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Productivity: The Evolution of Statistics Canada's Program

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Abstract

This paper discusses the evolution of the productivity program at Statistics Canada, the measures that have been produced, the reason for the differences, international efforts to provide more comparable statistics, recent extensions from more traditional frameworks, attempts to expand our knowledge of the factors behind productivity growth and challenges facing the program.

1. The evolving productivity program

A good statistical program makes government more effective by allowing it to engage in evidence-based decision making. The effectiveness of an evidence-based decision-making process depends on the provision of objective, high-quality statistics.

One of the keys to effectiveness is relevance. Statistics must be trusted and satisfy the needs of the user community. Trust comes from professionalism—objectivity, quality, and transparency of methods. Relevance depends on meeting the needs of the users, needs that are constantly evolving.

The productivity statistical program has adapted to changing user needs and continues to do so. This note outlines the strategic challenges that have faced the productivity program, how Statistics Canada's program has adapted to them, and some of the challenges that have recently emerged.

2. Stage 1: Simple summary statistics of labour productivity

Productivity measures provide a key indicator of the state of the economy. As such they provide a yardstick that allows Canadians to assess how well the economy is doing and to monitor its progress.

Labour productivity measures were the first set to be developed, are relatively simple, and are closely related to measures of both well-being and of efficiency of the economic system.

Labour productivity is defined as the amount of output (usually measured as GDP) produced per unit of labour input (measured either as number of workers or as hours worked). It is used to capture the efficiency with which the economic system transforms labour into output. It captures one dimension of the efficiency of the production process. It is closely related to a commonly used measure of economic well being—GDP per capita, since:

$$1) \qquad GDP / Pop = (GDP / L) * (L / Pop)$$

where Pop is population and L is the labour input. This identity demonstrates that the output per person (GDP/Pop) that is available for distribution to a society's population will increase if labour productivity (GDP/L) is higher and as the proportion of the population that is working (L/Pop) increases.[1]

Statistics Canada's productivity program has long produced estimates that capture the rate of *growth* in labour productivity, since growth is the primary focus of users. The labour productivity measure makes use of estimates of GDP and hours worked. The former are

1. For a study of how differences in the underlying factors affected Canadian productivity growth, see Wells, Baldwin and Maynard (1999).

measured by the National Accounts and the latter are provided by the Labour Force Survey—both mainstays of Statistics Canada's main programs.

A productivity measure is not the only summary statistic that is needed to evaluate progress that is being made by Canada's economy. And it does not capture some key trends in the economy. For example, increasing productivity does not necessarily translate into more profitability. An economy can be increasing its efficiency but find that the products that it produces are fetching lower prices in world markets. Nor does increasing productivity necessarily translate into superior competitiveness, if domestic wages are increasing faster than productivity.

In order to provide more comprehensive evaluations of the economy, productivity measures need to be combined with a set of other measures—such as output growth, labour growth, capital investment, profitability, and unemployment.

3. Stage 2: More complex analytic constructs—multifactor productivity

3.1 The concept

The power of the simple measure of labour productivity is also a weakness. Statistical programs have recognized that while simple summary statistics might provide approximate yardsticks for the growth in the economy's productive efficiency, more complex measurement systems were required to better understand the factors behind economic growth.

The measure of labour productivity is only one of several partial statistical measures that describe the efficiency of the production process—that describe how well the economy is doing in terms of transforming inputs into outputs. Other factor inputs include capital, energy and intermediate goods and services. Each of these can be combined with output (i.e., GDP) to produce other partial measures, such as capital productivity, or energy productivity. And ultimately the efficiency of the economy depends not just on how efficiently labour is being employed, but also on how efficiently all the other inputs are being used. A more comprehensive measure of overall productivity combines all of these partial measures in an aggregate index called multifactor productivity (MFP)—the ratio of output produced per combined bundle of all inputs—labour, capital, energy, intermediate goods and services.

$$2) \qquad MFP = \sum w_i (GDP / I_i)$$

where I_i is the i'th factor input and w_i is the weight used to aggregate the various components.[2]

In recent years, Statistics Canada has developed estimates of this multifactor productivity measure in order to facilitate a better understanding of the forces behind changes in overall efficiency.

