

STAY THE COURSE OR SEIZE AN OPPORTUNITY? OPTIONS FOR ALBERTA'S POST-SECONDARY INSTITUTIONS IN A PERIOD OF UNCERTAINTY ABOUT THE REBOUND OF THE OIL ECONOMY[†]

Ken Norrie and Herb Emery

SUMMARY

Colleges and universities in Alberta feel the booms and busts of the oil-driven economy, too. When oil prices are high, and oil exploration and new project construction are booming, post-secondary institutions will often find themselves unable to keep up with the demand for the education and skills-training programs that employers are clamouring for, with fewer spots available for students than there are students eager to fill them. When oil prices drop, and exploration and construction dry up, the schools face the opposite problem: They have too much capacity in the kinds of programs for skills that traditionally serve those sectors directly connected to oil, or closely linked to them, where there is suddenly a glut of available labour.

Making matters particularly complicated is that when oil prices fall, there is never any certainty of when they will rebound. If the lower oil prices are short lived like after 2009, colleges and universities have needed only to be patient and ride out short-term disruptions, without the need to restructure their program offerings. However, that was not the case after 1985, where oil prices stagnated for an extended period of time. Now, some observers project that the decline in oil prices that began in 2014, with prices yet to fully recover, could last even longer, perhaps with oil becoming the “new coal” and remaining in glut indefinitely.

Not knowing whether oil prices will rebound sooner, later, or never puts Alberta's post-secondary institutions in a tricky situation. Their programs providing skilled workers to the province's oil-based economy are longstanding and well-respected and the prospect of shrinking them or dismantling them, and shifting a school's focus to different programming priorities, should not be taken lightly as it could be very expensive to reverse if oil prices do indeed end up rebounding. But if they do not, they will nevertheless face pressure to do so, anyway, due to the considerable resources being tied up by programs that are not in high demand. If post-secondary

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administrators and governors cannot know when oil prices will rebound, if ever, they are even less able to predict what sectors Alberta's future economy will shift toward as it diversifies away from its energy export reliance.

Whatever decision is made, to stay the course or shift to exploit expected opportunities, university and college leaders are taking risk where the consequences will be borne across the institutions' students and faculty and the Alberta taxpayer. In that light there is a larger, existential question that must be addressed when considering Alberta post-secondary education institutions and how they respond to the slumping energy sector. What is the mission of PSE institutions in the Alberta economy? Are they instruments of economic adjustment, providing education and skills training that allow Albertans to be mobile across jobs, employers, industries and regions? Or, are they instruments for fostering economic diversification, where research, education and skills training are oriented toward meeting the needs of a targeted or emerging economic opportunity?

I INTRODUCTION

Alberta's post-secondary education system evolved over the past 20 years in the context of two prominent economic drivers. First, slower-moving demographic trends, such as population aging, migration and immigration, and changing participation rates of members of the labour force, as well as technical change, led to the development of programs and curriculums aimed at meeting emerging needs and addressing gaps in labour supply for the province. Second, the pressures of two energy booms (natural gas and then oil) created intense cyclical pressure in labour demand associated with the investment in resource-production capacity and resource export. Demands for construction trades were particularly acute.

With the collapse in oil prices after the summer of 2014, the cyclical pressures on labour demand have reversed, particularly with respect to capital construction and resource development. Is the downturn in energy prices transitory, meaning that the labour market of the past 10 years is the one we will see resuming should energy prices rebound? If that is the case, the labour market projections of the past decade are still valid.

Or, is the decline in energy prices indicative that oil — from the oil sands in particular — is the new coal: a glut commodity on global markets, with sustained low prices and profit margins for producers? In this case, energy production for export will continue, but the much higher labour demand associated with resource development and the consequent investment boom will not be as dominant a labour market influence. With investment levels and in-migration to Alberta expected to be lower, the labour market may shift to other activities through “natural diversification” around changing comparative advantages or through economic diversification via province-building efforts such as oil refining and upgrading.

This uncertainty about the province's future economic development poses significant challenges for post-secondary educational institutions. If the oil-price rout is indeed temporary, then the skills that would be in demand are familiar from previous energy booms. The capacities of Alberta's several institutes of higher-education to meet these needs are generally well understood and they have programs and curriculums already in place to meet probable labour market demands. The challenge in this event will be to resist the temptation to respond too quickly and inappropriately with program changes and curriculum reform.

If oil prices are expected to plateau for an extended period, however, institutions will need to consider what labour market skills will be in demand and, in light of this projection, whether and how to adapt their programs and curriculums to meet the needs of this new economy “beyond oil.” It is difficult to predict the labour skill sets that would be in demand, and such demands as may emerge could require significant rethinking of program and curriculum designs and adjustment of the scale/sizes of programs offered.

Beyond forecasting probable labour demands, there is the question of how best to meet predicted labour demands. The response is straightforward if one is prepared to make two common assumptions. The first is that there is a tight link between occupations and higher-education programs: if we know the nature of labour demand, we know which programs to look to in order to meet it. The second is that higher-education programs have clear learning expectations for their graduates and are able to deliver on these promises.

Recent higher-education research has increased our understanding of both conditions. First, it is evident that the links between occupations and higher-education programs are much more diffuse than is commonly assumed. That is, there are several educational paths to attainment for all but the most specialized skill sets, meaning that there is wider latitude with respect to program offerings by institutions and program choices for students than is commonly assumed. Second, this latitude is by no means assured unless expected program learning outcomes are transparent and delivery is credible.

Inevitably a larger, existential question will emerge when considering Alberta post-secondary education (PSE). What is the mission of PSE institutions in the Alberta economy?¹ Are they instruments of economic adjustment, providing education and skills training that allow Albertans to be mobile across jobs, employers, industries and regions? Are they instruments for fostering economic diversification, where research, education and skills training are oriented toward meeting the needs of a targeted or emerging economic opportunity? Investment in research over teaching and the scaling of niche programs to create skills gluts locally could be ways to raise the return to investment in targeted industries. The risks of this orientation of PSE institutions are borne by the taxpayer and the students. Pursuing this strategy also requires a better understanding of the relative roles of research, graduate education, undergraduate education and skills and vocational training in fostering economic diversification.

Alberta's PSE institutions have three significant things to ponder as they plan to address the ongoing oil price rout. First, what expectations should there be for what the future holds for the energy sector? Second, and conditional on the energy scenario chosen, what are the probable demands for knowledge and skill sets over the planning horizon? Third, PSE institutions need to decide how to address labour market demands with respect to the programs offered, how programs are designed, and through choices of teaching and learning methodologies.

These conditions pose significant challenges for the PSE sector in Alberta to be sure. But like any period of economic dislocation, they also present opportunities.

II A VERY SIMPLE CONCEPTUAL FRAMEWORK

It is useful to begin by setting out a very simple framework to understand the strategic-planning challenge and opportunities Alberta PSE faces in the current economic environment. The framework highlights economic indicators of particular interest and draws attention to some recent research on educating and training for job market preparation.

An obvious starting point is the observation that oil prices have been the primary determinant of the degree of economic activity in Alberta's energy sector and that energy has been the primary economic driver for the Alberta economy more generally. The aggregate demand for labour and the demands for particular labour skill sets derive directly from this economic driver, although the structural relationships may change over long periods. Oil prices are notoriously unstable, meaning the Alberta economy will undergo periodic episodes of boom and bust, with the magnitudes of the fluctuations depending on the size and duration of the price swings.

