

Productivity Issues in Canada: A Review Article

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One can begin the review of the volume *Productivity Issues in Canada* edited by Someshwar Rao and Andrew Sharpe¹ with the first and easiest of conclusions. It is hard to imagine any serious scholar or student of productivity issues who would not wish to have it among the essential works in the reference section of their library. And though much of the applied analysis in the volume is directed at Canadian and Canadian/U.S. issues and comparisons, 10 of the 25 papers collected here survey and review a world literature. Their collected bibliographies alone provide an essential trail for anyone coming fresh to the complex of issues that pervade productivity analysis. These reviews are written by some of the leading scholars in the field and are a careful education in their own right. Further, an introductory chapter written by the editors provides a review of the principal findings of each of the papers as well as an overall assessment of the outstanding and unsettled issues emerging both from the papers and from their close association with the field more generally.

The volume is published in the Industry Canada Research Series and is one in an extended series of publications emerging from this department of the Canadian government reflecting its commitment to analytical work, focussed particularly on productivity analysis. As noted,

25 papers (11 of which have been previously published) are collected in six sections. The sections are entitled: *Productivity Trends and Determinants*; *Innovation and Productivity*; *Investment and Productivity*; *Productivity in the New Economy*; *Global Linkages and Productivity* and *Social Aspects of Productivity*. The author of the lead paper in each section was asked to pull together the main findings of the papers in the section, integrate results of other Canadian and international research in the area, identify important research gaps, and identify research and policy implications of the key empirical findings from existing research.

Many papers address the apparent widening of the Canada-US labour productivity and real income gap in the 1990s. From the papers and from the theoretical reviews generally, one can perhaps do no better than quote the editors' own succinct conclusions:

“accurate measurement of productivity is critical to understanding and analyzing Canada's productivity problems and developing appropriate policies and strategies; Canada has lost significant ground in productivity and real income to the United States in the 1990s; Canada needs to pursue effective policies and strategies to close the innovation gap; the ICT-producing sector contributed in a major

way to Canada's aggregate productivity growth, but there is no strong evidence of a pick-up in productivity growth in ICT-using industries; there is no consensus on whether trend productivity growth in Canada has increased; productivity growth can improve social outcomes, social cohesion and quality of life, but there is no consensus about the positive feedback on productivity performance of investments in social programs; finally, governments play an important role in increasing productivity growth."

While the focus of these conclusions and the focus of the volume are on Canada (and Canada-US issues) much of the analysis and issues of analytical technique have applicability in all developed economies.

It would take a very extensive review article (and a very considerable range of expertise) to offer comments upon each of the papers in this volume. It would further be invidious to focus only upon those of more direct interest to the reviewer, particularly when the papers are of a uniformly high quality. Rather, in what follows, some comments are offered on a range of issues raised by the papers collectively.

A central and recurrent theme through most of the papers concerns issues of data and measurement. Richard Harris, who contributes two major survey pieces to the volume, one on the determinants of productivity growth and one on the linkages among social policies and growth, strikes this theme most forcefully in asserting that "in this subject measurement is everything". He notes further that rather than becoming easier, the evolution of developed economies toward service industry outputs, quality rather than quantity change in both outputs and inputs, and the increasing importance of human capital inputs makes the task of measurement ever more complex and difficult. It is not to be critical of most of the applied statistical papers in this volume to note that, while almost all authors

acknowledge these difficulties, they nonetheless proceed heroically to produce estimates of labour or total factor productivity, change and levels, often to apparently three, or even four, significant digits. (Indeed one might note and laud, parenthetically, the resurgence of applied analysis encouraged by such programs as the Industry Canada Research program and the Centre for the Study of Living Standards over which the editors preside).

One suspects that the degrees of freedom that would support such precision are frequently more than exhausted. To put the matter another way, one longs for the sheltering of the calculations within some stochastic process that yields confidence intervals which would soften a little the public policy alarms that frequently seem to spring from some newly revealed growth disappointment or divergence in Canada-US trends. While the literature surveys cite examples of the use of econometric technique, the non-parametric employment of index numbers dominates the field and particularly as analysis moves from broad aggregates to more disaggregated analysis of the business sector, manufacturing and industries within manufacturing. One has the sense that increasing ingenuity is applied to wedge measures of inputs and outputs as close to their theoretical definitions as the data will permit only to be bedevilled by frequent revisions and reconceptualizations of the basic time series themselves. As Rao and Sharpe note in their introduction, in one month of revisions Canadian labour productivity growth over the period 1995-2000 was revised upwards from 1.2 to 1.7 percent per year while its US counterpart was reduced from 2.8 to 2.4 percent over the same period. While divergence remains, the basic story is considerably diminished. The basic moral may be, not that inventive analyses should not continue to be pursued, indeed ever more actively in this vital field, but that results need to be sheltered a little against the possibility of

exciting the mistrust of policy-makers. Yet a further moral may be that seeking a broader understanding beyond the cognoscenti in the field, a primer on measurement issues, might be a very useful undertaking for the Research program to pursue.