2. For a description of Statistics Canada's productivity program, see Harchaoui, Kaci and Maynard (2001).

The framework upon which the multifactor productivity program rests is a widely accepted economic model of the economy. In this model, production depends on inputs produced and the quality of technology. Changes in output are decomposed into the changes in inputs and changes in efficiency with which these inputs are transformed into outputs—the latter being called the growth in multifactor productivity.

This framework produces estimates of the weights (w_i) that are needed to calculate the value of multifactor productivity in equation (2). As a by-product, the framework allows the origins of output growth to be traced to changes in the amount of labour applied to the production process, changes in the amount of capital, changes in other factor inputs like raw materials and energy, and finally, the growth in efficiency. The latter captures a host of influences that drive efficiency gains in the economy.

The system of productivity accounts does more than just produce a more comprehensive measure of efficiency change. It also provides a decomposition that allows users to understand the origins of the various sources of output growth—ranging from expanding employment, increased investment, or efficiency gains often associated with innovation.

Using this framework and the resulting statistics that were produced by statistical agencies, analysis of differences in output growth rates among countries has focused on the underlying causes of differences in the growth rates of each of the factor inputs—looking to demography to examine changes in labour inputs, the investment climate for capital stock and to the application of technology or R&D, or economies of scale for changes in the efficiency component.

These cross-country studies have been aimed at providing information as to which policy regimes work well. The studies have used productivity measures to try and understand the reasons why some countries grow more quickly than others.

These new, more comprehensive productivity measures have also been used by analysts to investigate the sources of changes in labour productivity—to ask whether it is just efficiency gains or the increasing use of other factors like capital that have contributed to productivity growth. While multifactor productivity estimates are intrinsically superior to labour productivity measures if we are interested in the overall productive efficiency of an economy, many analysts still focus on labour productivity as well, because of its relationship to the measure of GDP per capita.[3]

Labour productivity can increase either because the capital intensity of the production process increases (workers get more capital with which they work), because of improvements in the quality of the work force (perhaps because of more education or experience), or because the inherent efficiency of the production process (MFP) improves. Efficiency gains may occur if firms get larger and reduce their unit production costs by taking advantage of economies of scale, or if new technologies are employed, or if new more effective forms of organization are adopted.

3. It should be noted that there is nothing unique about the relationship depicted in equation 1. A similar relationship could be written using capital, or using a bundle of inputs rather than L—in the latter case, we could then relate increases in GDP per capita to increases in multifactor productivity and to increases in the total input bundle being used in production relative to the population.

Isolating the causes behind increases (or slowdowns) in labour productivity growth is important since policy interventions may differ depending on the causes behind slowdowns in labour productivity growth.

The new multifactor productivity measure can be used in conjunction with data on changes in the amount of capital per worker to ask what the underlying causes of changes in labour productivity were. The system of productivity accounts then can be used to provide insights into policies that might be designed to stimulate improvements in efficiency as opposed to increases in the capital intensity of the production process.

3.2 The estimation process

To estimate the multifactor productivity measure, the statistical system developed a new product that is more complex—both to understand and to estimate. This added complexity has had to wrestle with several problems.

In the first instance, a method had to be developed to measure the services that are provided by capital. While labour inputs are relatively (not absolutely) easy to measure, providing measures of the flow of services from capital yielded by a mass of different machinery and structures is not.

To do so, new surveys had to be designed to measure investment flows. And the disparate flows of investments in different productive assets had to be combined in such a way as to yield the services of the mass of capital that society had accumulated from investment in machinery, equipment, buildings and other engineering works.

Economic theory has provided the framework needed to accomplish this task. Investment is aggregated into capital assets using models of the flow of services used—resulting in the perpetual inventory technique that is used to aggregate investment to yield estimates of capital stock. Economic theory has been used to provide guidance on the method used to aggregate the flows of services that come from assets that have different yields and different rates of depreciation. Economic theory has also been used to develop aggregation techniques for combining all of the factors into one bundle for estimation purposes.[4]

In the second instance, new measures of multifactor productivity had to wrestle with issues of comparability. One of the more important uses of productivity statistics has been in international comparisons. And for this purpose, comparability is critical.

To this end, an international cooperative effort has codified a set of best practices that has considerably enhanced international comparability. Developing similar conceptual frameworks and reaching agreements on standards is a traditional function of international statistical organizations.

4. See Harchaoui and Tarkhani (2002).

Progress had to be made first in standardizing the way that GDP is measured.[5] The OECD, the United Nations, The World Bank and other international organizations helped write a set of international standards for measuring GDP. And international bodies like the OECD used the resulting GDP estimates to compare labour productivity across countries.

