The supply and demand of elementary-secondary educators in Canada

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Abstract

During the last few years, concerns have been expressed as to whether the supply of elementary-secondary educators will be sufficient to meet Canada's needs in the near future. This communication will outline the main components and results of a supply and demand projection model developed by the Centre for Education Statistics of Statistics Canada to estimate the number of educators that will be required in the next decade. This model is considered work in progress; however, it is identifying interesting trends. The analysis presented will be national in scope and will also present a view of the balance between the need and availability of elementary-secondary educators in all provincial jurisdictions from 1998 to 2010. It will provide valuable, factual insights into the debated teacher surplus/shortage issue.

The Model:

The model that was used was developed initially by Mr. Paul Holness from the Centre for Education Statistics. The model is quite simple and similar to the Cohort Component Method used in Statistics Canada's population projections. It takes the population of educators distributed by age at a base date and carries it forward in time, cohort by cohort, on the basis of separate allowances for attrition.

The supply and demand model can be summarized by three main equations:

- ♦ Supply = stock of current teachers + graduates – retirements + net migration

- ♦ Demand = school-aged population x participation rate / pupil-educator ratio

- ♦ Shortage or surplus = supply –demand

The model presents data for public sector full-time educators only. The period of time covered by the projection is from 1999 to 2010. As well, due to the limits of data and the major tends identified, three key hypotheses were constructed.

Hypothesis 1:   Percentage of attrition among each age cohort remains constant throughout the survey period.

Attrition is mainly composed of people who have retired from the teaching profession, but it also includes people who have left this sector for other reasons (for instance career change, emigration, death, voluntary departure and lay off). We were able to collect data on retirements and some on migration, however, it is relatively difficult to get exact figures on departures related to others reasons.

Hypothesis 2:   International migration of educators remains constant over time

In each province, the number of educators migrating from foreign countries is established from Citizenship and Immigration Canada databases. International migration is estimated based on the average number of teachers immigrating to Canada from the ten most frequent countries since 1986.

Hypothesis 3:   Pupils/educator ratio remains constant through the forecast period.

The pupil/educator ratio used for each province is the pupil/educator ratio for public elementary and secondary schools calculated annually by the Centre for Education Statistics. The data were calculated as the ratio of full-time equivalent enrolment to full-time equivalent educators in school year 1998-1999. The value of the ratio is assumed to remain constant over the projection period.

Data Sources:

The primary data sources for this analysis are: The Centre for Education Statistics' Survey of Elementary-secondary Teacher Characteristics; the Labour Force Survey; the National Graduates' Survey; Demography Division's population projections; Teachers Pension Plan Boards; the Ontario College of Teachers; Citizenship and Immigration Canada; le ministère de l'Éducation du Québec, la Direction des statistiques et des études quantitatives; United States Bureau of Labour Statistics; United States Citizenship and Naturalization Bureau, United Kingdom Department for Education and Employment.

Format of Results:

The result for Canada and each of the provinces were derived according to two different scenarios. The two scenarios are based on different estimates of the proportion of graduates of elementary and secondary teaching programs who enter the teaching profession. Based on data from the 1995 National Graduates Survey, the first scenario supposes that 75 % of elementary and secondary teaching graduates will work as educators. The second scenario assumes that 100 % of these same elementary and secondary teaching graduates will join the teaching profession.

For the purposes of this report we have chosen to present the results describing teacher supply and demand at the Canada level and in three provinces: Nova Scotia, Ontario, and British Columbia. The results for the other provinces are available and will accompany the documentation distributed at the conference.

Canada (all provinces at the exception of Yukon, Northwest Territories and Nunavut) :

There were in Canada, in 1998-1999, slightly over 300,500 full-time educators in public elementary-secondary schools.

