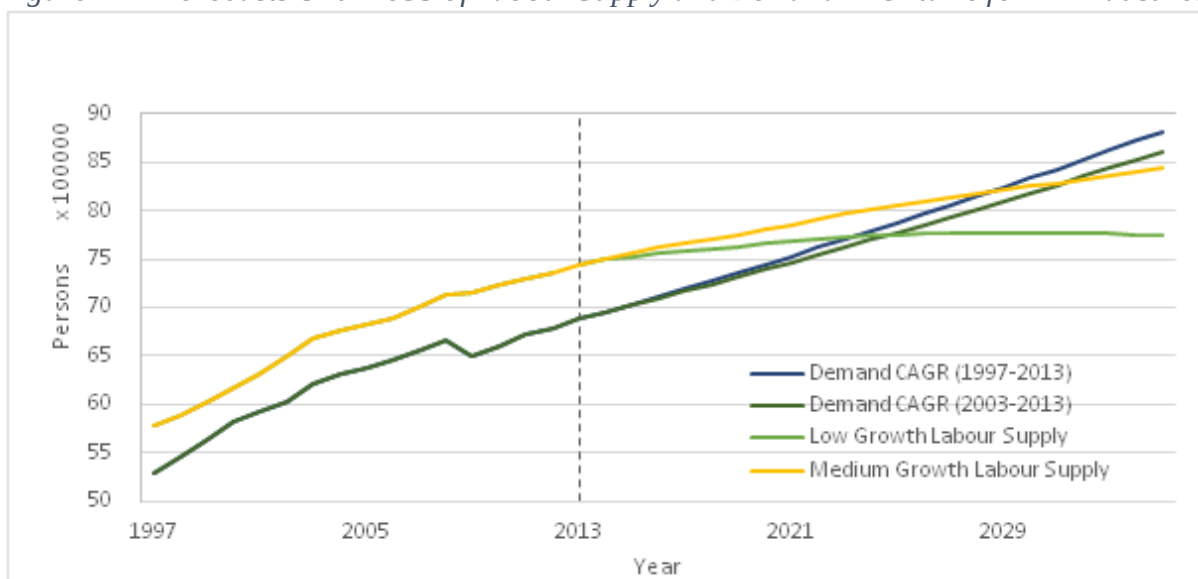
Trade	4.87	-2.81	-11.47	-9.72	-25.59
Wholesale trade	4.44	3.38	0.21	-16.54	-40.72
Retail trade	4.99	-4.21	-13.83	1.57	-2.52
Transportation and warehousing	4.11	0.22	-8.13	6.02	3.12
Finance, insurance, real estate and leasing	2.35	-2.37	-10.34	4.95	3.68
Finance and insurance	2.34	-0.49	-4.72	5.91	7.18
Real estate and rental and leasing	2.39	-5.23	-19.55	-1.02	-10.92
Professional, scientific and technical services	3.58	-7.21	-22.38	-9.26	-26.69
Business, building and other support services	8.72	1.57	-6.88	-2.73	-15.60
Educational services	4.29	-5.19	-18.63	8.87	8.80
Health care and social assistance	2.13	-5.94	-18.45	-9.33	-25.49
Information, culture and recreation	6.08	-5.57	-18.31	-22.87	-56.26
Accommodation and food services	6.72	-8.89	-22.81	-12.53	-30.45
Public administration	26.05	29.10	29.56	18.51	9.08

Table 52 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Ontario

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	7.54	3.49	-1.97	2.22	-4.43
Goods-producing industries	5.49	2.12	-3.21	-0.51	-8.35
Agriculture	3.88	-5.15	-19.71	37.21	53.49
Forestry, fishing, mining, quarrying, oil and gas	8.57	18.50	29.26	63.41	83.71
Forestry and logging with support activities	8.96	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	8.12	12.21	14.39	62.67	82.15
Industrial production	4.72	3.58	1.00	-19.89	-47.59
Utilities	1.44	2.93	5.51	-57.27	-128.87
Construction	7.10	1.64	-3.18	-12.03	-31.00
Manufacturing	4.80	4.05	1.58	-20.18	-48.72
Durable manufacturing industries	4.76	3.94	1.84	-	-
Non-durable manufacturing industries	4.91	4.69	2.20	-	-
Service-producing industries	4.22	-1.00	-7.43	-3.09	-11.55
Trade	4.87	0.96	-2.55	-5.69	-15.54

Wholesale trade	4.44	6.78	7.61	-12.44	-30.29
Retail trade	4.99	-0.35	-4.52	5.22	5.87
Transportation and warehousing	4.11	3.67	-0.07	9.28	10.34
Finance, insurance, real estate and leasing	2.35	1.34	-1.86	8.38	11.08
Finance and insurance	2.34	3.21	3.33	9.37	14.31
Real estate and rental and leasing	2.39	-1.68	-10.68	2.39	-2.68
Professional, scientific and technical services	3.58	-3.07	-12.12	-5.04	-16.07
Business, building and other support services	8.72	5.17	1.52	1.02	-6.52
Educational services	4.29	-1.11	-8.61	12.40	16.51
Health care and social assistance	2.13	-1.94	-8.83	-5.21	-15.30
Information, culture and recreation	6.08	-1.43	-8.16	-18.05	-42.85
Accommodation and food services	6.72	-4.58	-11.89	-8.07	-18.84
Public administration	26.05	31.95	35.61	21.79	16.89

Figure 24 – Forecasts Until 2035 of Labour Supply and Demand in Ontario for All Industries



Appendix IX – Variables Estimates and Results for Manitoba

Table 53 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Manitoba

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	2.49	2.42	1.44	1.23
Goods-producing industries	3.06	2.26	2.37	1.88
Agriculture	2.02	2.66	4.12	6.02
Forestry, fishing, mining, quarrying, oil and gas	3.38	2.13	0.45	4.44
Forestry and logging with support activities	-6.28	-2.48	2.42	0.86
Fishing, hunting and trapping	-1.05	-0.10	-	-
Mining, quarrying, and oil and gas extraction	3.68	2.25	-3.11	3.46
Industrial production	2.67	1.76	2.87	1.21
Utilities	2.85	0.38	1.65	-2.73
Construction	5.44	3.54	0.16	-0.29
Manufacturing	2.25	1.81	3.10	1.35
Durable manufacturing industries	-	-	-	-
Non-durable manufacturing industries	-	-	-	-
Service-producing industries	2.21	2.48	1.04	1.02
Trade	2.75	3.32	2.11	2.26
Wholesale trade	2.40	2.68	3.17	1.86
Retail trade	3.09	4.01	2.05	2.88
Transportation and warehousing	2.14	1.92	1.81	1.16
Finance, insurance, real estate and leasing	2.68	2.65	1.35	1.39
Finance and insurance	1.99	2.50	1.23	1.32
Real estate and rental and leasing	3.03	2.73	0.21	1.29
Professional, scientific and technical services	2.51	2.79	0.86	1.46
Business, building and other support services	1.48	3.21	1.89	1.33
Educational services	2.29	2.17	0.52	0.16
Health care and social assistance	1.59	2.14	-0.90	-0.50
Information, culture and recreation	1.70	3.35	0.59	1.80
Accommodation and food services	1.59	1.42	0.50	0.05
Public administration	2.02	1.90	1.51	0.32