Boom periods will generate conditions of increased demand for labour in general, and increased demand for particular sets of labour market skills.² The reverse is true for periods of bust. In principle, the labour market will signal that an economy-wide condition of excess demand or excess supply of labour exists through changes in wage and/or unemployment rates relative to those in other jurisdictions. Similarly, it will signal that occupation-specific conditions of excess demand or excess supply exist through changes in relative wages and/or unemployment rates. In a small open economy focused on natural resource exports, such as Alberta's, the extent of these adjustments may be influenced by altered rates of net migration and external investment in the economy.

¹ We do not address the view argued by some that universities should not be oriented to serving labour market needs. A referee noted that "universities are more than just job-training centres — the elements of helping students to be better students and inquisitive thinkers have value in their own right." In this case, the changing economic conditions in Alberta do not matter for university programs.

² There has been a tendency to interpret these conditions as reflective of excess demand for labour or skills shortages, even though there is no clear evidence that what was really a tight labour market was in a disequilibrium situation. See Emery (2013).

Changes in labour market conditions link directly into the higher-education sector. In Alberta, in boom times, the investment in education and training has increased, while in bust times it has declined (Emery, Ferrer and Green, 2012). This suggests that in Alberta since the 1970s, employment and earnings and more generous policy for access to higher education in the boom economy supported investment in human capital, while slumping labour markets, public deficits and requirements for students to cover more of the immediate costs of their educations through loans and earnings have discouraged investment in human capital.

Labour market changes also influence what PSE programs are in demand. The typical assumption is that there is a relatively tight alignment of particular labour market skill sets (occupations) with particular higher-education programs. Thus, conditions of excess demand or excess supply in specific occupations lead to changes in application rates in specific higher-education programs. In boom times, applications for these programs may exceed spaces, while in bust times, applications may fall short of spaces available.

PSE institutions then must decide how to respond to these changes in program-application rates. In an economy as subject to booms and busts as Alberta's, the key concern is to understand whether labour-market and program-application signals reflect long-term structural change in the economy or just another cyclical episode where changes are short term and transitory. In the former case, it could be an appropriate response to adapt program and curriculum offerings to accommodate the shifting demands, while in the latter case, the appropriate response could be to maintain capacity in traditional program areas. Complicating the issue of whether and how to respond comes from the supply side of PSE. PSE programs, particularly in universities, can take years to adjust and even once they do, graduates may still be another two to four years from entering the labour market.

III WHAT IS IN STORE FOR ALBERTA'S ENERGY ECONOMY?

The Alberta economy has seen a reversal of its fortunes in recent years due to continued low prices for the export products that are its main economic drivers. The West Texas Intermediate (WTI) price for oil was just under US\$106 at its peak in June 2014. It began to slide rapidly thereafter, falling to US\$47.22 by January 2015 before recovering to just under US\$60 in June 2015. After August 2016, the WTI price for oil hovered around US\$30 per barrel before rebounding to the mid-US\$40 range seen in the last quarter of 2016.

The price decline for oil has had predictable effects on activity in the energy sector.³ Capital investment by oil producers was expected to fall by an estimated 34 per cent in 2015, with the decline continuing into 2016. Investment in conventional oil supplies has been especially hard hit. The number of active drilling rigs has declined by over 50 per cent, with the result that conventional-oil investment is expected to fall by 46 per cent in 2015. Oil sands investment is expected to fall less than conventional-oil investment — by 23 per cent in 2015 — as projects already underway continue to move ahead.

These adjustments in the province's main economic driver have had equally predictable effects on the Alberta economy more generally. Real GDP grew by 4.4 per cent in 2014, but Alberta's GDP was expected to shrink by one per cent in 2015. Employment grew at an annual rate of 2.2 per cent in 2014–15, but this measure was expected to be just one per cent in 2015–16. The unemployment rate was projected to rise from 4.7 per cent in 2014–15 to 5.8 per cent in 2015–16. The Alberta unemployment rate was 8.5 per cent in October 2016. Weak labour market conditions mean rates of net in-migration and net immigration are expected to show declines.

³ All figures in these paragraphs are from Government of Alberta, Budget 2015.

The magnitude of the recent abrupt drop in oil prices and its weak rebound has generated understandable concern in the province, and has led to some obvious questions. The price decline no longer clearly seems so short-lived, as many others have been in the province's history, but how soon can we expect a rebound and how large might it be? If oil prices remain where they are, what are the economic and social implications of a long plateau in the price of this main economic driver?

We cannot know the future of course, but history can provide some perspective on these issues. At the risk of oversimplification, it is possible to speak of four oil-price periods over the period 1961 to 2016. The first is the period to the mid-1980s when the oil price increased dramatically from historically low levels. The second period runs from the mid-1980s to the end of the 1990s. Crude-oil prices were stable in nominal and constant dollars over this 14-year period, albeit with considerable fluctuations. The third period runs from the late 1990s to mid-2014. These years have two notable features. The first is the significant trend increase in the price of oil. The current dollar price rose by almost five times over these years, and the constant dollar price by nearly as much. The second feature of note is the extreme volatility of oil prices over the period.

The fourth period is the one of interest in this paper. Prices fell from their peak in June 2014 to January 2015, then had rallied by June 2015 and then fell again until they began moderately increasing the spring of 2016. The obvious question is where they go from there. Specifically, will the increase in oil prices since spring 2016 reflect that prices are resuming the upward trend in evidence since the turn of the century? Or are we entering a period more like that which occurred between 1986 and 2000, when oil prices plateaued for an extended period of time?

If the current price downturn is but a blip in a generally upward trend, we can expect to see a fairly quick return to a pre-2014 economy, where capital investment in construction and resource development becomes a visible economic driver. The extent of the recovery would depend on how quickly oil prices rise and by how much. A quick resumption of an energy-driven economy would mean a quick resumption of demands for familiar labour market skill sets and hence, presumably, reasonably predictable demands for education and training programs that provide these skill sets.

The picture may be very different, however, if the current price rout turns out to be more like the post-1985 scenario with, say, an extended plateau of oil prices. Once this expectation became entrenched, we would expect to see significant structural adjustments as the energy industry and other activities adapted to an economy "beyond oil." At a minimum, we would expect different levels of labour demand as the economy focuses more on producing oil rather than developing oil resources. Lower in-migration would also reduce the pace of residential construction in the province. Likewise, the government would have to undertake major budgetary measures to correct a structural fiscal deficit. These adjustments would impact labour markets by altering both the knowledge and skill sets that are in demand and the supply of these skills, which would be affected by altered patterns of labour force participation, employment, migration, and immigration decisions.

More ambitiously, Alberta may see a return of an era of activist government policy to diversify the Alberta economy, like that which predated the government of former premier Ralph Klein. The government might be tempted, then, to anticipate skills needs for new industries, or enlarged non-traditional industries in Alberta, and to take the opportunity to shift resources in PSE.

