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The Payoff: Returns to University, College and Trades Education in Canada, 1980 to 2005

By

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- Among OECD countries, Canada has the highest percentage of postsecondary graduates in the population 25-64 years old, which is due to having a large proportion of non-university postsecondary graduates from colleges and trade schools.
- By considering the financial returns to types of postsecondary education, which reflect demand and supply, this paper examines whether Canada has produced too many postsecondary graduates in general, or too many graduates from colleges or trade schools in particular.
- The answers to both questions is no. There are high rates of return to higher education, with the exception of women graduates of trade schools.

Canada is not alone among members of the Organisation for Economic Co-operation and Development (OECD) in subsidizing postsecondary education. However, unlike other OECD governments, Canadian governments support much higher levels of postsecondary training in colleges and trade schools relative to universities. Consequently, the educational composition of the working-age population in Canada also differs strikingly from that in other OECD countries, both in the high proportion of postsecondary graduates and the high proportion of community college graduates among them.[1]

At 48 percent, Canada has the highest percentage of postsecondary graduates in the population 25-64 years old and, at 56 percent, the highest percentage of postsecondary graduates among persons 25-34 years old among OECD countries (Figure 1). Canada also stands out in having the highest percentage of college-level graduates in the OECD – 24 percent of persons aged 25-64 years old, 26 percent of persons 25-34 years old. However, as concerns university graduates, Canada is well behind the OECD leaders, with 25 percent for persons 25-64 years old and 29 percent for persons 25-34 years old.[2]

The paper reflects the views of the authors and no responsibility for these views should be attributed to Industry Canada or the federal government.

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1 OECD (2009) Table A1.1a, p.37. The Canadian data in both of these OECD tables are compiled from the Labour Force Survey, while our estimates below use Census of Population data. The methodological note for Canada (Annex 3, p.13, available at www.oecd.org/edu/eag2009) notes that the tertiary-B (community college) proportion of the population is inflated by some persons who should be classed as postsecondary, non-tertiary (trades). In any event, since Canada has the highest population proportion with tertiary-B diplomas and the highest proportion with postsecondary, non-tertiary diplomas, Canada certainly has the highest proportion of non-university postsecondary credentials.

2 OECD (2009) Table A1.3a, p.39. We have used the terms "postsecondary," "college" and "university" in place of the OECD terms "tertiary," "tertiary-type B" and "tertiary type-A and Advanced Research programs."

The high percentage of postsecondary graduates in Canada and their concentration in non-university programs are, in part, the outcomes of public policy. While individual Canadians decide whether or not to continue on to postsecondary studies and at what level, their decisions are made in light of the availability and cost of places in different types of postsecondary institutions.

Public funding decisions play a large role in determining the total supply of postsecondary places and the allocation of those places across various types of programs. Public policy also plays a role in determining the price of postsecondary programs, both directly through decisions about tuition and fees, and indirectly through student loans, bursaries, and subsidies via the tax system.

The data on educational attainment cited above raise two important questions for educational policy. First, is there evidence that Canada produces "too many" postsecondary graduates? The second question is closely related to the first – does Canada produce "too many" of its postsecondary graduates from non-university programs?

To answer these questions, we consider the financial returns to postsecondary education. What is the value of a bachelor's degree in terms of earning power, compared to a high-school diploma? What about a college diploma or trade school certificate? The findings are not only of interest to aspiring students and their parents; from a public policy perspective, they can be instructive about the efficient allocation of scarce government funds.

Financial Returns to Postsecondary Education

Changes over time in the financial returns to postsecondary education are often interpreted as evidence as to the relative growth of supply and demand for new graduates.[3] Rising wages of graduates are taken to show demand growing more rapidly than supply; and falling wages, the opposite. Evidence of this type cannot tell us whether there is "too much" or "too little" postsecondary education, but a marked drop in returns might nonetheless be a strong indication to slow the expansion of postsecondary education; and contrariwise for a marked increase in returns.