Table 54 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Manitoba

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	63.44	-0.54	82.54	-0.12	62.22	1.92
Goods-producing industries	11.29	-0.79	19.87	-0.63	15.11	1.08
Agriculture	2.24	-3.64	2.53	-3.30	3.64	-3.59
Forestry, fishing, mining, quarrying, oil and gas	0.61	5.30	1.01	0.85	0.66	3.72
Forestry and logging with support activities	-	-	0.10	-10.13	-	-
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	0.56	-	0.90	4.33	0.52	-
Industrial production	4.19	-	11.24	-1.53	7.32	-
Utilities	0.34	0.93	1.19	-0.70	0.71	-
Construction	4.75	4.94	5.98	3.68	3.97	4.49
Manufacturing	3.30	-4.66	9.16	-2.04	6.09	2.17
Durable manufacturing industries	2.01	-3.50	5.36	-2.03	4.01	4.10
Non-durable manufacturing industries	1.34	-5.82	3.80	-2.05	2.12	-0.47
Service-producing industries	49.35	-0.75	61.36	-0.03	46.41	2.18
Trade	14.42	-1.08	10.09	-0.74	7.98	2.73
Wholesale trade	1.06	-5.92	2.69	-1.40	1.75	0.25
Retail trade	13.30	-0.59	7.40	-0.48	6.18	3.49
Transportation and warehousing	1.84	0.75	5.38	-0.90	3.92	1.22
Finance, insurance, real estate and leasing	1.90	-1.99	4.42	0.26	3.82	2.41
Finance and insurance	1.34	-1.68	3.27	-0.44	2.27	2.51
Real estate and rental and leasing	0.50	-3.70	1.17	2.76	1.56	2.27
Professional, scientific and technical services	1.17	-4.67	4.01	1.09	2.97	1.27
Business, building and other support services	2.63	-0.46	2.40	-1.59	1.89	-1.04
Educational services	1.56	-1.57	7.03	0.52	5.57	2.72
Health care and social assistance	5.92	2.46	13.05	1.25	8.64	2.30
Information, culture and recreation	3.52	1.23	2.84	-1.77	2.55	8.01
Accommodation and food services	12.07	-1.42	3.47	1.55	1.89	1.85

Public administration	1.23	-1.33	5.46	-0.69	3.49	1.27
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Table 55 – Observed and Expected Population Compounded Annual Growth Rates Manitoba

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.90	0.94	0.19	0.63
15 to 24 Years Old	0.18	0.80	0.04	0.59
25 to 54 Years Old	0.51	0.33	0.19	0.67
55 to 69 Years Old	0.21	2.87	0.34	0.55

Table 56 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Manitoba

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	63.32	1.04	1.23
Goods-producing industries	14.80	0.67	1.17
Agriculture	2.44	-2.01	-3.55
Forestry, fishing, mining, quarrying, oil and gas	0.72	2.92	5.36
Forestry and logging with support activities	0.07	-8.49	-1.43
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	0.63	7.01	5.78
Industrial production	7.81	-0.19	2.48
Utilities	0.81	1.18	1.28
Construction	4.46	5.26	3.56
Manufacturing	6.37	-0.82	-1.25
Durable manufacturing industries	3.84	-	-
Non-durable manufacturing industries	2.53	-	-
Service-producing industries	48.52	1.15	0.93
Trade	9.17	0.62	-0.84
Wholesale trade	1.91	-0.75	-1.55
Retail trade	7.26	1.02	0.39
Transportation and warehousing	3.76	0.32	0.79

Finance, insurance, real estate and leasing	3.35	1.31	0.70
Finance and insurance	2.36	0.75	0.79
Real estate and rental and leasing	0.99	2.82	0.76
Professional, scientific and technical services	2.81	1.63	3.10
Business, building and other support services	1.92	-0.41	2.93
Educational services	4.88	1.76	2.73
Health care and social assistance	9.45	2.50	2.38
Information, culture and recreation	2.52	1.09	0.97
Accommodation and food services	4.12	1.08	0.83
Public administration	2.89	0.50	0.03

Table 57 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Manitoba

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	66.9	0.56	0.96
Goods-producing industries	15.4	0.18	0.42
Agriculture	2.5	-3.00	-2.82
Forestry, fishing, mining, quarrying, oil and gas	0.8	2.67	3.07
Forestry and logging with support activities	0.1	-	-
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	0.7	-	-
Industrial production	8.1	-	-
Utilities	0.8	-	-
Construction	4.8	4.40	4.75
Manufacturing	6.6	-0.70	-0.35
Durable manufacturing industries	4.0	0.19	0.69
Non-durable manufacturing industries	2.6	-1.57	-1.29
Service-producing industries	50.1	0.76	1.05
Trade	9.4	0.30	0.68
Wholesale trade	2.0	-0.98	-0.67
Retail trade	7.5	0.68	1.11

Transportation and warehousing	3.9	0.22	0.45
Finance, insurance, real estate and leasing	3.4	1.15	1.38
Finance and insurance	2.4	0.61	0.89
Real estate and rental and leasing	1.0	2.76	2.96
Professional, scientific and technical services	2.9	1.27	1.55
Business, building and other support services	2.1	-0.89	-0.56
Educational services	5.1	1.52	1.73
Health care and social assistance	9.6	2.02	2.29
Information, culture and recreation	2.6	2.45	3.41
Accommodation and food services	4.3	0.38	0.98
Public administration	3.8	0.17	0.40

Table 58 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Manitoba

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	5.35	1.21	-5.09	-1.01	-9.46
Goods-producing industries	4.02	-1.81	-10.51	-7.98	-23.10
Agriculture	1.61	-11.09	-28.69	8.11	9.12
Forestry, fishing, mining, quarrying, oil and gas	5.26	2.53	-0.41	-29.10	-68.10
Forestry and logging with support activities	12.50	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	4.55	-	-	-	-
Industrial production	3.10	-	-	-	-
Utilities	1.22	-	-	-	-
Construction	6.50	-3.20	-14.36	15.13	20.09
Manufacturing	3.19	4.59	5.72	9.43	14.29
Durable manufacturing industries	2.78	-	-	-	-
Non-durable manufacturing industries	3.80	-	-	-	-
Service-producing industries	3.23	-1.37	-7.94	1.27	-2.84