The challenge facing Alberta's PSE institutions, and all Albertans for that matter, is that we do not have any firm basis for forecasting if the current slump in Alberta's energy economy is short-lived or long-lasting. Some optimists point to past oil routs and highlight that they can be sharp but brief experiences. Skinner (2015) argues that the current drop in oil prices is a product of supply factors that should resolve themselves in the face of modest demand growth and a lack of investment in new supply at current low prices, which will lead to a return of rising oil prices by the end of the decade.

While it is clear that most forecasts are for oil prices to rebound, we cannot know when or by how much. In this situation, PSE institutions have to prepare for both eventualities and determine how

much risk they want to bear. PSE institutions can take actions to balance two goals: mitigating the risks of uncertainty over labour market trends, and gambling to try to anticipate the trends for an upside return should the gamble pay off. To highlight these alternative strategic directions, we consider first the consequences of a relatively quick price rebound and then a scenario where oil prices plateau for an extended period, such as that after 1985.

IV ENVISIONING A RELATIVELY QUICK OIL-PRICE REBOUND

If an oil-price rebound were substantial enough, and expected to last for the foreseeable future, the province would see a resumption of energy-driven economic growth. This would feature some increase in conventional-oil and natural-gas exploration and development but we expect it would result in mainly new investments in oil sands facilities and capacity. Activities closely linked to energy development, such as construction and specialized business services, would grow apace. As in previous boom periods, these adjustments would put upward pressure on labour costs and the prices of non-tradable services, thereby increasing costs for other natural resource sectors and manufacturing.

The implications for the demand for labour in this scenario are familiar to employers and to higher-education providers, as these groups are among those traditionally impacted by economic activity in an energy-boom period. It is unlikely that the labour market skills required by the industry or by its closely linked sectors (such as construction) will have altered substantially in a short time period. Thus, Alberta PSE would face a situation similar to 2008 and 2009 with respect to labour market trends.

The required increase in labour supply in Alberta will come from four sources. The first is unemployed workers that were the immediate casualties of the downturn after June 2014. The second is a resumption of in-migration and immigration flows. The third is new labour force entrants. The fourth is workers in other occupations in declining sectors who are drawn to the career and income prospects of a booming energy sector.

The first two groups — returning workers and migrants — will mostly have the appropriate labour market skills, although there could be a need for upgrading, particularly for immigrants. However, the latter two — new entrants and defectors from other sectors — represent demands for appropriate education and training opportunities. Given the relatively short duration of the decline in this price scenario, there will be a general understanding of which programs deliver the requisite learning outcomes and where such programs are offered. Most institutions will have drawn on their experiences in previous booms to refine entrance standards, graduation requirements, and curriculums to meet the particular needs of these learners and their future employers. Thus, students and their advisers know where to direct their applications for admission and employers know where to seek graduates.

The primary challenge for higher-education institutions in this scenario is to resist acting as if the current oil-price decline were long-term rather than cyclical. As noted in Section II, they are likely to see applications for particular programs fall relative to the spaces available, creating a perception of excess capacity. Since programs are costly to mount, and resources are always scarce, the inevitable temptation is to scale back on these programs for budgetary reasons. The problem with this approach, however, is that educational institutions (and the provincial economy more generally) will be caught short when oil prices rebound. They will not be able to meet the education and training needs of the next cohort of students, at least not without costly and disruptive short-term adjustments to their programs and curriculums.

V ENVISIONING A LONG PLATEAU OF OIL PRICES: MACROECONOMIC PROSPECTS

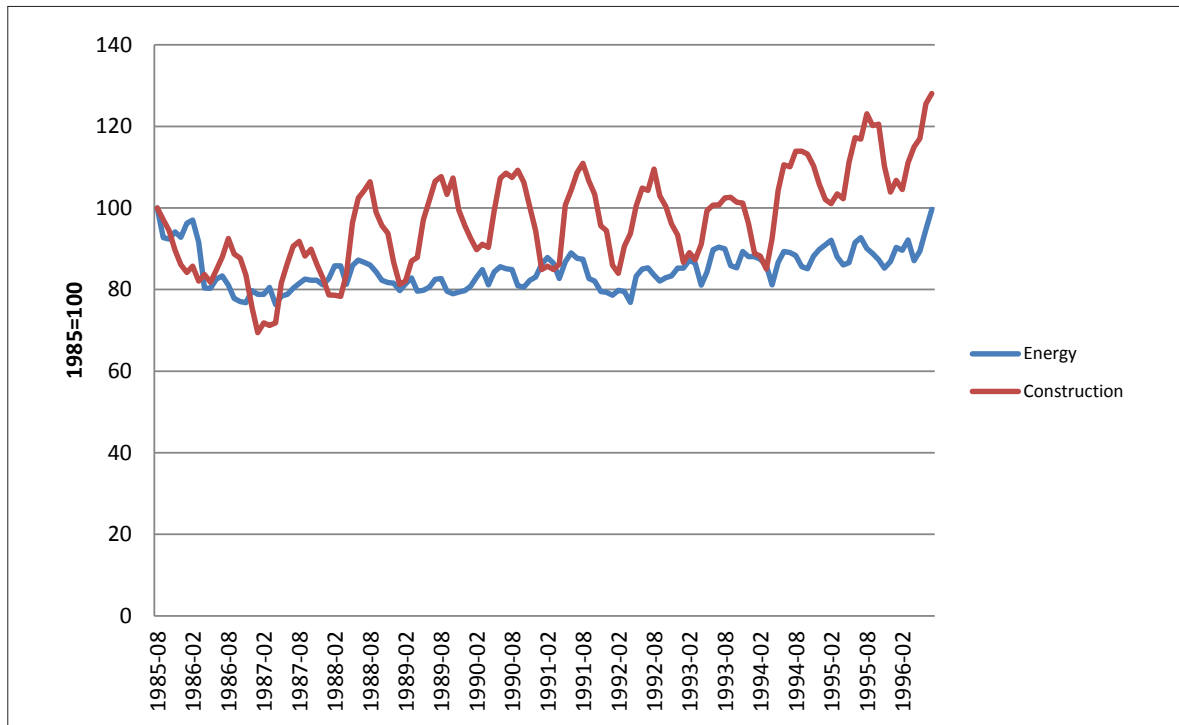
If lower oil prices last for an extended period, however, the outlook changes significantly. Attention now must turn to possible structural changes in the Alberta economy that will alter the types of labour skill sets in demand and, hence, require higher-education institutions to rethink how best to meet these needs.

We cannot know how this price scenario might play out, but we can gain some insight into what might occur from the economic history of the two decades after 1985 when, as seen above, Alberta actually experienced a prolonged period of plateaued energy prices. The past is no sure guide to the future of course, but, as for the movements in oil prices, history can at least provide some perspective on possible developments.

Alberta experienced four types of sectoral adjustments after the 1985 oil-price collapse. The first and most obvious was in the energy sector itself. These adjustments were both immediate and long-term in nature. Alberta's economic structure is mainly oil and gas and Figure 1 shows that following the 1985 collapse, employment in "Energy" (forestry, fishing, mining, quarrying, and oil and gas) fell by nearly 20 per cent to April 1987. It then recovered slightly, fluctuated around 90 per cent of its November 1985 value for a long period, and then declined again to nearly 80 per cent of its initial value in April 1992. Thereafter it began to trend upwards, albeit in a fluctuating pattern, finally regaining the November 1985 value in June 1996. Thus, it took more than a decade for employment levels to recover from the price shock in November 1985.