Based on the assumption that 75% of elementary-secondary teaching graduates do become educators, scenario 1 projects that a shortage of teachers will exist in Canada
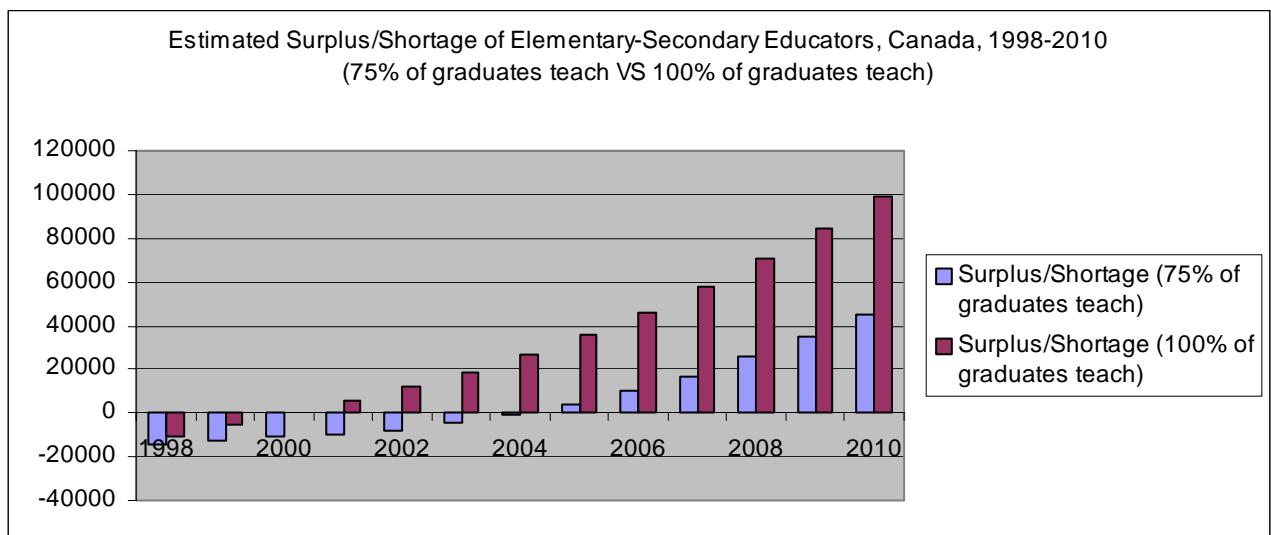
from 1998 to 2004. Nevertheless, there will be a significant growing surplus of teachers from 2005 to 2010, peaking at approximately 45,000 excess educators.

If, instead, we assume that 100% of the qualified elementary-secondary teaching graduates will teach, we notice that a surplus will also occur, but earlier than in scenario 1. A shortage of educators is predicted in 1998 and 1999, however starting in 2001, Canada will begin to see a significant surplus of educators, which will steadily increase to nearly 100,000 educators in the year 2010.

Essentially, both scenarios follow a similar pattern of supply and demand, the main difference being that the surplus of teachers is expected to occur 4 years early in scenario 2 (100% of graduates teach) than in scenario 1 (75% of graduates teach). We notice, furthermore, that the surplus that occurs in 2010 in scenario 1, is approximately half of the one predicted in scenario 2.

It should be mentioned that these results assume that surplus teachers from one jurisdiction will move to a jurisdiction which has a teacher shortage. As we all know this is the case for a minority of teachers. The jurisdictional picture is therefore much more important in this analysis than the national picture.

It is important to note that this model does not take into account the movement of educators between the elementary level and the secondary level. This same restriction also applies to subject matter areas. Therefore, although educational stakeholders expect a shortage of mathematics, science and minority language teachers, this model does not allow us to describe this situation in detail.
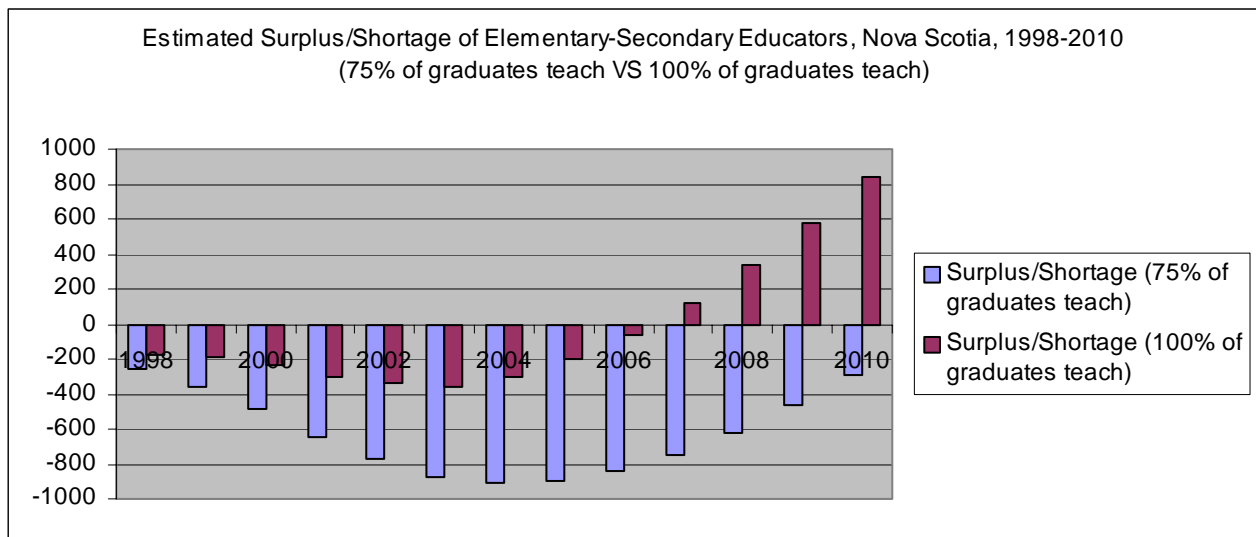
Estimated Surplus/Shortage of Elementary-Secondary Educators, Canada, 1998-2010
(75% of graduates teach VS 100% of graduates teach)

Surplus/Shortage (75% of graduates teach)
Surplus/Shortage (100% of graduates teach)

Nova Scotia:

In 1998-1999 in Nova Scotia there were approximately 9,500 full-time educators in public elementary-secondary schools.