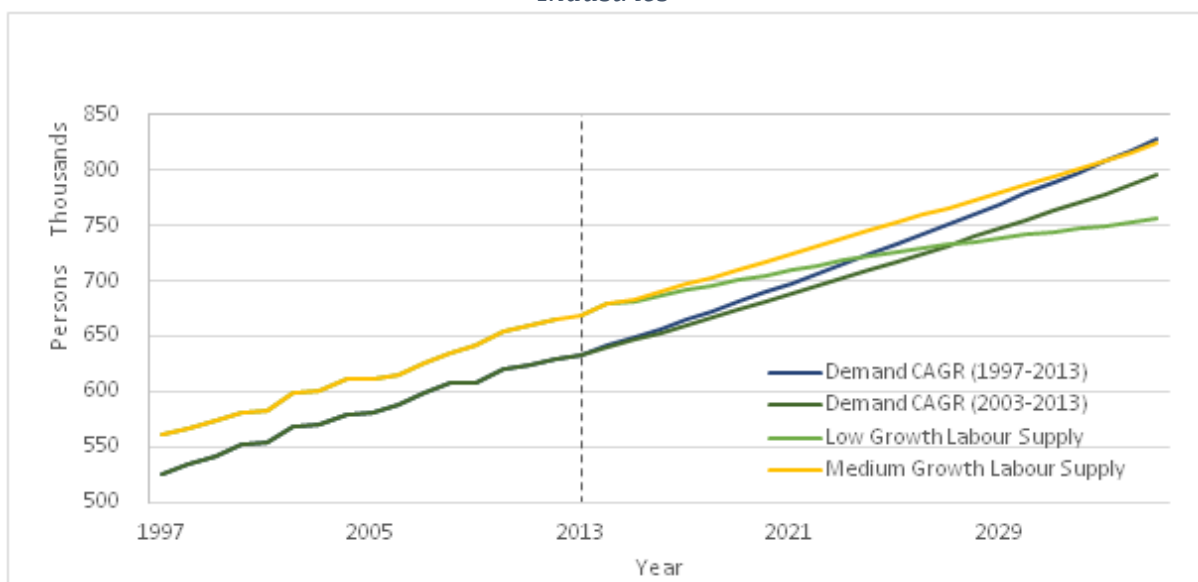
Trade	2.86	-0.89	-4.47	15.35	24.26
Wholesale trade	2.05	-0.70	-4.70	8.53	12.22
Retail trade	3.20	-0.78	-3.40	6.53	9.94
Transportation and warehousing	3.84	2.64	-1.89	-2.96	-12.88
Finance, insurance, real estate and leasing	2.05	0.16	-4.92	7.21	8.26
Finance and insurance	1.67	0.06	-3.66	-0.47	-4.67
Real estate and rental and leasing	2.94	2.37	-2.22	23.39	34.47
Professional, scientific and technical services	3.44	-0.84	-7.33	-19.71	-47.00
Business, building and other support services	8.57	3.07	-3.92	-44.01	-114.74
Educational services	3.75	1.03	-5.22	-10.90	-29.63
Health care and social assistance	1.36	-4.40	-13.01	-2.95	-10.15
Information, culture and recreation	3.82	18.04	37.48	19.21	39.11
Accommodation and food services	5.07	-3.20	-7.08	-0.12	-1.29
Public administration	23.14	20.05	14.46	24.40	22.80

Table 59 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Manitoba

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013		1997-2013	
		Trend		Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	5.35	4.73	3.65	2.59	-0.36
Goods-producing industries	4.02	1.82	-1.34	-4.13	-12.88
Agriculture	1.61	-7.39	-18.10	11.17	16.59
Forestry, fishing, mining, quarrying, oil and gas	5.26	6.05	8.30	-24.44	-53.52
Forestry and logging with support activities	12.50	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	4.55	-	-	-	-
Industrial production	3.10	-	-	-	-
Utilities	1.22	-	-	-	-
Construction	6.50	0.66	-4.21	18.30	27.18
Manufacturing	3.19	7.85	12.89	12.52	20.81
Durable manufacturing industries	2.78	-	-	-	-
Non-durable manufacturing industries	3.80	-	-	-	-
Service-producing industries	3.23	2.23	0.98	4.77	5.66
Trade	2.86	2.63	4.08	18.30	30.46

Wholesale trade	2.05	2.96	3.92	11.86	19.45
Retail trade	3.20	2.69	5.05	9.75	17.29
Transportation and warehousing	3.84	6.09	6.49	0.69	-3.60
Finance, insurance, real estate and leasing	2.05	3.57	3.34	10.38	15.49
Finance and insurance	1.67	3.57	4.60	3.06	3.67
Real estate and rental and leasing	2.94	5.60	5.90	25.93	39.68
Professional, scientific and technical services	3.44	2.84	1.68	-15.34	-34.66
Business, building and other support services	8.57	6.63	5.33	-38.71	-95.61
Educational services	3.75	4.45	3.09	-7.07	-19.39
Health care and social assistance	1.36	-0.54	-3.28	0.85	-0.66
Information, culture and recreation	3.82	20.42	41.59	21.56	43.12
Accommodation and food services	5.07	0.83	2.95	3.79	8.19
Public administration	23.14	22.94	21.49	27.14	29.15

Figure 25 – Forecasts Until 2035 of Labour Supply and Demand in Manitoba for All Industries



Appendix X – Variables Estimates and Results for Saskatchewan

Table 60 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Saskatchewan

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	2.79	2.32	1.25	1.18
Goods-producing industries	2.43	1.50	0.04	1.08
Agriculture	8.57	3.43	9.28	6.44
Forestry, fishing, mining, quarrying, oil and gas	-1.21	-0.60	-4.36	-3.06
Forestry and logging with support activities	-7.97	-2.19	-5.53	-1.07
Fishing, hunting and trapping	-13.64	-17.68	-	-
Mining, quarrying, and oil and gas extraction	-1.08	-0.57	-4.65	-3.33
Industrial production	0.13	0.39	-1.67	-0.70
Utilities	1.10	1.13	-2.11	-0.89
Construction	7.63	4.95	-0.05	-0.02
Manufacturing	4.32	2.92	4.02	3.10
Durable manufacturing industries	5.69	3.46	3.69	2.53
Non-durable manufacturing industries	3.06	2.80	5.04	4.52
Service-producing industries	3.12	2.97	1.88	1.54
Trade	6.21	5.31	5.42	4.20
Wholesale trade	7.75	6.02	5.45	4.29
Retail trade	4.55	4.52	4.26	3.61
Transportation and warehousing	0.96	2.19	-1.00	1.11
Finance, insurance, real estate and leasing	2.92	2.97	2.60	1.94
Finance and insurance	2.04	2.67	2.29	1.70
Real estate and rental and leasing	3.31	3.09	1.49	1.95
Professional, scientific and technical services	5.63	3.58	1.10	-0.29
Business, building and other support services	3.16	2.57	3.16	0.27
Educational services	1.60	1.62	0.16	-0.54
Health care and social assistance	2.22	2.14	-0.27	-0.24
Information, culture and recreation	2.42	3.01	2.78	2.35
Accommodation and food services	2.43	1.24	2.68	0.59
Public administration	2.15	2.15	1.82	1.87

Table 61 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Saskatchewan

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	61.32	-0.24	80.79	-0.39	66.69	1.78
Goods-producing industries	14.31	1.54	21.55	0.58	19.45	0.36
Agriculture	3.19	-1.53	4.65	-2.70	9.70	-2.94
Forestry, fishing, mining, quarrying, oil and gas	2.34	1.98	4.11	1.65	1.69	3.10
Forestry and logging with support activities	-	-	0.18	-5.71	-	-
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	2.21	2.12	3.91	2.21	1.63	4.14
Industrial production	4.68	-	9.56	0.12	4.90	4.14
Utilities	0.33	-	0.98	1.28	0.54	3.42
Construction	6.24	6.74	7.15	4.85	4.79	7.83
Manufacturing	2.15	-3.87	4.67	-1.52	2.72	4.29
Durable manufacturing industries	1.69	-0.58	2.88	-0.30	1.53	6.96
Non-durable manufacturing industries	0.46	-10.59	1.81	-3.08	1.20	1.71
Service-producing industries	45.39	-0.65	58.36	-0.70	46.64	2.46
Trade	14.83	-0.03	10.48	-1.49	8.66	2.38
Wholesale trade	1.95	3.42	3.33	-0.18	2.23	3.68
Retail trade	12.88	-0.45	7.15	-2.01	6.48	1.90
Transportation and warehousing	1.24	-0.20	4.22	-1.07	3.81	5.76
Finance, insurance, real estate and leasing	1.37	-6.43	4.67	-0.73	3.71	0.79
Finance and insurance	0.85	-6.89	3.48	-1.27	2.18	0.75
Real estate and rental and leasing	0.52	-5.64	1.18	1.31	1.53	0.86
Professional, scientific and technical services	2.21	4.72	4.31	2.59	3.00	3.24
Business, building and other support services	1.63	-2.94	1.72	-1.64	1.80	-0.38
Educational services	2.21	1.05	7.26	-0.86	5.88	3.62
Health care and social assistance	5.14	5.57	11.17	0.01	9.10	3.24
Information, culture and recreation	3.38	-2.10	2.59	-2.06	1.91	1.56
Accommodation and food services	8.91	-2.84	3.75	0.52	1.74	-2.21