The second set of sectoral adjustments was in those activities linked to energy production. Construction is the most obvious example. Oil prices drive investment in the province and investment spending, in turn, drives construction. Figure 1 shows that employment in construction in Alberta dropped immediately after the November 1985 oil price decline, recovered briefly by August 1986, and then fell to below 80 per cent of its November 1985 value in January 1987. Thereafter the trend is upwards, albeit in a wildly fluctuating pattern. But it is clear from the table that construction activity is also tied to other economic drivers. This period, to take one example, includes investments in buildings and other facilities needed for the 1988 Winter Olympics in Calgary.

FIGURE 1 INDEXES OF EMPLOYMENT IN ENERGY AND CONSTRUCTION, ALBERTA, AUGUST 1985 TO JULY 1996



The third set of sectoral adjustments to the 1985 oil-price collapse came in public sector activity. While public sector expenditures persisted at the same level as before the oil-price rout until the early 1990s, public sector investment spending did slow after 1986. Perhaps the biggest lesson from this period is the lack of impact public sector investment and spending can have in replacing the labour market demand of the oil boom. Further, the public sector stimulus will hit a time limit as the province reaches what international bond markets assess is the province’s debt wall. As the experience in Saskatchewan showed in the early 1990s, Wall Street will not buy a province’s bonds if there is not a plan to deal with deficits (MacKinnon, 2008). When that happens, the fiscal retrenchment will exacerbate the slack in the province’s labour market, as seen in Alberta after 1993.

Whatever market forces may have been operating in this period, it was certainly a period where government policies were aimed at moving the Alberta economy beyond its dependence on the energy sector. Diversification was a central tenet of the Progressive Conservative government of Peter Lougheed from its early days. A government memo issued in May 1974 stated that the government’s economic objective was to transition the province from “a primarily extractive economy, where our resources are exported for processing to other parts of Canada and the rest of the world, to an industrialized economy which will see further processing of our raw materials, increased manufacturing and ... satisfying employment opportunities for Albertans” (Morton and McDonald, 2015).

The government’s diversification strategy had a number of elements. One was the use of resource rents to finance a portion of government operating expenditures, thereby allowing the province to maintain relatively lower business and personal tax levels than those in competing jurisdictions. It also allowed the government to undertake direct investment in specific enterprises, including an airline, a cellphone and wireless-technology business, a hazardous-waste treatment plant, meatpacking, and more. The Alberta Heritage Savings Trust Fund was created in 1975 to support these efforts. This focus on diversification continued after Don Getty succeeded Lougheed as premier in 1985.

The government's orientation to economic development shifted in the 1990s when Klein was premier, partly because of a perceived need to address a persistent fiscal deficit and partly because of a shift in ideology. The government continued to rely on relatively lower tax rates to promote economic growth, but specifically eschewed explicit government investments in the private sector, and other loans and subsidies to business. The Klein government ended a number of inherited diversification programs and disinvested from a number of the interests developed under them.

Thus, conditions favoured economic diversification in Alberta in the post-1985 period. Oil prices were flat in current dollar terms and declined in real terms. Further, as just noted, the government of the day was active in promoting economic diversification, at least until a change in the mindset of political leadership in the early 1990s.

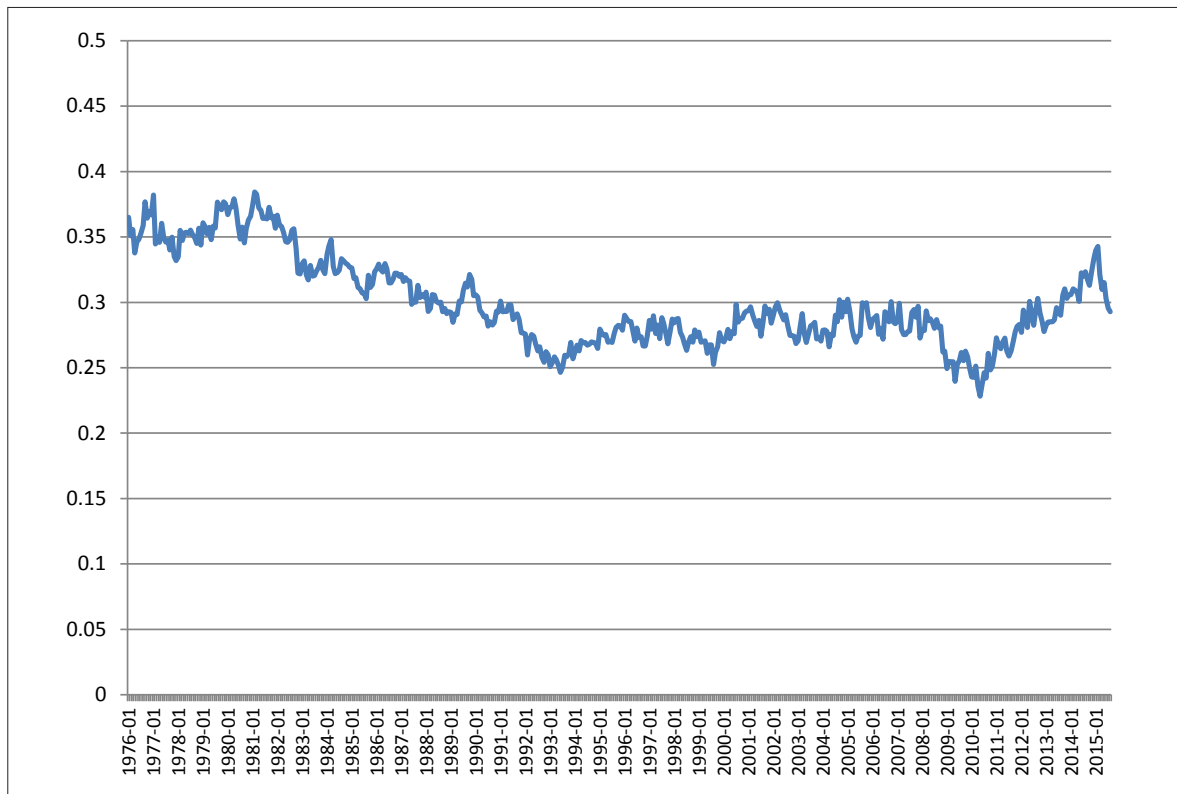
It is not enough to look just at shifts in relative employment by sector as a measure of economic diversification. This period was not a controlled experiment after all; there were many other forces at play that were altering Alberta's economic structure: technological change, globalization, international and internal trade agreements, and the trend everywhere to the increasing importance of the service sectors.

One approach to overcoming these difficulties is to calculate an index of specialization of employment that compares changes in the distribution of total employment among sectors over time for Alberta relative to those for a reference jurisdiction, such as Canada or Ontario. By virtue of such an index's construction, if Alberta's industrial structure was identical to that for a given reference entity, the value of the index would be zero. The more Alberta's structure differs from the reference economy, the greater the value of the index.⁴

Figure 2 shows the index of specialization for Alberta relative to Ontario based on monthly employment data for the period January 1976 to March 2015. Four periods are evident from the graph. The first runs from January 1976 to February 1981, where the index shows a slight upward trend, meaning the economy was becoming slightly more specialized in this period of rising energy prices. The second period runs from February 1981 to June 1993 and exhibits a clear downward trend. The index was 30-per-cent lower at the end of the period than at the beginning. The third period runs from June 1993 to May 2010. The index fluctuated slightly in these years, but the trend was essentially flat. The final period runs from May 2010 to August 2015 and shows a marked increase in the index. In fact, at the end of the period the index was nearly equal to its values in the mid to late 1970s.