Based on the data derived from scenario 1, in which 75% of qualified graduates are expected to assume teaching positions, it is estimated that Nova Scotia will experience a shortage of educators from 1998 through to 2010. This shortage is expected to peak at slightly more than 900 unfilled teaching positions in the year 2004, and then gradually decline to approximately 300 by 2010.

Scenario 2 also predicts a teacher shortage from 1998 onward, but of a smaller degree and duration. Based on the assumption that 100% of graduates will teach, it is projected that the shortage will grow to approximately 350 teachers by 2003 and then be gradually reduced until a surplus exists in 2007. The surplus of teachers is expected to grow rapidly to more than 800 surplus educators by the year 2010.
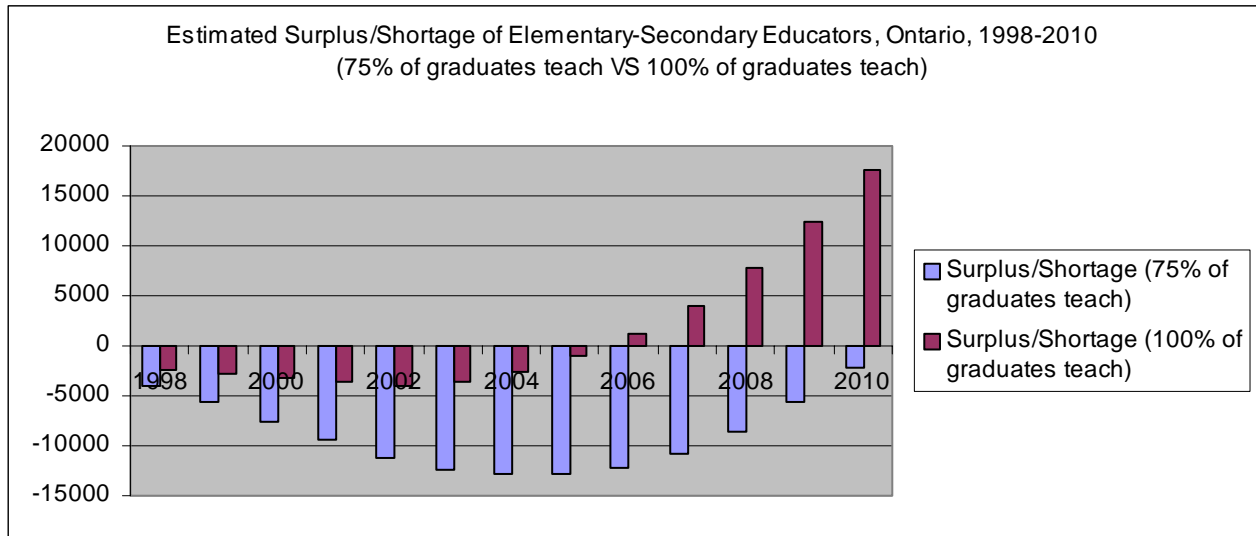

Estimated Surplus/Shortage of Elementary-Secondary Educators, Nova Scotia, 1998-2010 (75% of graduates teach VS 100% of graduates teach)

Ontario:

In Ontario, in 1998-1999, there were close to 116,600 full-time educators in public elementary-secondary schools.

Scenario 1, based on the assumption that only 75% of elementary-secondary teaching graduates will teach, predicts that a shortage of educators will exist in Ontario from 1998 through to 2010. The number of teachers in demand will increase steadily from 4,000 in 1998 to 12,000 in 2003. The shortage is then expected to persist at the 12,000 level for four years before decreasing to the 2,000 level by 2010.