Public administration	1.37	-1.53	5.03	-0.84	3.43	2.94
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*Table 62 – Observed and Expected Population Compounded Annual Growth Rates
Saskatchewan*

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	0.79	0.90	-0.08	0.23
15 to 24 Years Old	0.17	0.20	0.06	0.47
25 to 54 Years Old	0.45	0.56	-0.19	0.15
55 to 69 Years Old	0.18	2.59	0.07	0.21

*Table 63 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for
Saskatchewan*

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	55.53	1.52	1.59
Goods-producing industries	14.97	2.39	1.84
Agriculture	4.32	-0.65	-1.77
Forestry, fishing, mining, quarrying, oil and gas	2.42	3.29	2.71
Forestry and logging with support activities	0.10	-2.59	-9.36
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	2.31	3.74	2.99
Industrial production	5.73	1.83	1.87
Utilities	0.58	3.28	3.42
Construction	4.80	7.68	3.40
Manufacturing	2.84	0.29	1.89
Durable manufacturing industries	1.79	1.92	1.51
Non-durable manufacturing industries	1.05	-1.88	2.39
Service-producing industries	40.56	1.22	1.27
Trade	8.33	0.75	2.97
Wholesale trade	2.16	2.19	4.90
Retail trade	6.17	0.28	1.16
Transportation and	2.75	1.98	0.80

warehousing			
Finance, insurance, real estate and leasing	2.91	0.31	0.83
Finance and insurance	2.05	-0.24	0.12
Real estate and rental and leasing	0.86	1.79	1.69
Professional, scientific and technical services	2.76	4.48	2.45
Business, building and other support services	1.28	0.00	0.53
Educational services	4.51	1.44	0.25
Health care and social assistance	7.35	2.50	1.54
Information, culture and recreation	1.95	-0.35	0.44
Accommodation and food services	3.18	-0.25	-0.01
Public administration	2.52	0.32	1.66

Table 64 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Saskatchewan

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	57.8	0.20	0.48
Goods-producing industries	15.4	0.68	0.98
Agriculture	4.4	-2.61	-2.35
Forestry, fishing, mining, quarrying, oil and gas	2.5	1.87	2.19
Forestry and logging with support activities	0.1	-	-
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	2.4	2.46	2.77
Industrial production	5.9	-	-
Utilities	0.6	-	-
Construction	5.1	5.88	6.19
Manufacturing	2.9	0.00	0.24
Durable manufacturing industries	1.8	1.79	2.04
Non-durable manufacturing industries	1.1	-1.79	-1.55
Service-producing industries	41.7	0.17	0.45
Trade	8.6	-0.10	0.19
Wholesale trade	2.2	1.40	1.68

Retail trade	6.4	-0.50	-0.21
Transportation and warehousing	2.8	1.85	2.07
Finance, insurance, real estate and leasing	3.0	-0.54	-0.27
Finance and insurance	2.1	-1.00	-0.73
Real estate and rental and leasing	0.9	0.83	1.10
Professional, scientific and technical services	2.8	3.01	3.32
Business, building and other support services	1.4	-1.48	-1.21
Educational services	4.7	0.78	1.04
Health care and social assistance	7.5	1.80	2.09
Information, culture and recreation	2.0	-1.19	-0.91
Accommodation and food services	3.4	-0.87	-0.54
Public administration	3.1	0.20	0.46

Table 65 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Saskatchewan

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	3.98	-10.97	-28.10	-11.82	-29.91
Goods-producing industries	2.92	-17.20	-40.73	-9.88	-25.04
Agriculture	0.69	-21.70	-53.93	-6.20	-19.90
Forestry, fishing, mining, quarrying, oil and gas	3.59	-13.34	-30.78	-5.83	-15.33
Forestry and logging with support activities	9.09	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	3.35	-11.65	-27.02	-2.35	-8.31
Industrial production	2.88	-	-	-	-
Utilities	1.69	-	-	-	-
Construction	4.95	-16.40	-37.62	28.50	43.68
Manufacturing	2.74	-2.83	-3.62	-24.35	-46.82
Durable manufacturing industries	2.19	-3.38	-0.63	1.49	7.89
Non-durable manufacturing industries	4.55	4.63	6.50	-59.07	-138.85

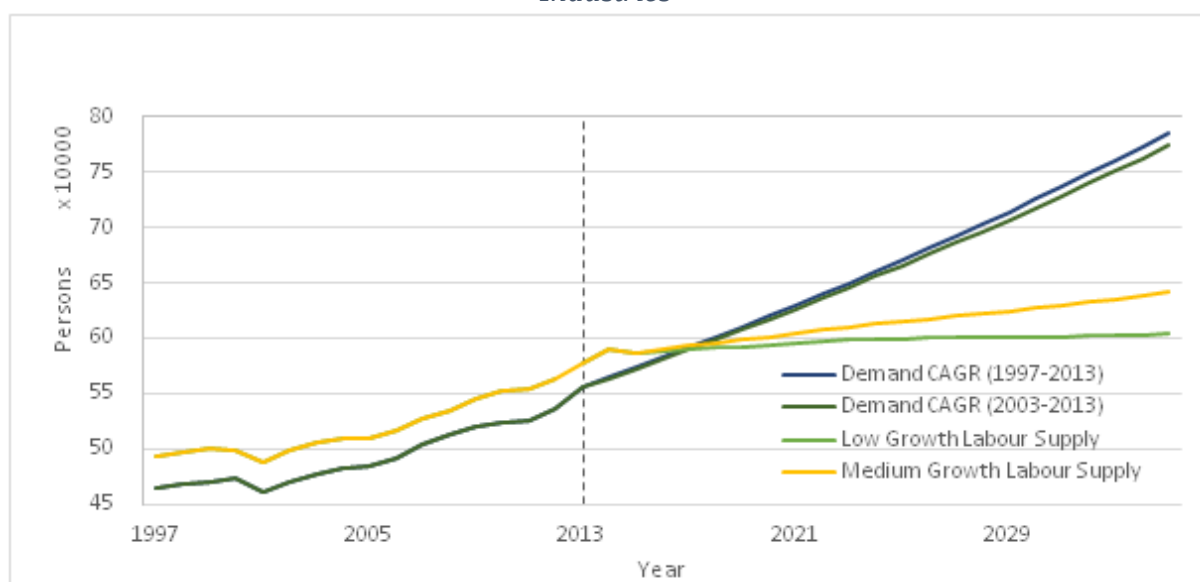
Service-producing industries	2.69	-9.43	-22.27	-10.14	-23.73
Trade	2.69	-8.51	-17.21	-40.95	-89.31
Wholesale trade	1.82	-8.39	-16.42	-48.40	-107.08
Retail trade	2.99	-7.62	-15.17	-19.53	-39.61
Transportation and warehousing	1.08	-2.81	-1.87	10.62	21.20
Finance, insurance, real estate and leasing	2.02	-6.48	-18.21	-13.19	-32.22
Finance and insurance	1.91	-6.14	-16.15	-10.85	-25.78
Real estate and rental and leasing	3.37	-5.86	-19.10	-4.61	-16.52
Professional, scientific and technical services	2.13	-14.92	-33.70	9.21	13.21
Business, building and other support services	5.19	-11.49	-31.58	-18.81	-47.84
Educational services	3.22	-3.94	-11.59	9.73	13.84
Health care and social assistance	1.47	-7.95	-14.51	3.56	6.87
Information, culture and recreation	3.94	-6.82	-15.58	-17.43	-37.49
Accommodation and food services	5.64	-4.67	-8.27	-7.68	-14.04
Public administration	18.45	18.03	16.24	3.90	-12.12