Labour productivity estimates were the first to be constructed for these international comparisons because the statistical requirements consisted only of estimates of GDP and labour. The latter in their crudest form (number of workers) were relatively easy to collect for different countries on a comparable basis. The other requirement for these cross-country estimates was the development of relative prices (or purchasing power parities—PPPs, as they became known) that were needed to provide a measure of comparability for GDP estimates that were measured in different currencies. Here the international community (led first by the predecessor to the OECD, and then by the United Nations and the World Bank) provided the needed resources for international co-ordination and estimation.

As the user community and governments moved beyond the simple measure of labour productivity to the more complex measure of multifactor productivity, additional international efforts have been required—efforts that are ongoing. Labour inputs are only crudely measured by the number of workers, when hours-worked differ across full and part-time workers. And therefore several international bodies (the International Labour Office, and the OECD) have moved to harmonize the collection of comparable estimates of hours-worked so that they can be used to provide comparable measures of the flow of labour services that enter into the production process.[6]

A significant innovation in the area of international coordination in the last two decades has been the development of the so-called 'city groups'. They are comprised of volunteer countries that agree to pool their resources to advance conceptual and empirical work in a given field. One of the expert working parties (the Canberra group) has examined differences in the way that estimates of capital stock are created with an eye to harmonizing the estimates across countries. And the OECD has supplemented this initiative with the preparation of a manual of best practices. Finally, an international effort (again coordinated under the auspices of the OECD) has produced a manual on best practices with regards to the preparation of multifactor productivity estimates.[7] Statistics Canada has participated in all of these efforts so as to ensure that its estimates meet current standards of excellence and to enhance the usefulness of the estimates that are provided to the user community.

These efforts have meant that international productivity estimates are more comparable than they used to be. This in turn has increased the extent to which users of data can employ them for the important international comparisons that are aimed at understanding how differences in the economic environment faced by different countries affect outcomes.

The third challenge that the multifactor productivity program faced was deciding upon the level of detail to be used. When users value programs, they begin to apply statistics to new areas.

5. See System of National Accounts (1993).
6. See Paris Group Meeting (2003).
7. See OECD (2001).

These extensions often require the adaptation of the statistical program. Statistics Canada's users of productivity data have pushed for extensions in several areas to allow them to better understand the contribution of different factors to the growth process. In the case of the multifactor productivity program, users have asked whether part of economic growth could be explained by changes in the nature and quality of the factor inputs (labour and capital). On the one hand, users suggested that changes in the quality of labour due to increased education or training associated with experience needed to be considered. Others suggested that labour force composition (full as opposed to part time workers) might affect growth.[8] Still other users pointed out that, like labour, capital was not homogeneous and differences in the composition of assets across countries needed be taken into account in the estimation process.[9]

Using economic and index number theory, Statistics Canada's productivity program has adapted to the needs of users and has modified the way in which both labour and capital services are measured so as to allow users to compare Canada's experience with that of the nations with whom we compete. These new measures of labour input take into account the effect of having a more educated workforce or of having more high-tech computer related machinery and equipment in the production process.

From the beginning, users of productivity statistics have focused their attempts to understand developments in the economy by examining the performance of different sectors. Users have therefore requested detailed industry data so as to monitor the progress of different sectors. For example, recent studies have asked whether the so called high-technology industries were contributing more than proportionately to overall growth.

Statistics Canada's productivity program has therefore produced industry detail for its user community—all the while recognizing that there is a trade-off between relevance and credibility. Producing productivity statistics at finer levels of industry detail reduces the quality of the product. The productivity program produces a set of data at the industry level on outputs, labour inputs, capital inputs, material inputs, energy inputs, service inputs and prices that can be used to estimate large-scale econometric models of industry performance. The program not only provides simple summary statistics for the aggregate economy but it also provides a dataset with the underlying data that are required for specific analytical purposes.