⁴ Given the way it is constructed, the value of the index is capped at two.

FIGURE 2 INDEX OF REGIONAL SPECIALIZATION, ALBERTA EMPLOYMENT BY SECTOR RELATIVE TO ONTARIO, JAN 1976 TO AUGUST 2015



The Alberta economy exhibited relatively high specialization rates in the late 1970s when oil prices were high, but experienced some diversification relative to Ontario after the early 1980s when oil prices declined in real terms. There was a further shift to greater specialization after 2010 as oil prices climbed, after little movement either way for a decade after the early 1990s.

Despite these fluctuations, however, there is no evidence of significant structural shifts: the value of the index at end of the period is virtually identical to the value at start. The conclusion is that provincial efforts appear to have had little impact on economic diversification.⁵

This brief historical tour provides some guidance as to what we might expect should oil prices plateau at current levels for 10 or more years.

First, the province would experience relatively lower rates of growth (i.e., compared to the rapid price-rebound scenario) of the main macroeconomic indicators: GDP, investment, employment, immigration and immigration, wage and salaries.

Second, we can expect to see differential effects among sectors. Obviously, the energy sector would be most affected as it adapts to oil in the US\$30 to US\$50 range. We can expect continued production of conventional oil, but less exploration and development for new supplies than there would have been at prices around or above US\$100. The same holds true for the oil sands. Existing

⁵ This conclusion is consistent with a similar exercise reported by the Pembina Institute (2005) using GDP data by sector, rather than employment data, and using Canada rather than Ontario as a reference point. Its calculations show that Alberta's economy became relatively more specialized between 1971 and the mid-1980s. This trend then reversed, with Alberta becoming relatively less specialized for the next decade, when the trend reversed again. By 2003, when its data end, Alberta's diversification was much less than in 1971. Tombe and Mansell (2016) use alternative measures for employment and income diversification akin to the Herfindahl index. They show that for some time Alberta shows itself to be one of the more diversified economies among the 10 provinces. Alberta's problem is a lack of diversification of markets for its products rather than a lack of diversification in its economic structure.

sites would continue to produce, but we would likely see the development of new sites put on hold. These adjustments would spill over to closely related sectors such as construction, although for a shorter period than in energy.

A long-run decline in government revenue would call for major changes to deal with a structural budget deficit. The reaction would depend on the regime in place and its attitude to economic development. The government might try to offset the private sector decline by extending concessions to industry or engaging in public infrastructure spending. It could run a large deficit relative to GDP for some time, given the province's favourable fiscal situation, but it eventually would have to come to grips with a structural deficit.

Past experiences notwithstanding, Alberta governments continue to try to promote economic diversification. In 2009, then premier Ed Stelmach appointed former federal cabinet minister David Emerson to lead a task force (the Premier's Council on Economic Strategy) to advise on what Albertans must do now to sustain prosperity through the next three decades and beyond. The council issued a report in May 2011, although subsequent political changes in the province have meant that it has been largely ignored to date.

The council's final report, "Shaping Alberta's Future," acknowledged that six decades of diversification efforts in Alberta have not yet met with much success (page 40). They stressed the need for action, however, and point to three immediate opportunities for building long-term economic expansion (pages 46-47):

- Exporting expertise and technology/equipment related to high-carbon energy production and associated environmental challenges.
- Expanding agriculture and forestry, putting a greater focus on higher-value food and fibre opportunities.
- Medical and biotechnology innovation.

The report also identified information and communication technologies (ICT) as essential underpinnings to these areas and notes favourably Alberta's growing ICT sector.

The first budget of Alberta's new NDP government (2015) put considerable emphasis on economic diversification. "Economic growth, diversification and job creation" was one of the three themes underlying the budget.⁶ To these ends, the government will increase capital spending by 15 per cent over five years, invest in a job-creation program, establish a new Ministry of Economic Development and Trade, and improve access to capital for businesses. Presumably, the new ministry will be responsible for developing a diversification strategy.

The foregoing analysis indicates what are the most likely prospects for the Alberta economy in the event of a sustained plateau of oil prices:

- Continued activity in the oil and gas sector, including oil sands production, albeit at a lower level than in the event of a price upturn.
- Quite probably technological and managerial advances that bring down the break-even price for conventional and non-conventional oil and gas production.
- continued importance of sectors in the Alberta economy closely linked to energy production such as construction; activity levels adjust to new energy activity.
- Relatively little market-induced diversification into new economic drivers.
- New diversification measures from government but with uncertain (at best) probability of much success.

⁶ The other two themes are stabilizing funding for key provincial services and returning to budget balance.

Overall, the picture is of a province that is no longer the economic force it is when the energy sector is booming, but it is still a relatively prosperous economy. The province, after all, has many natural advantages. The Emerson report lists these as: a vast supply of natural resources, money to invest, an educated workforce, stable political and financial systems, and a favourable regulatory environment (pages 15-16). To this list we would add an entrepreneurial tradition, high-quality colleges and universities, and generally high-quality infrastructure.

VI THE LABOUR MARKET AND THE HIGHER-EDUCATION SECTOR

We know from Section II how the connection between labour markets and the higher-education sector operates in principle. Economic shocks impact the demands for particular knowledge and skill sets (occupations), which in turn affect the demand for access to relevant higher-education programs. Institutions experience under-capacity in some programs and over-capacity in others and have an incentive to adjust their educational offerings accordingly. How they choose to respond determines (along with in- and out-migration) the incidence and duration of skills imbalances. On the supply side, the higher the expected cost of adjustment and the longer the time required to adjust, the lower the likelihood that program offerings will respond to labour market conditions.

If institutions respond in the predictable manner to these incentives, and the economic shock turns out to be long run or structural in nature, the labour market will move towards a new equilibrium. New graduates (along with new migrants) will fill the gap between the demand and the supply of skilled labour in growing sectors. Likewise, there will be relatively fewer graduates (and fewer migrants) seeking employment in relatively declining sectors, thereby easing excess supply conditions. We would observe shortages and surpluses of skilled labour in this case due to the unavoidable lags in student and institutional responses, but they are self-correcting. The “system” operates as intended.

There are many examples of the system operating in this manner. Perhaps the most obvious one is in the area of information technology. The revolutionary changes in this field in the last few decades created a need for workers with entirely new skill sets, such as writing code or setting up and maintaining local area networks. Colleges and universities responded by establishing new programs and funding instructor and infrastructure needs. Skills imbalances still exist as the pace of change in this industry is rapid and there are unavoidable lags in adjusting education and training programs. But overall, the system has responded and continues to respond in an appropriate manner.

Skills imbalances will be more frequent and more prolonged if institutions respond in the predictable manner to changes in relative program-application rates but the economic shock turns out to be cyclical in nature. The temptation is for education planners, often with government encouragement, to expand capacity in particular programs or perhaps even design and implement new ones that appear to fit the labour force needs of currently booming sectors. Meanwhile, capacity in formerly robust programs is cut back. Given the unavoidable lags in this process and the time it takes to produce graduates, it will be many months or even years before the change in enrolment patterns is reflected in graduate patterns.