Table 66 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Saskatchewan

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	3.98	-8.19	-20.46	-9.02	-22.16
Goods-producing industries	2.92	-14.16	-31.82	-7.03	-17.13
Agriculture	0.69	-19.07	-45.28	-3.90	-13.16
Forestry, fishing, mining, quarrying, oil and gas	3.59	-10.14	-22.24	-2.84	-7.80
Forestry and logging with support activities	9.09	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	3.35	-8.52	-18.85	0.51	-1.34
Industrial production	2.88	-	-	-	-
Utilities	1.69	-	-	-	-
Construction	4.95	-13.40	-29.07	30.34	47.18
Manufacturing	2.74	-0.31	1.86	-21.31	-39.06
Durable manufacturing industries	2.19	-0.87	4.63	3.88	12.71
Non-durable manufacturing industries	4.55	6.94	11.40	-55.22	126.35
Service-producing industries	2.69	-6.73	-15.19	-7.42	-16.57

Trade	2.69	-5.86	-10.14	-37.50	-77.90
Wholesale trade	1.82	-5.66	-9.41	-44.66	-94.62
Retail trade	2.99	-5.02	-8.16	-16.63	-31.10
Transportation and warehousing	1.08	-0.63	2.88	12.52	24.87
Finance, insurance, real estate and leasing	2.02	-3.78	-11.39	-10.31	-24.59
Finance and insurance	1.91	-3.35	-9.33	-7.94	-18.39
Real estate and rental and leasing	3.37	-3.31	-12.28	-2.09	-9.84
Professional, scientific and technical services	2.13	-11.86	-25.17	11.63	18.75
Business, building and other support services	5.19	-8.77	-23.83	-15.90	-39.13
Educational services	3.22	-1.49	-5.63	11.86	18.44
Health care and social assistance	1.47	-5.29	-7.59	5.93	12.50
Information, culture and recreation	3.94	-4.15	-8.68	-14.49	-29.28
Accommodation and food services	5.64	-1.65	-0.65	-4.57	-6.02
Public administration	18.45	20.07	20.88	6.29	-5.90

Figure 26 – Forecasts Until 2035 of Labour Supply and Demand in Saskatchewan for All Industries



Appendix XI – Variables Estimates and Results for Alberta

Table 67 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for Alberta

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	3.42	3.40	0.93	0.72
Goods-producing industries	3.02	2.41	0.30	-0.33
Agriculture	4.99	3.08	5.88	5.29
Forestry, fishing, mining, quarrying, oil and gas	1.67	0.83	-3.67	-3.22
Forestry and logging with support activities	2.76	4.47	9.69	7.92
Fishing, hunting and trapping	15.57	5.70	-	-
Mining, quarrying, and oil and gas extraction	1.66	0.81	-4.00	-3.45
Industrial production	1.79	1.21	-0.59	-1.46
Utilities	1.83	1.55	-1.15	-2.22
Construction	7.62	7.14	2.79	1.50
Manufacturing	2.41	2.02	3.14	1.02
Durable manufacturing industries	3.32	3.31	4.44	1.92
Non-durable manufacturing industries	1.59	0.91	1.77	0.40
Service-producing industries	3.92	4.33	1.51	1.67
Trade	5.04	5.05	2.65	2.27
Wholesale trade	4.88	4.32	2.58	1.07
Retail trade	5.22	5.95	2.79	3.32
Transportation and warehousing	3.22	3.55	1.53	1.39
Finance, insurance, real estate and leasing	4.25	4.47	1.80	2.12
Finance and insurance	5.07	4.51	2.63	2.55
Real estate and rental and leasing	3.93	4.45	1.45	1.38
Professional, scientific and technical services	4.67	5.84	0.56	1.10
Business, building and other support services	3.77	4.96	2.02	2.03
Educational services	2.79	3.36	1.30	1.36
Health care and social assistance	3.58	3.96	-0.32	0.59
Information, culture and recreation	2.75	4.09	2.48	2.56
Accommodation and food services	3.38	3.15	2.15	1.25
Public administration	2.93	3.09	0.09	0.48

Table 68 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in Alberta

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	64.73	-0.78	85.09	-0.17	67.81	1.47
Goods-producing industries	13.80	-1.39	25.17	0.09	19.11	1.55
Agriculture	1.10	-5.93	1.76	-4.41	4.24	-2.32
Forestry, fishing, mining, quarrying, oil and gas	3.21	0.78	7.38	2.58	4.54	7.51
Forestry and logging with support activities	-	-	0.11	-8.24	-	-
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	3.13	1.13	7.27	2.90	4.50	8.25
Industrial production	6.45	-1.55	13.71	-0.40	9.10	-
Utilities	0.37	1.10	0.77	-0.30	0.47	-
Construction	6.17	0.11	9.59	2.26	5.73	2.74
Manufacturing	2.95	-3.95	5.68	-3.39	4.13	-0.07
Durable manufacturing industries	2.18	-2.89	3.22	-4.00	2.27	-0.17
Non-durable manufacturing industries	0.76	-6.42	2.46	-2.52	1.86	0.05
Service-producing industries	49.20	-0.69	58.94	-0.32	47.87	1.38
Trade	16.44	0.05	10.80	-0.51	8.70	2.35
Wholesale trade	2.20	3.04	3.33	-1.01	2.15	0.82
Retail trade	14.24	-0.34	7.47	-0.28	6.54	2.92
Transportation and warehousing	1.75	-0.25	4.81	-1.36	3.90	0.31
Finance, insurance, real estate and leasing	1.57	-4.60	4.41	0.12	3.88	1.32
Finance and insurance	1.06	-3.15	3.04	-0.06	1.84	2.83
Real estate and rental and leasing	0.50	-7.04	1.38	0.54	2.04	0.01
Professional, scientific and technical services	2.98	1.92	7.06	0.90	6.00	3.10
Business, building and other support services	2.42	-2.00	2.77	-0.74	2.61	0.79
Educational services	1.92	-0.01	5.06	-1.91	4.86	1.45
Health care and social assistance	3.64	0.59	9.44	1.07	7.62	2.64
Information, culture and recreation	3.58	-3.07	2.66	-2.12	2.17	1.46
Accommodation and food services	9.84	-2.01	4.22	-0.18	1.94	-1.12

Public administration	1.29	2.96	3.53	-1.27	3.17	0.44
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Table 69 – Observed and Expected Population Compounded Annual Growth Rates Alberta

Age Group	Population in 2013 (in millions)	Observed Growth (1997- 2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	2.98	2.48	0.98	1.35
15 to 24 Years Old	0.63	1.77	1.05	1.50
25 to 54 Years Old	1.83	2.12	0.83	1.24
55 to 69 Years Old	0.61	4.55	1.36	1.54

Table 70 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for Alberta

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	221.10	2.47	2.27
Goods-producing industries	62.53	2.70	0.74
Agriculture	6.33	-0.84	0.32
Forestry, fishing, mining, quarrying, oil and gas	17.37	5.54	-2.04
Forestry and logging with support activities	0.25	-6.32	1.64
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	17.12	5.90	1.03
Industrial production	32.83	2.40	-1.33
Utilities	1.87	3.01	2.42
Construction	23.13	4.69	6.92
Manufacturing	13.84	-0.71	-0.62
Durable manufacturing industries	8.07	-1.07	-0.31
Non-durable manufacturing industries	5.77	-0.17	-0.88
Service-producing industries	158.57	2.38	3.27
Trade	32.80	2.33	3.19
Wholesale trade	8.43	2.25	2.08
Retail trade	24.37	2.37	4.25
Transportation and warehousing	11.74	1.66	2.09