A number of findings in Table 1 are noteworthy:

1. Female university graduates who worked full-time and full year earned more on average (e.g., 57.6 percent more in 1995) than female high-school graduates who worked full-time, full-year (Table 1).[4]
2. For both women and men, the earnings premium – how much more money, on average, postsecondary graduates earn over high-school graduates – to a bachelor's degree is higher than the premium from a community college diploma, which is higher than the premium to a trade education.
3. The earnings premium to a bachelor's degree is markedly higher for women than for men. However, by 2005 there is little difference in male and female earnings premia to a community college diploma.[5]
4. In 2005, men with a trades certificate earned 12 percent more on average than male high-school graduates. On the other hand, female trades graduates, on average, see no significant earnings difference with female high-school graduates.[6]

3 Goldin and Katz (2007) is a recent example of this approach.

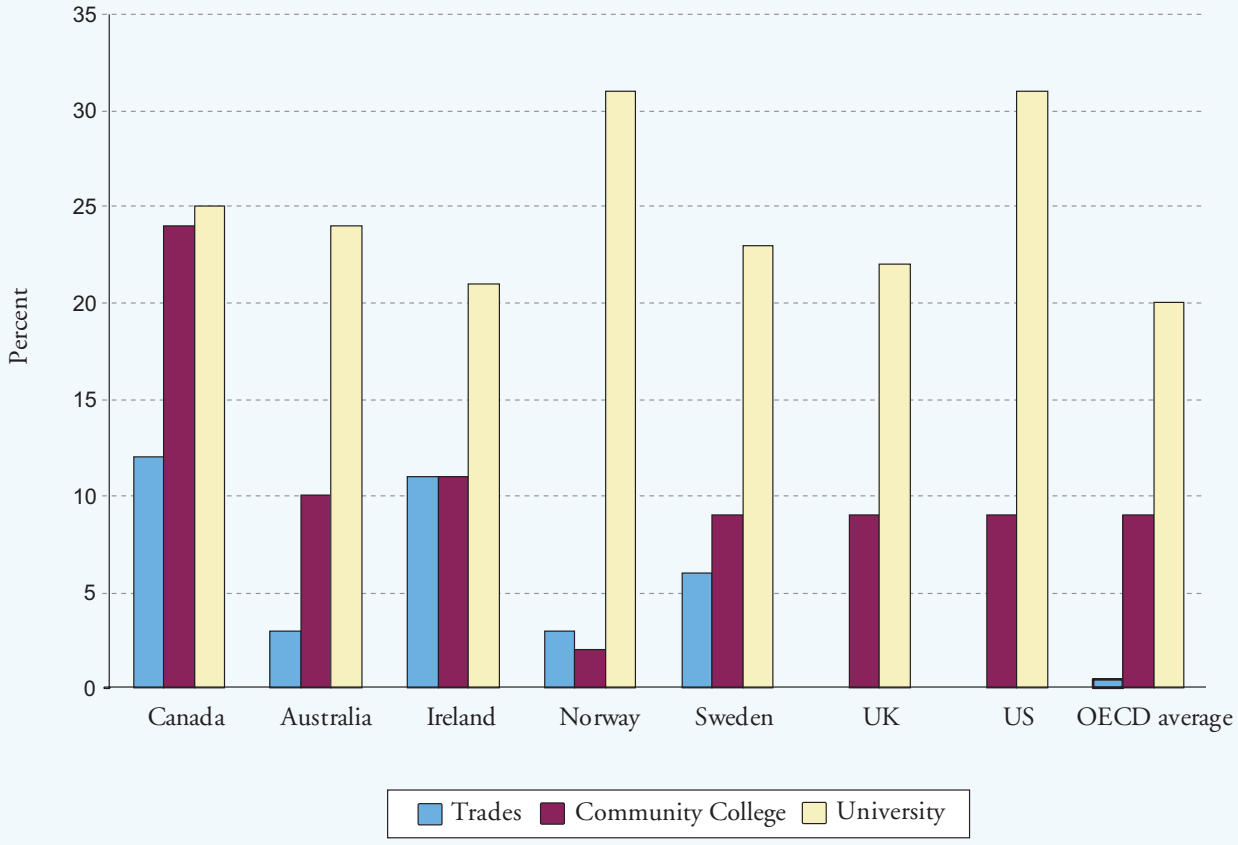
4 The entries in Table 1 show earnings premia to male and female graduates from various levels of postsecondary education; that is, how much more they earn than high-school graduates of the same gender, once other factors that affect earnings are taken into account. The data are taken from the quinquennial Censuses of Population.