The consequences of misinterpreting economic signals appear when the cyclical effect is reversed and labour market imbalances alter once again. Now we have graduates seeking jobs where demand is no longer as robust, and employers seeking graduates from programs where graduation numbers have fallen. If the government or the educational sector again misreads these signals, we can enter into another round of adjustments in programs and curriculums. We would certainly observe shortages and surpluses of skilled labour in this scenario, but they would not dampen as in the previous case.

The possibility of misreading economic signals and making structural adjustments to cyclical phenomena is the reason for spending the time we did on the nature of the current oil-price situation. If oil is indeed the new coal, the appropriate response is a relative shift of program capacity from fields traditionally associated with the skills needs of the energy sector to the skills needs of new economic drivers. Or, if there is no imminent new economic driver for Alberta, an appropriate response would be to downsize the energy-focused programs and, consequently, the budget of the PSE institution. But if the current price rout is temporary, a shift of capacity away from the traditional fields will mean another period of skills shortages for Alberta.

Labour market imbalances are more extreme and more visible during boom and bust periods for the energy sector, but they are possible even in periods of relative tranquility in the industry. One might think of these as structural imbalances. There are at least three situations where skills imbalances of this type could exist.

First, skills imbalances could arise and persist if not enough Albertans were opting for, or completing, higher education. It is commonly asserted that nearly 70 per cent of new jobs created in the coming decades will require some form of post-secondary education. But Alberta's post-secondary-education attainment rates closely track the national average and Canadian rates are among the highest in the world. We note, however that Emery, Ferrer and Green (2012) found that the oil boom of the 1970s was a period of time when Alberta's post-secondary attainment levels increased to match the national average but fell off during the bust conditions of the 1980s. If history repeats, we could see Alberta's post-secondary attainment rate fall below the national average if energy prices remain low.

Second, skills imbalances might arise and persist if Albertans were attending and completing higher-education programs but were choosing the "wrong" ones. This could happen if they were unaware of the income and employment prospects for graduates of the various programs and disciplines, or were aware and chose to ignore them. Cross (2015) notes that university enrolment in Canada has grown faster than college enrolment over the past decade, despite some evidence that the wage premium for university education has eroded slightly in recent years. This is the situation many critics have in mind for example when they argue that there are too many students in general and liberal arts programs and too few in technical and STEM disciplines.

It is not clear how to evaluate this possibility though, as there is considerable ambiguity around the notion of "right" and "wrong" programs. The traditional view is that there are tight links between particular occupations and particular higher-education programs. Once an applicant decides on his or her career aspirations, the choice of higher-education program is set. Conversely, the choice of higher-education program dictates and constrains possible career choices.

Recent research in higher education has queried this presumption. A recent graphic posted by the Higher Education Quality Council of Ontario (HEQCO, 2015) illustrates this point for the Ontario labour market. The graphic draws on data from the 2011 National Household Survey⁷ on university and college fields of study and occupations. Both categories are at a fairly high level of aggregation but the results are striking.

The results can be viewed by focusing on fields of study for specific occupations. Not surprisingly, the professions are most tightly linked to specific higher-education fields of study. Thus 92 per cent of judges, lawyers and Quebec notaries have law and social and behavioural sciences as their fields of study, while 86 per cent of engineers graduated from architecture and engineering programs, and over two-thirds of those in health occupations reported health as their field of study.

⁷ We make the standard caution that this survey departed from previous census methodologies, so its reliability is uncertain.

The result can also be viewed by focusing on occupations for graduates of specific fields of study. The most specialized from this perspective is education, where 64 per cent of graduates report their occupation as teacher or professor while 53 per cent of graduates of health programs are in health occupations.

Other links, however, are more unexpected. Computers and information systems are often thought of as highly technical and specialized activities, and to some extent they are. Forty-one per cent of those whose occupation is computer and information systems report their field of study as math, computer and information systems. Another 25 per cent come from architecture and engineering programs. But, perhaps surprisingly, nine per cent come from business, management and public administration programs; another nine per cent from law and social and behavioural sciences; and five per cent from humanities. Thus nearly one-quarter of employees in this occupation group have what might be considered non-traditional education and training.

A similar conclusion holds when viewed in the reverse direction. Forty per cent of graduates of math, computer and information system programs report their occupation as computer and information systems. But 15 per cent are in management positions and 14 per cent are in business, finance and administration roles. Thus nearly one-third of these supposedly specialized graduates end up in business-related occupations.

Business is another interesting case. Only 28 per cent of those listing management as their occupation come from business, management and public administration programs. Twenty-three per cent come from law and social and behavioural sciences; 13 per cent from architecture and engineering; and 12 per cent from humanities. Viewed in the opposite direction, 41 per cent of graduates of business, management and public administration programs find their careers in business, finance and administration and another 22 per cent do in management. But 14 per cent end up in sales and services, with the remainder being found in virtually every category.

Sales and services is the third-largest occupation at 13 per cent of the workforce, surpassed only by business, finance and administration at 21 per cent and management at 15 per cent. Yet these workers come from every field of study, the largest being law and social and behavioural science at 26 per cent, followed by business, management and public administration at 19 per cent, and humanities at 16 per cent.

Law and social and behavioural sciences constitute the largest fields of study at 21 per cent. Nearly one-quarter of these graduates report their occupation as business, finance and administration, 16 per cent as management, and 16 per cent as sales and service. The remainder are found in virtually every other occupation category.

If the matches between fields of study and occupations are indeed diffuse, the responses to apparent structural skills gaps change somewhat. More employers can look beyond traditional higher-education programs to meet their skills needs. More graduates can look beyond traditional occupations when entering the labour market. Institutions can amend their programs to broaden the job readiness of their graduates.

A third situation where structural skills gaps could emerge and persist is if Albertans were choosing the appropriate programs but not obtaining the expected learning outcomes. Cross (2015, 14) cites a recent Statistics Canada report indicating that a quarter of university graduates in Canada had low levels of literacy skills and a third had low levels of numeracy skills. There may even be cause for concern about the quality of the soft skills received (page 14).

Recent research in higher education has focused on methods to identify the knowledge and skills that students obtain from their higher-education programs. Traditionally, programs were defined by the number of courses and other requirements to be successfully completed in order to graduate. This approach proved problematic in Europe when economic integration brought with it increased

labour mobility. Educational systems differed greatly among nations, so students did not know how their education and training would be viewed in other countries and employers did not know how to evaluate foreign transcripts.

The response was to work to identify and articulate expected learning outcomes in higher-education programs. Specifically, policy-makers asked what do students know and what can they do when they graduate from a specific higher-education program? Note the emphasis on competencies as well as knowledge. It was not enough to say that a graduate had taken advanced statistics courses, for example. It was also necessary to set out the kinds of tasks a student with this knowledge could competently perform.

These top-down initiatives were accompanied by a bottom-up approach known as “tuning.” In contrast to the qualification-framework development, tuning was a bottom-up process involving faculty, students, graduates, and employers. Tuning extended the idea of learning outcomes and competencies to the program or discipline level, and worked to identify best approaches and methodologies to achieve these outcomes. Tuning proved very popular, and quickly gained widespread international participation.