Finance, insurance, real estate and leasing	11.02	2.40	2.52
Finance and insurance	7.10	2.38	3.34
Real estate and rental and leasing	3.92	2.44	2.54
Professional, scientific and technical services	17.76	4.09	5.28
Business, building and other support services	7.41	1.72	5.44
Educational services	12.88	1.47	3.44
Health care and social assistance	23.53	3.91	4.45
Information, culture and recreation	7.73	0.26	2.59
Accommodation and food services	13.57	1.20	3.35
Public administration	11.16	2.85	1.73

Table 71 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for Alberta

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	231.8	1.17	1.51
Goods-producing industries	65.1	1.32	1.66
Agriculture	6.4	-2.33	-2.07
Forestry, fishing, mining, quarrying, oil and gas	18.0	4.79	5.12
Forestry and logging with support activities	0.3	-	-
Fishing, hunting and trapping	-	-	-
Mining, quarrying, and oil and gas extraction	17.7	5.29	5.61
Industrial production	34.1	-	-
Utilities	1.9	-	-
Construction	24.4	3.15	3.51
Manufacturing	14.5	-1.57	-1.26
Durable manufacturing industries	8.5	-1.88	-1.57
Non-durable manufacturing industries	6.0	-0.99	-0.68
Service-producing industries	163.5	1.07	1.40
Trade	33.9	1.31	1.65
Wholesale trade	8.6	1.14	1.49
Retail trade	25.3	1.50	1.83

Transportation and warehousing	12.1	0.19	0.52
Finance, insurance, real estate and leasing	11.3	1.28	1.61
Finance and insurance	7.3	1.44	1.77
Real estate and rental and leasing	4.0	1.23	1.55
Professional, scientific and technical services	18.2	2.64	2.98
Business, building and other support services	8.0	0.53	0.86
Educational services	13.3	0.37	0.67
Health care and social assistance	23.9	2.48	2.82
Information, culture and recreation	8.1	-0.37	-0.06
Accommodation and food services	14.2	0.13	0.51
Public administration	9.1	0.70	1.03

Table 72 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in Alberta

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	4.62	-9.26	-26.25	-6.74	-20.97
Goods-producing industries	3.98	-10.79	-29.29	12.12	15.44
Agriculture	1.09	-13.92	-37.93	-31.01	-78.21
Forestry, fishing, mining, quarrying, oil and gas	3.50	-5.55	-12.82	56.84	78.11
Forestry and logging with support activities	7.41	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	3.44	-4.39	-9.65	40.66	61.07
Industrial production	3.75	-	-	-	-
Utilities	1.06	-	-	-	-
Construction	5.01	-11.93	-31.85	-44.05	-109.38
Manufacturing	4.49	-5.01	-15.76	-6.13	-18.03
Durable manufacturing industries	4.50	-5.08	-14.44	-15.30	-35.66
Non-durable manufacturing industries	4.47	-3.86	-14.51	4.64	2.08
Service-producing industries	3.00	-11.38	-28.77	-23.69	-56.07

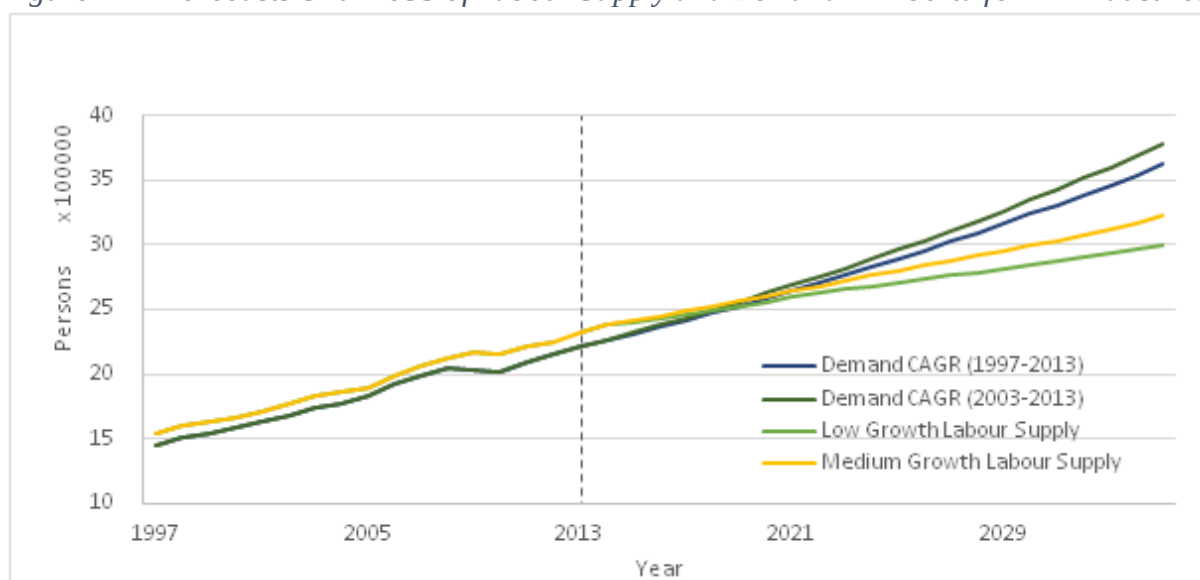
Trade	3.24	-8.83	-20.84	-20.26	-45.11
Wholesale trade	1.86	-12.18	-24.82	-10.05	-20.50
Retail trade	3.71	-6.69	-16.18	-32.82	-73.60
Transportation and warehousing	3.22	-12.79	-33.40	-18.74	-46.59
Finance, insurance, real estate and leasing	2.30	-9.13	-24.57	-10.57	-27.59
Finance and insurance	2.20	-8.09	-19.83	-20.89	-47.12
Real estate and rental and leasing	2.73	-8.87	-26.32	-10.15	-29.06
Professional, scientific and technical services	2.36	-13.11	-32.75	-29.74	-70.70
Business, building and other support services	7.03	-5.10	-20.37	-61.85	-165.63
Educational services	2.87	-9.08	-23.57	-37.38	-88.62
Health care and social assistance	1.42	-13.78	-33.73	-21.09	-49.91
Information, culture and recreation	4.69	-2.95	-9.67	-35.58	-81.68
Accommodation and food services	4.30	-9.47	-20.96	-40.90	-92.14
Public administration	-23.04	-56.34	-95.73	-37.20	-54.06

Table 73 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in Alberta

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013		1997-2013	
		Trend		Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	4.62	-5.74	-17.27	-3.31	-12.37
Goods-producing industries	3.98	-7.18	-20.12	14.98	21.44
Agriculture	1.09	-11.10	-30.07	-27.76	-68.05
Forestry, fishing, mining, quarrying, oil and gas	3.50	-2.22	-5.42	58.21	79.54
Forestry and logging with support activities	7.41	-	-	-	-
Fishing, hunting and trapping	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	3.44	-1.12	-2.57	42.52	63.59
Industrial production	3.75	-	-	-	-
Utilities	1.06	-	-	-	-
Construction	5.01	-8.11	-22.04	-39.13	-93.80
Manufacturing	4.49	-1.69	-7.95	-2.78	-10.07
Durable manufacturing industries	4.50	-1.78	-6.64	-11.68	-26.42
Non-durable manufacturing industries	4.47	-0.55	-6.79	7.68	8.68
Service-producing industries	3.00	-7.81	-19.61	-19.74	-44.97
Trade	3.24	-5.42	-12.18	-16.48	-34.70