4. Stage 3: Analysis[10] and new arenas

Maintaining program relevance requires that needs be monitored and data gaps be filled. For this purpose, analysis has explored several areas where gaps exist. For example, the estimates of productivity focus just on the business sector and consider only marketed outputs and purchased inputs. Yet the production process produces unwanted environmental damage. Analytical studies

8. For a discussion of how the composition of the workforce has affected productivity growth in Canada, see Gu, Kaci, Maynard and Sillamaa (2003).
9. For a discussion of how the composition of capital has affected productivity growth in Canada, see Harchaoui and Tarkhani (2003).
10. For an overview of the productivity research program, see http://www.statcan.ca/english/studies/eaupdate/prod.htm

produced by Statistics Canada's productivity group have explored how an integrated set of input/environmental accounts on CO_2 emissions can be used to modify the traditional productivity estimates to take into account environmental degradation. This framework has shown that when CO_2 emissions are taken into account, the economy's productivity growth is actually higher than the conventional estimates suggest.[11]

The standard productivity measures also only consider factor inputs that are purchased by businesses. Yet governments provide infrastructure that complements private investments. Analysis has also explored how this can be incorporated into the productivity framework. The results of these studies show that government investments in infrastructure account for a good proportion of overall multifactor productivity growth.[12]

These studies show the value and the necessity of expanding the traditional framework for measuring productivity—and for having an integrated set of national accounts within which the various outputs and activities can be coherently integrated.

5. Stage 4: Linking activities to productivity growth

Statistical programs rely on having the appropriate conceptual framework to guide developments. In the early stage of the development of productivity measures, economic theory informed the process—and continues to do so.

Recently, the statistical program has moved into new territory, where conceptual frameworks are much more fluid and where they are still being developed. Questions have emerged on the underlying causes of productivity growth that could not be placed within the standard growth decomposition framework that was used to understand the determinants of economic growth. As a result, a new complementary statistical program has emerged that supplements the original one.

Similar extensions have occurred in other statistical program areas, such as health and education. In the health and education area, the statistical process began to move away from just examining processes (by counting inputs like teacher salaries) and has begun to investigate outcomes. These new and exciting statistical programs are developing statistical systems that support our learning from experience: they are investigating whether some approaches work better than others. They are aimed at developing an understanding of the underlying reasons when they do. This has led to new surveys in the areas of health and education.

While still in its infancy, there is a similar phenomenon at work in new program areas that contributes to our understanding of economic growth. The statistical program has turned from expanding productivity estimates in an incremental fashion and has begun to add new activities that differ in quite fundamental ways from the original program.

11. See Harchaoui and Lasserre (2002).
12. See Harchaoui and Tarkhani (2003).

As productivity growth declined in the late 1970s from its rapid pace in the initial post-war period, the external user community began to focus on understanding the forces behind growth by asking what underlying activities, strategies and competencies (a firm's characteristics) were associated with increases in a firm's productivity—not by asking for information on how much growth was occurring in labour or capital inputs, but by asking for information on the underlying competencies that led to these improvements.

New statistical developments in this area have focused on a set of technology and innovation surveys on the one hand, and the Workplace and Employment Survey on the other. The first set of surveys has investigated the science-based competencies (R&D and technology) in firms;[13] the second set is more focused on human-resource practices. In addition, surveys have been developed to examine other dimensions of firm growth—from how new entrants perform, to the financial structure of firms.[14]

The new statistical program has been developing its own conceptual framework—with the inevitable interaction between conceptual development, application, analysis and survey modification. It has benefited from two concurrent statistical developments. The first is the evolution of international cooperative efforts to develop the new statistical framework for measuring innovation. Under the guidance of the OECD and Eurostat, a number of countries experimented with alternate survey instruments and a manual of best practices was developed.[15] Second, the surveys have been linked to administrative data on firm performance to allow analysis of the links between firm performance and innovative activities.[16] The development of electronic files that allow the performance of firms to be tracked over time has permitted analyses that were infeasible before.

Analysis has played a key part in the progress that has been made in the new program. By its very nature, the information product is far more complex than are simple productivity measures. Analytic exploitation is needed to identify relationships between outcomes of interest (productivity growth) and the factors that appear to be associated with them. The program has begun to analyse a rich dataset that contains the characteristics of firms (their competencies and their environment) to ask how these relate to productivity growth. The results are just beginning to emerge—but they confirm the potential for the new statistical program. Innovation is closely related to productivity gains. Firms that adopt new advanced technologies during process innovation gain productivity and grow at the expense of others. The characteristics of the most successful firms depend in complex ways on the industry and competitive environment in which the firm is located.