The estimates in Table 1 are the result of regressing the log of weekly earnings on dummy variables for highest level of completed schooling, then converting the estimated coefficients to exact percentage differences. Control variables include estimated work experience and province of residence. Separate regressions were carried out for women and men for each Census income year. The samples were limited to full-year, full-time workers. Detailed results are available from the authors.

5 Female bachelor's degree graduates have lower earnings than male bachelor's degree graduates; and female high-school graduates have lower earnings than male high-school graduates. Female bachelor's degree graduates have higher earnings premia than male bachelor's degree graduates because the ratio of their earnings to those of female high-school graduates is greater than the ratio of male bachelor's graduate earnings to male high-school graduate earnings.

6 For reasons of space, we will have little to say here about the effects of field of study on earnings. It is worth pointing out that female and male trades graduates have very different field of study distributions. For example, of females completing apprenticeships in 2007, 67 percent of them did so in hairstylist programs and only 1 percent of people certified in construction trades were women. See Skof (2010).

Figure 1: Percentage of Population 25-64 with Completed Post-Secondary Education by Highest Level Completed: Selected OECD Countries and OECD Average



Source: OECD.

Table 1: Percentage Earnings Premia (compared to high-school graduates)

	1980	1985	1990	1995	2000	2005
			Males *percent*			
Trade	2	3	7	9	10	12
College	10	12	16	17	19	17
Bachelor's	32	36	40	43	49	45
			Females *percent*			
Trade	2	-1*	2	1*	2	-2
College	16	15	19	19	19	19
Bachelor's	49	52	56	58	59	60

* insignificant at the 10% level.
Source: Authors' computations from 1981, 1986, 1991, 1996 and 2001 Census of Population Individuals Public Use files and from 2006 Census of Population Individuals microdata files.

5. As to changes over time, the earnings premium for both women and men with a bachelor's degree rose fairly steadily from 1980 to 2005, though the rate of increase slows somewhat after 1990.[7]
6. For female community college graduates, the earnings premium rose slightly from 1980 to 1990; premia for male community college graduates followed a similar pattern.

The most striking results with regard to changes over time concern trades graduates. Throughout the period, there is little, if any, earnings premium to a trades certificate for women, likely due to the continuing concentration of female trades graduates in personal services and cooking fields of study. Men's earnings premium to a trades certificate rises throughout the period, due perhaps to an increase in the total years of schooling of men with a trades certificate,[8] to increasing demand for trades graduates, or to both.

Rates of Return

These earnings premium differences are related to differences in the length of studies in each type of postsecondary education: it typically takes longer to complete a bachelor's degree than a community college diploma, and a community college diploma than a trades certificate. Not surprisingly, this greater investment of time, not to mention foregone earnings, leads to a higher total return.

Computation of financial returns to education by taking into account foregone earnings and length of time invested – internal rates of return – allows a more direct comparison of the net returns to investment in each of the various types of postsecondary program.

The rates of return are based on age-earnings profiles for female and male high-school graduates, community college graduates and bachelor-level graduates and for male trades graduates. The profiles were estimated using data on 2005 earnings of full-year, full-time workers from the 2006 Census of Population.[9] The rates of return are for individuals who undertake full-time studies at age 18 and continue through to graduation without an interruption. The assumed periods of study are four years for a bachelor's degree, three years for a community college diploma and two years for a trades certificate.[10]

7 One should not read too much into small changes in these premia, as they are sensitive to methods of estimation, sample restrictions, and so on. For example, while we show a fall in the male premium for a bachelor's degree from 1995 to 2000, Boudarbat, Lemieux and Riddell (2010) also use Census data, but find the male bachelor's degree premium rose over this period. One possible reason for this discrepancy is that their sample appears to include less-than-full-time workers.

8 The proportion of men with a trades certificate but without a high-school diploma has fallen and the average length of trades education may have risen. While it is possible in earlier Censuses to compute the total years of schooling for trades graduates, these questions were dropped in the 2006 Census.