Wholesale trade	1.86	-8.49	-15.45	-6.43	-11.46
Retail trade	3.71	-3.40	-7.97	-28.72	-61.34
Transportation and warehousing	3.22	-9.17	-24.04	-14.93	-36.31
Finance, insurance, real estate and leasing	2.30	-5.64	-15.97	-7.03	-18.79
Finance and insurance	2.20	-4.54	-11.53	-16.92	-36.93
Real estate and rental and leasing	2.73	-5.59	-17.81	-6.84	-20.37
Professional, scientific and technical services	2.36	-9.55	-23.61	-25.65	-58.94
Business, building and other support services	7.03	-1.80	-11.98	-56.77	147.11
Educational services	2.87	-5.81	-15.53	-33.27	-76.35
Health care and social assistance	1.42	-10.12	-24.38	-17.20	-39.42
Information, culture and recreation	4.69	0.22	-2.21	-31.40	-69.32
Accommodation and food services	4.30	-5.67	-11.26	-36.01	-76.74
Public administration	-23.04	-51.42	-81.90	-32.88	-43.18

Figure 27 – Forecasts Until 2035 of Labour Supply and Demand in Alberta for All Industries



Appendix XII – Variables Estimates and Results for British Columbia

Table 74 – Gross Domestic Product and Labour Productivity Compound Annual Growth Rates by Industry for British-Columbia

Industrial Aggregate	Gross Domestic Product (in percentage points)		Labour Productivity (in percentage points)	
	2003-2013	1997-2013	2003-2013	1997-2013
All industries	2.41	2.48	0.94	1.10
Goods-producing industries	1.98	2.06	1.11	1.66
Agriculture	1.27	1.61	3.13	2.75
Forestry, fishing, mining, quarrying, oil and gas	1.60	2.29	0.49	2.93
Forestry and logging with support activities	-0.62	-0.78	3.14	2.79
Fishing, hunting and trapping	-3.26	-5.59	6.39	1.60
Mining, quarrying, and oil and gas extraction	2.20	3.36	-5.77	-0.22
Industrial production	1.24	2.06	2.24	2.58
Utilities	1.58	0.83	-0.09	-0.85
Construction	4.34	2.99	-0.68	0.21
Manufacturing	0.48	1.47	2.69	2.66
Durable manufacturing industries	1.40	2.30	4.06	3.62
Non-durable manufacturing industries	-0.92	0.83	0.61	1.81
Service-producing industries	2.60	2.66	0.98	1.03
Trade	2.83	3.15	1.53	1.80
Wholesale trade	2.81	3.27	1.77	2.19
Retail trade	2.85	3.06	1.46	1.63
Transportation and warehousing	2.22	2.18	1.82	1.43
Finance, insurance, real estate and leasing	3.61	3.18	1.54	1.91
Finance and insurance	3.33	2.16	1.45	1.13
Real estate and rental and leasing	3.71	3.57	1.33	1.86
Professional, scientific and technical services	3.38	3.68	0.36	0.53
Business, building and other support services	1.98	2.10	0.38	-0.46
Educational services	2.41	2.35	-0.16	-0.08
Health care and social assistance	1.28	1.50	-0.78	-0.47
Information, culture and recreation	1.48	3.10	0.74	1.47
Accommodation and food services	1.43	1.06	0.48	-0.20
Public administration	1.85	1.94	1.15	1.33

Table 75 – 2013 Point Estimates and Compounded Annual Growth Rates, For the Period 2003-2013, of Participation Rates by Age Group and by Industry in British-Columbia

Industrial Aggregate	15-24 Years Old (in percentage points)		25-54 Years Old (in percentage points)		55+ Years Old (in percentage points)	
	2013	1997-2013	2013	1997-2013	2013	1997-2013
All industries	61.24	-0.03	84.03	0.17	55.66	1.28
Goods-producing industries	8.65	-0.68	17.11	-0.36	10.76	0.19
Agriculture	0.94	-1.31	0.82	-3.90	1.04	-3.22
Forestry, fishing, mining, quarrying, oil and gas	0.89	-0.62	2.03	-0.33	1.08	0.16
Forestry and logging with support activities	0.30	-7.78	0.78	-4.69	0.42	-5.20
Fishing, hunting and trapping	-	-	-	-	-	-
Mining, quarrying, and oil and gas extraction	0.56	-	1.18	6.70	0.61	7.21
Industrial production	-	-	8.00	-2.28	5.06	-
Utilities	-	-	0.54	0.04	0.29	-
Construction	4.24	3.93	7.44	4.12	4.19	2.12
Manufacturing	2.49	-5.39	6.27	-3.45	4.17	-0.70
Durable manufacturing industries	1.53	-5.96	3.89	-3.37	2.18	-2.69
Non-durable manufacturing industries	0.96	-4.40	2.39	-3.58	1.99	2.24
Service-producing industries	49.41	0.12	65.23	0.34	43.69	1.66
Trade	16.00	0.42	11.64	0.07	7.60	1.16
Wholesale trade	1.45	-0.74	3.05	-0.54	2.30	3.09
Retail trade	14.55	0.54	8.59	0.30	5.29	0.41
Transportation and warehousing	1.68	0.89	4.53	-1.11	3.27	0.41
Finance, insurance, real estate and leasing	1.70	-0.52	5.65	0.86	4.26	1.28
Finance and insurance	1.41	3.49	3.73	0.26	2.07	2.64
Real estate and rental and leasing	0.29	-9.43	1.92	2.14	2.19	0.16
Professional, scientific and technical services	2.47	0.45	7.06	1.81	4.65	2.50
Business, building and other support services	1.90	-2.66	3.13	-0.05	3.09	2.40
Educational services	2.34	3.02	6.59	0.91	4.69	3.60
Health care and social assistance	3.03	4.88	9.91	0.62	6.76	1.16
Information, culture and recreation	3.95	-1.62	4.07	-0.46	2.21	2.88
Accommodation and food services	13.21	0.25	4.62	-0.12	2.00	-1.16

Public administration	0.66	-4.65	4.60	0.58	2.55	3.66
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Table 76 – Observed and Expected Population Compounded Annual Growth Rates British Columbia

Age Group	Population in 2013 (in millions)	Observed Growth (1997-2013) (in percentage points)	Expected Growth (2014-2035)	
			Low Growth (in percentage points)	Medium Growth (in percentage points)
15 to 69 Years Old	3.40	1.11	0.00	0.54
15 to 24 Years Old	0.62	0.82	-0.09	0.53
25 to 54 Years Old	1.93	0.32	-0.06	0.56
55 to 69 Years Old	0.87	3.68	0.19	0.52

Table 77 – Labour Demand Forecasts and Compounded Annual Growth Rates by Industry for British Columbia