This analytical program makes use of both Statistics Canada staff and outsiders. And internally, initiatives have been taken simultaneously in two separate divisions—both the Micro-Economic Analysis (MEAD) and the Science, Innovation and Electronic Information (SIEID) Divisions. As in the case of the new health and education programs, Statistics Canada has leveraged its own expertise with that of outsiders. Statistical offices typically do not have adequate analytical

13. See Baldwin and Sabourin (2002), Baldwin, Hanel and Sabourin (2002), Baldwin and Hanel (2003).
14. See Baldwin and Gellatly (2003) for a compendium of these studies.
15. See OECD (1996).
16. See Baldwin (1996), Baldwin and Johnson (1998), Baldwin and Sabourin (2002), Baldwin and Gellatly (2003).

capacity to carry out all the useful and needed analyses, because of the large numbers of issues that can and should be explored in these largely uncharted domains. Multiple explorations are needed for maximum progress.

6. Challenges

6.1 Data gaps and relevance

The changes implemented in the productivity program illustrate how Statistics Canada has responded as an innovator to produce relevant statistics that provide objective insights into new public policy issues. The evolving statistical program has been aimed at providing new information to facilitate evidence-based decision-making by the government. A statistical program needs to be relevant to meet the quality standards that Statistics Canada strives to meet.

While the latest developments that allow us to better understand the effects of innovation and R&D have not fully worked themselves into the public consciousness, they promise to enhance the ability of the policy process to make informed decisions on the programs that are required to facilitate economic growth.

Success has involved extensions of the program—because analytic exercises using statistics usually suggest new avenues that need to be explored. And to do that, new statistics have to be prepared. The major challenge facing any program is to decide which of the requests for new data should be given priority in light of existing policy priorities and the limited resources that are available to pursue them.

Challenges also exist in the statistical system. As users ask for more detailed industry data, improvements have to be made in the feeder systems. The Canadian productivity program is built on the data provided by the Canadian System of National Accounts—a source that is recognized for its excellence around the world—because of the extent to which its programs are integrated, the coherence of the estimates produced, and their reliability. Moreover, the National Accounts is built on the solid core of the Input/Output Accounts, which provides integrated coherent data at the industry level. In other countries (the U.S.), various data sources measuring GDP are not integrated and provide mixed signals with regard to the source of overall productivity growth.

More recently, pressures are being placed on the productivity program to provide more comprehensive coverage outside the business sector. In Statistics Canada, productivity measures are provided only for the business sector. The government sector is removed from total GDP before productivity is estimated. This occurs because the statistical system produces measures of government output that do not lend themselves to productivity estimates. Yet there is considerable demand to have measures that assess the efficiency of government programs as well as the efficiency of the business sector.

Despite the quality of the data produced by the Canadian System of National Accounts, on which the productivity statistics are based, challenges exist in providing good productivity estimates for

some purposes.[17] For example, attention shifted in the 1980s from manufacturing industries to the service sectors, which have been increasing their relative size. But reliable productivity estimates require reliable estimates of GDP. And for historical reasons, data on services used to receive less attention than data for the goods-producing industries. Here, there has been a major effort within Statistics Canada to improve the surveys that profile the service sector and this has led to better data on outputs and inputs used in the service sector. But more work remains to be done in the area of price measurement if improved productivity estimates are to be produced.

Other challenges exist in the measurement of capital services. The new international standard for estimating the growth in capital services requires more data on investments, retirements and dispositions than before. Fortunately, due to the foresight of planners in Statistics Canada, a new data collection program was commenced in the late 1980s and can now be used to implement the new international standards.[18]

Improvements to the productivity program also need to be made in the estimates of certain industries, because of peculiarities therein. One example of this occurs in the natural resource sector, where capital needs to take into account the stock of natural resources. Here progress has been made analytically in working out the adaptations that are required, but new data have yet to be integrated into the program.

There are challenges in other areas that have been brought about by the changing nature of the production process. Capital used to be employed mainly in industries that purchased it. With improvements in the financial system, leasing has become more important. And as such, capital investments are increasingly being reported outside of industries that use that capital. This structural change needs to be addressed.

Challenges also exist with regards to integrating the environment into the productivity accounts. While analytical studies have investigated how this can be done in areas where the data for the exercise exist (Harchaoui and Lasserre, 2002), full-scale extensions require the development of environmental accounts. Recommendations for these extensions have been made by the National Roundtable on the Economy and the Environment—but still require implementation.

