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Current trends in the analysis of Canadian productivity growth

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ABSTRACT

For more than a decade, debates over the impact of new information technologies on trend productivity growth rates have played a key role in the formulation of monetary policy in many countries, including the United States and Canada. However, the question of whether the *trend* growth rate of aggregate productivity has changed *significantly* is rarely examined formally. This paper examines the latest aggregate labour productivity data for Canada using a new testing approach specifically designed to detect recent changes in trends. In addition to showing the strength of the evidence for changes in long-run trends, it considers the effect that data revision and changing sample period has had on inference about structural changes. In an appendix, it investigates how large such changes must be before they can be detected and to what degree detection tends to lag the structural change. Evidence of a decline in the trend rate of labour productivity growth in Canada since 1990 is mixed. In particular, conclusions vary considerably from year to year as data are revised and as the accumulation of observations after purported breaks changes initial perceptions. The instability of test results suggest that policymakers need to use extreme caution in interpreting claims of changes in labour productivity trends and highlight the uncertainty that they face.

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1. Introduction

Trends in productivity growth play a key role in the formulation of public policy. They are important factors in determining long-run economic growth and therefore play central roles in the management of public pension systems and government debt. They are an essential component in defining measures of economic slack and have therefore played a key role in the formulation of monetary policy, particularly in the United States and Canada.[2] International differences in such trends in turn have profound influences on the balance of world saving and investment. Not surprisingly, the possibility of a persistent change in aggregate productivity growth casts a long shadow over many of the most important economic policy debates. For all these reasons, great effort is devoted to accurate productivity measurement and to the analysis of sources of productivity growth.[3]

Surprisingly, however, the question of whether the *trend* growth rate of aggregate productivity has changed *significantly* is rarely examined formally.[4] The answer to this question is frequently ambiguous, even in the much-studied context of recent trends in U.S. productivity growth. For example, Gordon (2003) concludes

> Productivity growth experienced a second acceleration in 2000–03 following the initial productivity revival of 1995–2000. [p. 272]

a view shared by Bailey (2003).[5] Blinder and Yellen (2001) present evidence for a change at the end of 1995, and Hansen (2001) finds that formal statistical analysis supports this timing.[6] However, Fair (2004) argues that late 1995 is simply a cyclical trough in productivity growth and that cyclically adjusted productivity growth shows very little improvement in the 1995–1999 period. Maury and Pluyaud (2004) find weak evidence of trend break in US hourly productivity in 1995Q3, but none after the early 1980s when using per capita GDP.

We argue that at least two potential problems complicate the analysis in this literature. First, productivity data are revised over time, with the revisions often causing non-trivial changes in measured growth rates. None of the above papers investigate this problem in a systematic way. Second, very few papers perform statistical tests for changes in productivity growth trends, and some of those that do (Hansen, 2001; Maury and Pluyaud, 2004) use methods that are known to be unreliable close to the end of sample.

This paper examines the latest aggregate labour productivity data for Canada using a new testing approach specifically designed to detect recent changes in trends. Using real-time data, it then considers the impact of data revision on the detection of trend breaks. In an appendix, we also consider how large changes must be before they can be detected and to what degree detection tends to lag the structural change.

2. Literature review

Most of the literature on trends in aggregate productivity growth relies on informal methods to characterize trends. On the basis of such analysis, it appears that profession opinion shifted around

[2] For example, the May 4th 2004 minutes of the FOMC note the FRB staff's opinion that "... *that the remaining slack in resource utilization and strong productivity growth would keep core inflation at a low level over the forecast period*." The same minutes also summarize the committee's view that "... *a range of factors was continuing to restrain inflation, including slack in resource utilization, strong productivity gains* ..."

[3] Many different measures and definitions of productivity play a role in this research and policy debate. The most common are labour productivity and total-factor productivity (which considers aggregate inputs of both labour and capital). This paper examines the behaviour of labour productivity (specifically, real output per employee.)

[4] This puzzling blindspot affects even the most important works in this field. For example, Gordon (2003) provides a 73-page analysis of the "explosion" in US productivity growth, but remarks by Durlauf and Sims [p. 293] lament the absence of any analysis of the uncertainty surrounding his estimates.

[5] "... it does now seem clear that trend labor productivity growth picked up substantially in the 1990s, and the most recent data suggest that there may even have been a further acceleration in the past two years. [p. 282]"

[6] Blinder and Yellen (2001, p. 61, Table 8.1) and Hansen (2001, p. 123). Note that Hansen finds no evidence of a trend break in the early 1970s.