	Population Employed in 2013 (x 10,000)	Expected Growth for 2014-2035 Based on	
		2003-2013 Trend (in percentage points)	1997-2013 Trend (in percentage points)
All industries	230.81	1.45	2.48
Goods-producing industries	44.62	0.86	2.06
Agriculture	2.76	-1.80	1.61
Forestry, fishing, mining, quarrying, oil and gas	4.99	1.11	2.29
Forestry and logging with support activities	1.87	-3.64	-0.78
Fishing, hunting and trapping	0.17	-9.07	-5.59
Mining, quarrying, and oil and gas extraction	2.95	8.46	3.36
Industrial production	20.61	-0.98	2.06
Utilities	1.31	1.67	0.83
Construction	19.22	5.05	2.99
Manufacturing	16.35	-2.16	1.47
Durable manufacturing industries	9.82	-2.55	2.30
Non-durable manufacturing industries	6.53	-1.52	0.83
Service-producing industries	186.19	1.60	2.66
Trade	37.01	1.29	3.15
Wholesale trade	8.43	1.03	3.27
Retail trade	28.58	1.37	3.06
Transportation and	12.12	0.39	2.18

warehousing			
Finance, insurance, real estate and leasing	15.35	2.03	3.18
Finance and insurance	9.70	1.86	2.16
Real estate and rental and leasing	5.65	2.35	3.57
Professional, scientific and technical services	18.56	3.00	3.68
Business, building and other support services	9.30	1.59	2.10
Educational services	17.62	2.57	2.35
Health care and social assistance	26.23	2.08	1.50
Information, culture and recreation	11.43	0.74	3.10
Accommodation and food services	17.39	0.94	1.06
Public administration	9.96	0.69	1.94

Table 78 – Labour Supply Forecasts and Compounded Annual Growth Rates by Industry for British Columbia

	Active Population in 2013 (x 10,000)	Expected Growth for 2014-2035	
		Low Growth (in percentage points)	1997-2013 Trend (in percentage points)
All industries	247.1	0.42	0.94
Goods-producing industries	47.5	-0.25	0.27
Agriculture	3.1	-3.06	-2.57
Forestry, fishing, mining, quarrying, oil and gas	5.4	-0.25	0.28
Forestry and logging with support activities	2.1	-4.97	-4.46
Fishing, hunting and trapping	0.2	-	-
Mining, quarrying, and oil and gas extraction	3.1	6.73	7.30
Industrial production	21.7	-	-
Utilities	1.3	-	-
Construction	20.5	3.78	4.36
Manufacturing	17.2	-2.77	-2.29
Durable manufacturing industries	10.3	-3.39	-2.88
Non-durable manufacturing industries	6.9	-1.21	-0.79
Service-producing industries	193.3	0.64	1.16
Trade	38.6	0.38	0.92
Wholesale trade	8.8	0.64	1.12

Retail trade	29.8	0.39	0.94
Transportation and warehousing	12.6	-0.49	0.02
Finance, insurance, real estate and leasing	15.6	0.93	1.45
Finance and insurance	9.8	1.18	1.70
Real estate and rental and leasing	5.8	1.46	1.99
Professional, scientific and technical services	19.2	1.91	2.44
Business, building and other support services	9.9	0.65	1.13
Educational services	18.2	1.90	2.41
Health care and social assistance	26.8	1.20	1.73
Information, culture and recreation	12.1	0.13	0.64
Accommodation and food services	18.5	-0.07	0.50
Public administration	11.5	1.33	1.83

Table 79 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Low Labour Supply Growth in British Columbia

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	6.57	-4.33	-17.10	-17.70	-46.05
Goods-producing industries	6.12	-5.75	-19.84	-21.88	-55.47
Agriculture	9.51	-4.13	-20.25	-56.92	-155.02
Forestry, fishing, mining, quarrying, oil and gas	7.42	-7.61	-24.64	-23.69	-60.88
Forestry and logging with support activities	8.78	-6.85	-23.89	-51.91	-136.14
Fishing, hunting and trapping	10.53	-	-	-	-
Mining, quarrying, and oil and gas extraction	6.05	-12.67	-33.72	36.77	53.64
Industrial production	5.02	-	-	-	-
Utilities	1.50	-	-	-	-
Construction	6.38	-7.70	-22.32	15.14	20.97
Manufacturing	5.11	-1.48	-8.95	-57.09	-142.72
Durable manufacturing industries	4.75	-4.41	-15.01	-87.11	-235.15
Non-durable manufacturing	5.50	7.14	11.70	-23.20	-48.27

industries					
Service-producing industries	3.70	-6.63	-18.76	-20.71	-49.08
Trade	4.12	-6.03	-16.84	-31.93	-74.41
Wholesale trade	3.88	-0.07	-4.62	-30.16	-69.39
Retail trade	4.19	-7.20	-18.55	-30.81	-70.75
Transportation and warehousing	3.66	-5.36	-16.82	-30.27	-72.38
Finance, insurance, real estate and leasing	1.73	-9.85	-24.88	-25.62	-59.68
Finance and insurance	1.42	-6.30	-14.25	-10.15	-21.96
Real estate and rental and leasing	2.25	-6.77	-18.27	-23.14	-53.63
Professional, scientific and technical services	3.08	-8.36	-22.48	-17.27	-41.57
Business, building and other support services	5.78	-3.84	-15.58	-10.21	-28.90
Educational services	3.13	-3.48	-11.81	-0.86	-6.68
Health care and social assistance	2.16	-7.72	-18.30	-0.58	-4.33
Information, culture and recreation	5.77	-1.48	-7.57	-34.05	-79.19
Accommodation and food services	6.05	-6.99	-17.35	-8.43	-20.26
Public administration	13.39	20.15	24.61	7.36	1.00

Table 80 – Labour Surplus and Shortages, As A Percentage of Labour Supply, Assuming Medium Labour Supply Growth in British Columbia

	Labour Surplus or Shortage in 2013	Labour Surplus or Shortage if Labour Demand follows			
		2003-2013 Trend		1997-2013 Trend	
		In 2025	In 2035	In 2025	In 2035
All industries	6.57	1.14	-4.47	-11.52	-30.30
Goods-producing industries	6.12	-0.14	-6.79	-15.41	-38.54
Agriculture	9.51	0.96	-7.60	-49.24	-128.20
Forestry, fishing, mining, quarrying, oil and gas	7.42	-1.78	-10.88	-16.98	-43.11
Forestry and logging with support activities	8.78	-1.01	-10.08	-43.61	-109.81
Fishing, hunting and trapping	10.53	-	-	-	-
Mining, quarrying, and oil and gas extraction	6.05	-6.54	-18.91	40.21	58.77
Industrial production	5.02	-	-	-	-
Utilities	1.50	-	-	-	-
Construction	6.38	-1.71	-8.36	19.86	29.99
Manufacturing	5.11	3.64	2.18	-49.16	-117.92
Durable manufacturing industries	4.75	1.19	-2.48	-77.08	-198.62
Non-durable manufacturing industries	5.50	11.35	19.70	-17.62	-34.84

Service-producing industries	3.70	-1.06	-6.01	-14.40	-33.08
Trade	4.12	-0.39	-4.00	-24.91	-55.25
Wholesale trade	3.88	4.82	5.76	-23.80	-52.59
Retail trade	4.19	-1.37	-5.19	-23.69	-51.52
Transportation and warehousing	3.66	0.04	-4.48	-23.60	-54.18
Finance, insurance, real estate and leasing	1.73	-4.18	-11.57	-19.13	-42.65
Finance and insurance	1.42	-0.71	-2.02	-4.37	-8.91
Real estate and rental and leasing	2.25	-1.40	-5.60	-16.95	-37.18
Professional, scientific and technical services	3.08	-2.67	-9.30	-11.11	-26.34
Business, building and other support services	5.78	1.10	-4.19	-4.96	-16.20
Educational services	3.13	1.72	-0.30	4.21	4.30
Health care and social assistance	2.16	-2.06	-5.41	4.71	7.04
Information, culture and recreation	5.77	3.81	3.72	-27.05	-60.37
Accommodation and food services	6.05	-0.91	-3.58	-2.27	-6.15
Public administration	13.39	24.25	32.38	12.12	11.20

Figure 28 – Forecasts Until 2035 of Labour Supply and Demand in British Columbia for All Industries