In Canada, government and higher-education institutions took an active interest in these developments. The Council of Ministers of Education, Canada (CMEC) developed a statement of expectations of graduates of three degree levels: bachelor, master and doctoral. There were six categories of expectations: depth and breadth of knowledge; knowledge of methodologies and research; application of knowledge; communication skills; awareness of limits of knowledge; and professional capacity/autonomy. Note that this is a mix of specific skills, generic skills, and competencies.

It is not enough that institutions identify and articulate expected learning outcomes if they are to provide appropriate labour market skills. They must also deliver on these promises. In the early days, this check was attempted through quality-assurance frameworks. But these were largely audit approaches, where the implicit assumption is that good processes lead to good outcomes.

More recently, attention has turned to actual measurement and evaluation of program successes in delivering expected learning outcomes. One well-known example is an OECD initiative known as the Assessment of Higher Education Learning Outcomes (AHELO). AHELO’s objective was to determine if it is possible to devise and implement standard tests for use in an international environment to measure what final-year students know and can do. To this end, AHELO commissioned tests for two disciplines — civil engineering and economics — and a third for generic or soft skills.

Measurement and evaluation of learning outcomes are complex and controversial tasks, however. To appreciate the challenge, consider a typology of learning outcomes such as that proposed by Weingarten (2014). To the familiar disciplinary knowledge and skills he adds three types of generic learning outcomes. Basic cognitive skills refer essentially to literacy and numeracy. Higher-order cognitive skills include problem solving, critical thinking, and communication. Transferable life skills are soft or non-cognitive and include behavioural and personality traits such as determination, confidence, initiative, persistence, resilience and time management.

Institutions generally do a good job of teaching disciplinary content. The curriculums are well defined, learning materials are plentiful and constantly updated, testing methods are longstanding, and standards are widely understood. Instructors in an economics department or skilled-trades program can readily cite what they expect their graduates to know and be able to do with their disciplinary training.

The same is increasingly true of basic cognitive skills. There is an increasing international consensus on how to define these and how to test for competencies. There are even tests available

that allow for comparisons among jurisdictions and tracking trends within a given jurisdiction. Green and Riddell (2012) use data from the International Adult Literacy Survey (IALS) and the International Adult Literacy and Life Skills Survey (IALLS) to look at the effects of aging on literacy. Dion and Maldonado (2013) use the same surveys along with the Program for the International Assessment of Adult Competencies (PIAAC) to highlight what they see as troubling trends in literacy achievement.

The difficulties come with the other two skill sets. There is general recognition that they are essential to a successful labour market experience, yet there is little understanding of how to define them. What exactly is meant by cultural sensitivity, for example? Measuring and evaluating these skill sets are even more difficult. How might an employer screen applicants according to their degree of cultural sensitivity? How might a job applicant credibly signal a high degree of cultural sensitivity?

One further benefit of the attention paid to measuring learning outcomes is that it enhanced research into how teaching and learning could be improved. “Chalk and talk” approaches could be compared to problem-based learning ones. Formal mass lectures could be compared to smaller tutorial groups. On-line courses could be compared to residence-based ones. The roles of various student services in complementing academic work could be evaluated. Programs with co-op programs or work placements could be compared to purely classroom-based ones.

Together with the work on matching fields of study and occupations, this research has clear relevance for the task of reducing structural skills imbalances. If statements of expected learning outcomes in programs are clear and credible, employers are more likely to look beyond traditional disciplines for potential workers, and graduates are more likely to look beyond traditional occupations for employment opportunities.

In sum, skills imbalances are an inevitable feature of an energy-based economy such as Alberta’s, given the boom-bust sequences and the unavoidable lags in deciphering labour market signals and responding to them appropriately. But higher-education institutions can influence the magnitude and duration of the imbalances through their admission and program decisions. They can also play a role in reducing skills gaps that are more structural in nature by developing clear and credible statements of expected learning outcomes that allow employers and students to understand and appreciate the job skills they have upon graduation.

VII HOW SHOULD ALBERTA PSE RESPOND TO THE OIL PRICE ROUT?

It is important to begin by putting Alberta’s PSE situation into context. For the most part, Alberta PSE faces the same long-term planning challenges as do all other higher-education institutions in Canada. This is perhaps an obvious point but it is worth stressing because there is a real danger that academic planning could get hijacked by the attention to the energy sector. Oil prices are visible and receive a great deal of regional, national and international media attention. It is important not to let this high visibility detract from the real planning challenge, which is to anticipate and prepare for the myriad of less visible and slower-developing trends that will inevitably affect higher education in profound ways.

Higher-education institutions in Alberta do have an extra dimension of planning uncertainty, however, due to the importance of energy as an economic driver for Alberta and the extreme volatility of crude oil prices. The economic volatility brought about by these oil-price swings quickly spreads to Alberta PSE by altering the demand for programs, in particular those geared to servicing the energy sector’s needs. It may also affect the sector’s ability to supply programs if consequences include changes in grants and tuition income and financial support from the private sector.

The long-run prospect for oil prices is almost certainly upwards from current levels. The only questions are how soon this rebound might happen and how strong the recovery might be. The

implication of the statement that oil prices will eventually rebound is that Alberta PSE must retain the capacity to meet the education and training needs of the energy sector and its closely linked sectors. It is premature to think of Alberta as entering a “post-oil” economy and thus for Alberta PSE institutions to shift away from the energy economy.

The implication of the statement that the size of the rebound is uncertain is that Alberta PSE institutions must plan with two stylized oil-price scenarios in mind. One possibility is that prices rebound in short order to levels experienced as recently as the summer 2014. In this event, the consequences are relatively straightforward: greater numbers of students will be seeking the particular education and training that the energy industry and its closely affiliated sectors require.

The other possibility is that Alberta will experience a long period of relatively flat oil prices, like it did after 1985. In this event, the implications for the demand for labour market skills are uncertain. Certainly, the energy industry will concentrate more on finding ways to live with oil in the US\$30 to US\$50 range. Linked sectors such as construction will feel these effects immediately, although they may be offset to some extent by other developments such as federal and provincial infrastructure projects. If history is any guide, there will likely be little economic diversification either from natural market forces or explicit government policies.

This scenario of relatively flat oil prices for an extended period poses two significant planning issues for Alberta PSE. The first is that PSE institutions must resist the temptation to reduce their capacity to meet the labour force needs of the energy industry and its closely related sectors. The pressures to do so will be even greater in this case. There will more programs and courses appearing to be under-enrolled, and for longer periods. Resources are always scarce, so there will be calls to reallocate budgets towards other programs that, at least for the time being, appear to be in greater demand. Given the benefit to Alberta more generally of retaining this capacity, it is certainly reasonable to expect government assistance in covering the costs.

The second issue for PSE institutions in Alberta in this flat-oil-price scenario is to consider whether they should extend their educational missions and move into new program areas and credentialing areas.⁸ The diffuse pattern of mapping between fields of study and occupations indicates that some employers at least are willing to look beyond traditional higher-education programs for the labour skills they seek. Equally, it suggests that some graduates at least are willing to look beyond traditional occupations when seeking employment. These facts are clearly encouraging for institutions considering developing new programs in areas traditionally served exclusively by other types of institutions; for example colleges moving into business education and universities moving into certificate programs.