Scenario 2, which assumes that 100% of graduates will teach, predicts a less severe teacher shortage lasting from 1998 to 2005. The shortage will reach its peak in 2002, with approximately 4,000 educators, which corresponds to only one third of the size of the peak shortage projected by scenario 1. Then, scenario 2 projects that a surplus of teachers, beginning in 2006, will rapidly grow to an excess of 17,500 educators in 2010.
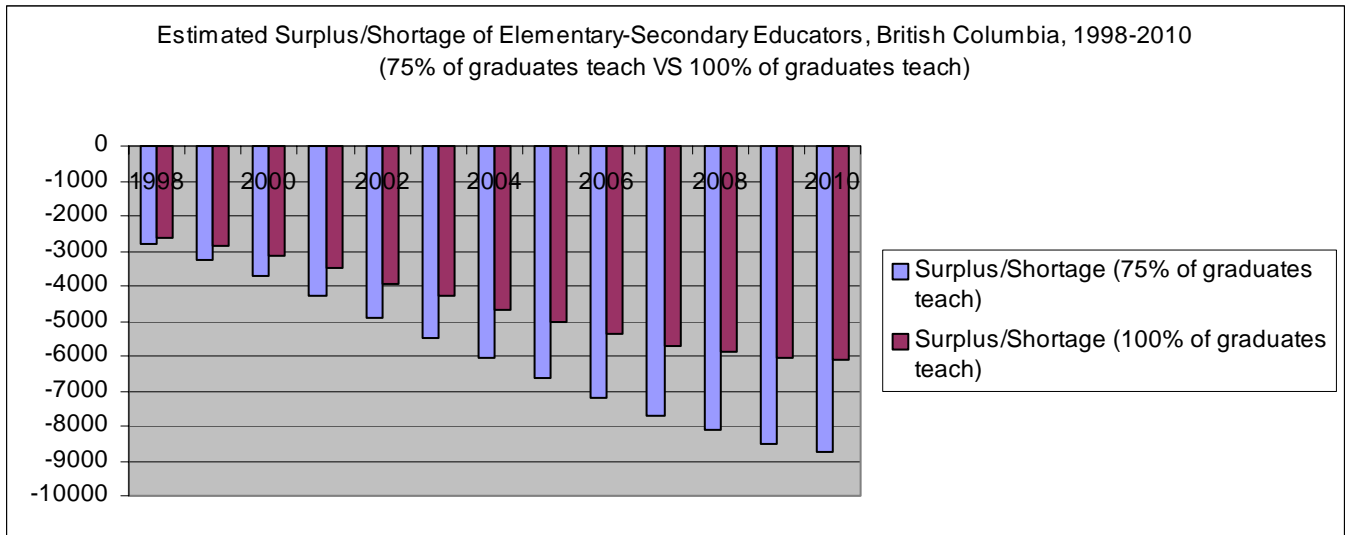

Estimated Surplus/Shortage of Elementary-Secondary Educators, Ontario, 1998-2010
(75% of graduates teach VS 100% of graduates teach)

British Columbia:

There were in British Columbia, in 1998-1999, near 35,000 full-time educators in public elementary-secondary schools. However, according to the two scenarios described in the methodology in our projection model, we estimate a significantly large shortage of educators in British Columbia that will persist and grow through to 2010.

According to scenario 1, in which it is assumed that 75% of graduates teach, the shortage of teachers will steadily grow from 2,800 in 1998 to 8,700 in 2010. However, there is some indication in the data that the rate of growth of the shortage will begin to level off slightly in 2009 and 2010.

Scenario 2, in which it is assumed that 100% of graduates teach, also predicts an increasing shortage of educators, but the rate of growth is expected to be slower. According to that scenario, the deficit should level off at approximately 6,000 teachers from 2008 to 2010.

Estimated Surplus/Shortage of Elementary-Secondary Educators, British Columbia, 1998-2010
(75% of graduates teach VS 100% of graduates teach)

Legend:
- Surplus/Shortage (75% of graduates teach)
- Surplus/Shortage (100% of graduates teach)

Conclusion:

Although the model we have developed represents a simplified view of the real factors involved in the supply and demand of educators, it does reveal some interesting trends. As we have already noted, the situation of the supply and demand of educators will not be homogenous across all regions of Canada in the next decade. However, a shortage of teachers is expected for all three of the provinces examined as part of this study, namely Nova Scotia, Ontario and British Columbia.

At the national level and for each province we took into account the following factors influencing the supply and demand of elementary-secondary educators: the current number of educators (the stock of educators), the rate of attrition, the proportion of teaching graduates who enter the profession, immigration, the projected school-aged population, the participation rate and the pupil/educator ratio. Other relevant factors and variables are yet to be included in our model, and additional avenues of research will also be explored in the future (for example, variations in the data according to elementary or secondary levels, rural or urban areas, language of instruction, etc.) Thus, this symposium represents a valuable opportunity for us to receive comments and suggestions regarding the work we have completed and the areas to which our research should be directed in the future.

In the future we intend to elaborate this model further in order to accommodate additional factors. Additionally, we are also considering the development of a micro data simulation model. This model could allow greater flexibility in accommodating factors which may effect the number of teachers available and the supply of teachers.