6.2 Interpretability

Each of the above challenges arises from the existence of specific data gaps. Closing these gaps would improve the quality of the statistical product by making the productivity program more relevant. But quality also depends on interpretability—the extent to which Statistics Canada's clientele fully understand the uses to which data produced by the program can be appropriately put.

The productivity program serves more than one purpose. On the one hand, it provides data on long-run trends in efficiency—productivity growth over the last decade. On the other hand, it produces estimates for the present time period. For example, quarterly estimates of productivity

17. The program provides guidance on the quality of the disaggregated detailed industry data. See Beckstead, Girard and Harchaoui (2001).
18. For a description of the methods being used to estimate depreciation, see Gellatly, Tanguay and Yan (2003).

growth for the present year are used by analysts to gauge short-run developments. Estimates of productivity growth for the latest time period are more volatile because, in the short run, it is difficult to determine whether a change in productivity reflects long-run trends or just short-run developments that will quickly reverse themselves. In the short run, productivity estimates contain a high noise-to-signal ratio. This is partly because they are highly cyclical. For example, measured productivity growth often slows when an economy is operating below capacity, only to pick up and exceed long-run trends at the end of a business cycle. Only when capacity returns to normal can a more precise estimate of trend be derived. As a result, some have argued that trend can only be estimated by comparing time periods that are separated by a full economic cycle.

An additional source of uncertainty exists when productivity estimates for the contemporaneous periods are being used. The System of National Accounts prepares estimates of GDP for the most recent and present years that are regularly revised over a period of several years as additional, more accurate and more comprehensive data sources become available. The quarterly labour productivity estimates make use of these preliminary estimates of GDP and therefore must be revised as the GDP estimates are revised.

The productivity program faces the challenge of explaining how users can best employ the estimates that are produced—because users have a tendency to use the estimates for past years that have already been finalized and those that are still preliminary in interchangeable ways.

Part of this challenge is met with analysis in the productivity program. By providing information to the Canadian public in the form of articles in Statistics Canada's Daily and other publications that make use of our own data (*Productivity Growth in Canada*, Catalogue 15-204), the analytical group provides guidance on the long-run trends that can be discerned from data that are finalized.[19]

The productivity program also provides commentary on the short-run or contemporaneous results.[20] In the latter case, the analytical product describes the inferences that are appropriately made using the short-run data—such as what the productivity data tells us about cyclical events in light of other complementary economic statistics. Even though contemporaneous estimates may be revised, when used in conjunction with other information, they enhance our understanding of how a conjunction of events may be unfolding. For example, slowdowns in the economy are generally accompanied by falling labour productivity. Finding that labour productivity has fallen at the same time that GDP starts to decline, therefore, is useful corroborative information on the state of the economy—even if subsequent revisions lead to changes in the absolute values of estimates, providing the revisions do not change the fact that there was a cyclical downturn.

19. For an article that discusses the bounds that need to be used on productivity estimates when making international comparisons, see Baldwin and Harchaoui (2001).
20. See Canadian Economic Accounts Quarterly Review at http://www.statcan.ca/english/freepub/13-010-XIE/free.htmfor overall document and http://dissemination.statcan.ca:8083/english/freepub/13-010-XIE/2004001/pdf/13-010-XIE2004001.pdf for productivity section.

While revisions (if they are not too drastic) to short-run productivity estimates do not invalidate the usefulness of the productivity estimates for some purposes, they may do so in other cases. Here, the productivity program has been using analyses to issue warnings when they are appropriate. For example, in recent years, preliminary estimates of productivity have shown large differences for the United States and Canada. Subsequent revisions, especially those for the U.S., have substantially reduced the gap between the two countries. This is a new phenomenon and the commentaries that have been published in Statistics Canada's *Daily* have provided users with a caveat that the most recent estimates of productivity should be used with caution when comparisons are being made between Canada and the United States.[21]

The challenges faced by the productivity program in these areas are not unique. Any of the data series produced by the System of National Accounts that experience revisions suffer from similar problems. But the very high visibility that the productivity numbers receive and the interest that is constantly expressed in knowing how the Canadian economy is doing relative to that of the United States makes the task faced by the productivity program in this area particularly challenging.

21. For a study of the revisions in Canada and the United States, see http://dissemination.statcan.ca:8083/english/concepts/15-204/productivity.pdf

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