

Editor's Overview

THIS 18TH ISSUE OF THE *International Productivity Monitor* published by the Centre for the Study of Living Standards contains seven articles. Topics covered are the relationship between education, productivity and economic growth, new estimates of multifactor productivity for the Canadian provinces, the World Productivity Database developed by the United Nations Industrial Development Organization (UNIDO), and a symposium on the recently released Council of Canadian Academies Expert Panel report on business innovation in Canada.

It has long been known that education is important for productivity growth. But the exact mechanisms and channels by which education affects productivity have not always been well specified. In the lead article **Serge Coulombe** and **Jean-Francois Tremblay** from the University of Ottawa review the evidence of the linkages between education and productivity. They find that the Canadian data fit the neoclassical prediction that in an open economy growth model, the evolution of capital and output are largely driven by the accumulation of human capital. The authors point out that investment in education will only generate macroeconomic benefits if it has real effects on aggregate productivity, thus emphasizing that what really matters for productivity growth is the skills that are produced by education. A key conclusion of the review is that returns to additional investments in post-secondary education in Canada would likely be substantial.

Multifactor productivity growth, a key concept in the economists' toolbox, captures the increased in output that cannot be explained by increases in inputs. Historically, labour input has been defined as hour worked, unadjusted for changes in quality, and capital input as the capital stock, also unadjusted for changes in composition. More recently statistical agencies have developed input estimates that adjust for quality and compositional changes. In the second

article, **Andrew Sharpe** and **Jean-Francois Arsenault** from the Centre for the Study of Living Standards present new estimates of multifactor productivity for the Canadian provinces for the 1997-2007 period that are adjusted for these quality and composition changes. The estimates were prepared by Statistics Canada for the CSLS with the financial support of Alberta Finance and Enterprise. Not surprisingly, these multifactor productivity estimates exhibit much slower growth than earlier estimates that did not take account of the increased labour quality and the composition shift of the capital stock toward assets with shorter lives, such as information and communications technologies. The article finds that multifactor productivity growth for the market economy varied greatly across provinces between 1997 and 2007, from a high of 4.1 per cent per year in Newfoundland to a low of -1.6 per cent in Alberta.

The monitoring and analysis of international productivity developments requires the construction of international productivity databases, which are major undertakings. The third article by **Anders Isaksson** from the United Nations Industrial Development Organization (UNIDO) reports on a new database, the UNIDO World Productivity Database. This database contains estimates for levels and growth rates of aggregate total factor productivity for up to 112 countries for the 1960-2000

period. A key feature of the database is that it allows researchers to specify the measure of the labour and capital input they would like used for the productivity calculation, as well as the functional form of the production function.

It is widely recognized that Canada's record on innovation trails that of many other developed countries. To assess the reasons behind this situation the Minister of Industry asked the Council of Canadian Academies to establish an expert panel on business innovation in Canada. In April 2009 the panel released its report *Innovation and Business Strategy: Why Canada Falls Short*. The last four articles in this issue comprise a symposium on the report.

The first article in the symposium by **Peter Nicholson** from the Council of Canadian Academies summarizes the report. The report presents statistical evidence to show how lagging productivity growth has been due to subpar innovation, defined not just as the outcome of research and development but also as the day-to-day activities of all kinds of businesses looking for new or more efficient ways to serve the needs of customers. The panel finds that too many businesses in Canada are technology followers, not leaders. It concludes that a fresh discussion on innovation in Canada is needed, one that focuses on the factors that influence adoption of innovation-based business strategies.

The second article in the symposium is by **Richard Hawkins** from the University of Calgary. To critically assess some of the major suc-

cesses and mistakes of Canadian industrial policy, he focuses on the innovation experiences of the automotive and telecommunications sectors, two currently troubled industries. He concludes that the innovation problem in Canada has less to do with capabilities or opportunities than with recent tendencies not to follow through when ambitious innovation initiatives in specific industries could be transformed into new national "engines of growth".

In the third article in the symposium **Jorge Niosi** from the Université du Québec à Montréal makes the case that a missing component of Canada's innovation strategy is direct incentives targeted at small technology firms to assist them cross the "valley of death" and become eligible for venture capital. He points to the Small Business Innovation Research Program (SBIR) in the United States as a model for Canada to adopt to fill this public policy gap .

In the fourth article in the symposium **Ian A. Stewart**, former Deputy Minister of Finance, finds the report comprehensive in its gathering and assessment of available research, and innovative, in its own right, in its analysis of innovation as an outcome of business strategy formation. He suggests that given both the economic and environmental crises facing humanity, future actions, including public policies toward innovation, may now require more explicit collective resolve than reliance on private markets. Shareholder value may cease to be the sole criterion by which enterprises are judged.