The reshaping of economics to focus more fundamentally on growth theory of which productivity analysis is an integral part and to diminish the importance of macroeconomic analysis reflects, in substantial part, the end of the golden era, the still enigmatic collapse of productivity growth circa 1973, the related inflation tribulations of the 1970s and 1980s, and the sterner disciplines of monetary and fiscal policies which have emerged from these events. One of the consequences of this change in focus is that the question of the relationship of trend productivity growth to periods of sustained economic growth more generally and degrees of capacity utilization go largely unaddressed in this volume. While it is recognized in several places that productivity growth varies procyclically, and while several authors relate productivity growth to factor mobility generally (and hence, most frequently, to an aspect of the importance of human capital investment) the possibility that labour mobility, innovation and capital investment processes generally are fostered by the anticipation of continued ceiling-bumping growth does not seem to attract much serious attention. Inflation and debt phobias, NAIRUs and the preservation of a necessary cushion of excess capacity seem to have turned the profession to the pursuit of micro rather than macro economic explanations of lags in productivity growth.

And yet casual empiricism and observation suggests that some part of the explanation of the golden era lay in its own sustained success. While not unmarked by short cyclical swings the almost three decades of post-war growth were marked by unemployment rates unsustainably low by today's standards, and structural shifts in

developed economies provoked by and supporting quite remarkable sectoral productivity advance, particularly in agriculture. The fact that agriculture's share of the Canadian labour force employment fell from over 30 per cent to less than 10 per cent in little over 10 years is surely as much a reflection of the easy availability of alternate manufacturing and service sector employment as it is the reflection of the productivity revolution in agriculture itself. One can wonder how much of the superior labour productivity experience of the United States in the 1990s was simply the result of a superior macro-economic performance and a return of unemployment rates to approximate golden era levels.

A great deal of attention in this volume is paid to the disappointing evidence of Canada's innovation performance, not only in the section of the volume devoted to this topic, but recurrently through the evidence and assessments of other papers. Low R&D ratios compared to other G-7 and beyond to other OECD economies; low relative levels of investment in machinery and equipment and, hence, slower rates of embodiment of new technologies; evidence of relatively slow rates of patenting and patent applications; these and other pieces of evidence are adduced to suggest that this may be a central source of lagging Canadian productivity performance.

An older literature sought to distinguish among invention, innovation and diffusion as differing categories of the technological change process. There would seem to be some value in sustaining these distinctions in searching for policy implications. Reports of the former Economic Council of Canada focussed particularly on evidence of slow diffusion of "best practice." In the agriculture example employed above, it is difficult to believe that agricultural research stations and extension services were not a critical factor in disseminating technical information and practice to a widely dispersed constituency. Some part of this was R&D but much

was simply rapid diffusion. Authors in this volume speculate about the relative efficacy of taxes and subsidies in support of innovation versus more direct expenditures in infrastructure and education.

It may be, however, that in the internet provision of free (to the user) and readily accessible information on management techniques and services, technical and technological information including up-to-date surveys of best practice (systems building within the Industry Canada and other government departments) government will find its most effective application of the ICT revolution. This might be particularly so where the constituency is marked by a high proportion of medium to small businesses without other readily accessible linkages to knowledge and information.

Two-handed economists, particularly in the current era, are fond of noting the inefficiency effects of all taxes while, at the same time, many of these urge increased public expenditures on human capital (education and training), infrastructure generally, health of the population, and inducements to innovate and invest. In an age when many view purely redistributive expenditure as having been a source of the growth difficulties of the past three decades not many appear to see the direct pursuit of equity as a direct or intermediate contribution to productivity enhancement. The final section and chapters in the volume seek to review these issues and it would not be amiss to predict that they will occupy a greater share of attention the next time Industry Canada surveys the general territory.

This will be so not only because of the increasing attention being paid to social capital and its effects, social inclusion, and the environmental preconditions of sustaining growth — what Lars Osberg refers to as unpriced inputs in the production process — but because the transforming effects of the new ICGPT (information and communication general purpose technology)

will be becoming better understood. The article by Richard Lipsey and Kenneth Carlaw “What Does Total Factor Productivity Measure” in the inaugural issue of this *International Productivity Monitor* (Fall 2000) surveys issues of TFP measurement (issues frequently referenced in the works in this volume but not assessed in this review) but more importantly is suggestive of a gestation and transformational process that is in progress but far from complete with profound social as well as economic effects. Further, the evolution of measurements of economic well-being rather than simply real income, an example of which is described by Andrew Sharpe in the volume’s concluding chapter, may reform and broaden the productivity debate.

This is a rich, rich volume of papers. It will be as useful to productivity students as the influential *Technology and Productivity* volume published by the OECD in 1991 which reported on a conference addressing the post-1973 productivity slowdown. The scatter of comments above barely scratches the surface of a territory still abounding in conjecture and researchable issues, much of it canvassed in this extensive collection of papers. The editors and their benefactors are to be commended.

Notes

- * The author served as Deputy Minister of Energy, Mines and Resources from 1978 to 1980 and as Deputy Minister of Finance from 1980 to 1982 in the federal government. He currently serves as Chair of the Centre for the Study of Living Standards.
- 1 The volume (912 pp.), the tenth in the Industry Canada Research Series, was published in English and French by the University of Calgary Press in May 2002. The table of contents can be viewed at <http://www.ucalgary.ca/UofC/departments/UP/1-55238/1-55238-065-3.html>. The price is \$81.95 Canadian.