The challenge for institutions attempting to diversify into niche areas is to demonstrate the value of the new program offerings. They are, in effect, trying to move students and other stakeholders away from brand-name suppliers. To this end, the recent educational research on expected learning outcomes provides three useful lessons.

One, it is essential to identify and articulate program-learning expectations in a clear and transparent manner. Instructors must buy into them completely, and they must be evident to students and their advisers as well as potential employers. Program descriptions must indicate what graduates know, but also what they can do with this knowledge.

Two, it must be clear how learning expectations are achieved in each and every program. One approach to this is a process known as curriculum mapping. Program curriculums are reviewed with a view to determining where and how these expected learning outcomes are taught, paying particular attention to the range and sequence of courses and course-related activities. This review

⁸ There is an interesting parallel here with the interest shown by the Alberta government in diversifying the provincial economy while maintaining and enhancing its traditional comparative advantage in energy.

normally involves curriculum experts examining syllabuses and conducting interviews with instructors and students.

Three, the programs must actually deliver the stated learning outcomes. To be credible, this must involve rigorous measurement and evaluation techniques. This requirement is likely to be the most difficult to implement as outcomes-measurement techniques are in their infancy and because they tend to be highly controversial among teaching staff.

Should an Alberta PSE institution opt to extend its academic mission, it faces two significant challenges. The first is that, to begin planning, it must form some expectation of future labour market needs beyond those associated with the energy industry and its closely aligned activities.

One approach is to monitor labour-market signals closely and respond to new labour force needs as they begin to appear. We saw above that there are links from employer needs to higher-education program responses, however slowly and imperfectly they may operate. The institution would look to the traditional indicators of labour market imbalances such as statements of skill requirements from industry and trends in relative wages and salaries by occupational groups. If these signals are inconclusive, as they often are, eventually the new requirements will begin to show up as shifts in relative institutional and program application rates.

A more aggressive version of this approach is to draw on inside and outside expertise to project future labour force needs in advance of any firm labour market signals. The lure of this approach is understandable: it would give an institution a head start on its academic planning. But the downside is evident. The costs of guessing wrong about future economic trends and labour force needs can be large. It takes considerable resources and time to develop and implement new programs, and to advertise them widely to potential students. Any number of unfortunate consequences could follow: new programs with chronic under-enrolment, overcrowding in others, and graduates with impressive new credentials but no career prospects. These are not easy decisions to reverse, although probably less difficult in a college setting than in a university setting.

The second planning challenge is to decide how far the academic mission might be extended. For purposes of analysis, it is useful to consider two stylized diversification strategies: a cautious one and an aggressive one.

A cautious strategy would accept a relatively strict version of the traditional division of labour within the post-secondary education sector: i.e., colleges focus on building technical and practical skills while universities provide more general education along with professional programs such as medicine and law. The implication is that institutions would look to expand and extend programs within their traditional areas of strength. This could be done individually within programs or jointly by drawing on the strengths of several programs.

The construction trades are an obvious candidate for extension. Many graduates end up running small businesses, which require information technology and business skills that older tradespeople are sorely lacking. As another example, graduates of university engineering programs frequently end up in management positions.

The cautious approach has a number of advantages. To the extent it is successful in developing new program areas and attracting new students it would help prepare PSE institutions for a time where oil is a weaker economic driver than in the recent past. It has a reasonable chance of success as it builds on existing expertise and on existing institutional reputations with students and employers. Equally important, it is least likely to compromise efforts to enhance the institution's existing competitive strengths.

The drawback is one common to all cautious strategies whether in higher education or elsewhere. PSE institutions would miss the opportunity that disruptive shocks such as an extended oil-price plateau provide to bring about institutional transformation. This may not be considered a problem

at the moment, but it could limit an institution's ability to succeed in some future rapidly changing educational environment. One need only mention Research in Motion, now Blackberry, to make the point.

An aggressive strategy would reject outright the traditional division of labour within the higher-education system. The boundary between colleges and universities has become much more blurred in recent years, in Alberta as in other provinces. Increasingly, colleges are offering general programs and universities are focusing more on preparing their graduates for the job market. If a college were to adopt this approach, it would mean introducing programs where it feels it could compete for students and resources with the province's universities. These may bear some connection to existing areas of expertise, but they may be entirely new ventures. Presumably these would be programs in general arts, sciences, and business, as professional programs are very expensive and highly regulated.

The advantage of this approach is one common to all risky ventures: the opportunity to genuinely transform the academic mission of colleges and universities.

This transformation could be difficult to achieve, and pursuing it could backfire if it affected traditional program strengths adversely. The evidence is quite clear that most students prefer universities over colleges for general programs. Ontario colleges, for example, have not had a great deal of success to date in attracting students in general degree programs. Further, it takes considerable resources and time to develop and implement new programs, and to advertise them widely to potential students. Any number of unfortunate consequences could follow: new programs with chronic under-enrolment, overcrowding in others, and graduates with impressive new credentials but no career prospects. These are not easy decisions to reverse although probably easier than they would be in a university setting.

On the other hand, universities may not see colleges as competitive threats and may see this as redefining the distinction between colleges and universities as one of teaching versus research. Universities could accept colleges having more of a role providing general undergraduate programs and in turn become more research-intensive and graduate-training focused.

There are many strategies that lie between these two extremes. Where a given PSE institution chooses to land depends on its academic ambitions, the degree of risk it is willing to assume, and the resources and expertise it can bring to the task.

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About the Authors

Ken Norrie is Professor Emeritus of Economics at McMaster University. Ken began his academic career in Economics at the University of Alberta in 1971, was promoted to Full Professor in 1980 and was the Dean of Arts from July 1999 to December 2001. He joined McMaster University in January 2002 as Professor of Economics and, from January 2002 until September 2006, served as Provost and Vice-President (Academic). He was seconded to the Higher Education Quality Council of Ontario (HEQCO) from February 2007 until January 2012, serving as Vice-President (Research). He was seconded to the Royal Commission on the Economic Union and Development Prospects for Canada (the Macdonald Commission) in 1983-84 and 1984-85. In 1990-91, he was Clifford Clark Visiting Economist at the Department of Finance, Government of Canada. He was the editor of *Canadian Public Policy/Analyse de Politique* between 1986 and 1990, and has served on the editorial boards of *Canadian Journal of Economics*, *Canadian Journal of Regional Science*, *Prairie Forum* and *National History*.

Herb Emery is the Vaughan Chair in Regional Economics at the University of New Brunswick. He holds an MA and PhD in Economics from the University of British Columbia. Previously, at the University of Calgary, he served as Full Professor in Economics and Research Director for The School of Public Policy at the University of Calgary as well as the Sware Professor in Health Economics, a joint position in the Department of Community Health Science in the Faculty of Medicine and the Department of Economics. From 2010 to 2015, he served as Managing Editor of *Canadian Public Policy/Analyse de politiques*, Canada's foremost journal examining economic and social policy.

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THE CONNECTION BETWEEN PROFESSIONAL SPORTING EVENTS, HOLIDAYS AND DOMESTIC VIOLENCE IN CALGARY, ALBERTA

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