9 The profiles are the result of regressing earnings on age, age-squared and age-cubed.

10 A first remark about these rates of return is that they are extremely sensitive to the assumed duration of studies. If one shortens the period of studies for community college from 3 years to 2.5 years, the rate of return rises to 13.2 percent for women and 12.9 percent for men. Similarly, assuming a duration of studies of 1.5 years rather than 2 years for a trades certificate for men raises the rate of return to 15.7 percent.

While it is reasonable to assume that a BA typically requires four years of study beyond age 18 years, it is much more difficult to arrive at "typical" duration of studies for a community college diploma or a trades certificate. It is also the case that community college graduates are older on average than BA graduates, which also affects the rate of return. The rate of return for a person 21 years old who undertakes a three-year community college program falls to 8.9 percent for women and 9.2 percent for men from the rates shown in Table 2.

A final remark concerns direct costs of study. We have not included any direct costs of study in our rate of return. Tuition and fees are likely to be highest for university studies. If we arbitrarily include $5,000 a year of direct costs (net of earnings during studies) in addition to foregone earnings as a cost of a bachelor's degree, the rates of return to a bachelor's degree fall to 14.0 percent for women and to 11.4 percent for men.

Students often have earnings during studies, which may well offset or more than offset the direct costs of studies. We have also not accounted for the effects of the tax system, either in subsidizing postsecondary subsidies, or in reducing the private return to postsecondary studies due to progressivity. Davies and Collins (2005) take all of these factors into account for bachelor's degree studies.

In light of the sensitivity of rates of return to change in assumptions, we will confine ourselves to quite general conclusions.

Table 2. Rates of return to different levels of postsecondary education

Women*		Men		
Financial returns in percent				
BA	Community College	BA	Community College	Trades
17	11	13	11	9

*Not computed for Trades for women because of the negative earnings premium for this group in Table 1.
Source: Authors' computations from 2006 Census of Population microdata.

All of the forms of postsecondary education have substantial financial returns, over and above the earnings foregone, and length of time invested, by taking up studies (Table 2). Although the rate of return from a university degree, for both men and women, appears to be higher than the financial earnings from other postsecondary studies, it is difficult to say which form of postsecondary education pays the highest rate of return without a comprehensive understanding of the length of studies and the variable enrolment costs across jurisdictions.

Conclusion

The main policy-related questions posed at the beginning of this paper are whether Canada produces too many post-secondary graduates and whether too many of Canada's post-secondary graduates are from non-university programs. The evidence presented here would lead us to conclude that the answer to both questions is, "no." Earnings premia for all three levels of post-secondary education have risen over the period 1980-2005 for men. Earnings premia for women have risen over this period for BA and community college graduates, but not for trades graduates.[11] Our crude rate of return computations indicate that, on average, students' investment of time and foregone earnings in most of these types of study earns a substantial return.[12]

While Canada is unusual among OECD countries for the high percentage of the population with a postsecondary credential and for the high percentage of community college and trades graduates, we find little indication that growth in the supply of Canadian postsecondary graduates has outpaced growth in demand in general, or for community college and trades graduates.

The enormous expansion of postsecondary education in Canada is in large part due to substantial investments by provincial governments and the federal government that support both students and educational institutions. With an aging population and growing healthcare costs, governments that face significant fiscal pressures may seek to reduce their level of postsecondary support. Evidence that postsecondary education had over-expanded would provide justification for reallocating funds elsewhere – but we found no broad-based evidence to support this view.

11 There may be non-pecuniary returns to female trades graduates in personal services and cooking, but there is no return in increased earnings. The number of female trades graduates continues to be small in other fields of study that are typical fields of study for male trade graduates. Further investigation of the reasons for this continuing gender segregation would seem to be indicated, but is beyond the scope of this paper.

12 Our rates of return are private rates of return that do not take take into account taxes, direct costs, subsidies or educational externalities. A more appropriate comparison would be between social rates of return to various levels of study. Collins and Davies (2005), take taxes, direct costs and subsidies into account. They show that this lowers what they call the "total rate of return" by less than two percentage points, although this number may have risen since due to increased tax subsidies to postsecondary education and decreased progressivity of the tax system. To go from their total rate of return to a social rate of return requires adding the value of externalities to postsecondary education. Collins and Davies suggest adding two percentage points to the total rate of return as a lower bound of positive externalities from university education. While their computations are for university studies only, we see no reason the results should be very different for other forms of post-secondary education.

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