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One Issue, Two Voices

Canada–U.S. Competitiveness: The Productivity Gap

Drawing on expertise from both sides of the Canada–U.S. border, the *One Issue, Two Voices* series is designed to stimulate dialogue on policy issues that have a significant impact on the bilateral relationship. This seventh issue compares the economic performance of Canada and the United States, focusing on the widening productivity gap between the two countries. Authors Glen Hodgson of the Conference Board of Canada and Jack Triplett of the Brookings Institution are leading international economists. Together they compare how our countries measure up in terms of economic productivity and competitiveness.

In the past decade, the U.S. economy has generated a surge in productivity, in sharp contrast to weak growth in Canada. Each author critically assesses the state of his country's economy, highlighting the causes of the disparity in productivity performance. In his essay, Hodgson states that Canada's lagging productivity directly affects its standard of living. He says that the first step to stopping Canada's sliding income growth relative to that of the United States is the creation of a single Canadian market. Currently, myriad regulatory barriers between and among provinces contribute to the declining productivity by raising the cost of doing business and sheltering Canadian industry from domestic and international competition. Hodgson maintains that a national business and regulatory environment is crucial to boosting productivity.

In contrast to Hodgson's picture of Canada's mediocre economic growth, Triplett describes how U.S. productivity has taken off since 1995, after two decades of stagnant productivity performance. In his opinion, the conversion from stagnant to vibrant productivity performance in the U.S. services sector is one of the most remarkable economic transformations of all time. He emphasizes that services growth accounts for most of the difference between the recent productivity performance of the United States and that of other advanced countries, including Canada. Thus, services must feature prominently in any attempt to explain international differences in productivity growth rates.

Although the authors agree that the services sector in the United States is the source of both faster productivity growth and the U.S.–Canada productivity gap, they say they cannot fully explain the causes without further research.

The Canada Institute thanks the authors for their contributions to our understanding of a controversial topic in the ongoing dialogue. We are grateful to the Canada Institute on North American Issues for its support.

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Glen Hodgson

Canada–U.S. Competitiveness: Addressing the Canadian Economic Contradiction

Canada is facing a deep contradiction in its economic performance. Prospects north of the 49th parallel appear very rosy from a macroeconomic perspective, but Canada's microeconomic performance is a source of serious concern. Weak growth in productivity and in incomes over many years has resulted in a large income gap with the United States. This article examines the factors behind the income gap and what Canada can do, in concert with the United States, to improve productivity performance and competitiveness.[1]

Context

Over the past two decades, Canadians have largely bought into the unavoidable reality that their future economic prosperity depends heavily on close economic relations with the United States. Firms' supply chains crisscross the border, with as much as 40 percent of Canada–U.S. bilateral trade now being intrafirm—that is, involving different units of the same company. Indeed, Canada's most successful companies view the North American economy as a single platform from which to compete in the global economy. Electricity infrastructure, for example, is largely integrated along continental lines, and integration in energy continues to deepen.

Canada has also produced stellar macroeconomic results. Notwithstanding the negative impact of a stronger Canadian dollar on exports, economic growth remains solid, stimulated by domestic consumption and investment. Inflation is well contained within the Bank of Canada's target range, centered at 2 percent. Unemployment levels are at a 33-year low. Canada enjoys a bilateral trade surplus with the United States and an overall current account surplus. Government debt continues to fall in relative and absolute terms as Canada remains the only Group of Eight (G8) government consistently operating in the black.

But when Canada's economic performance is examined in greater detail, a remarkable dichotomy emerges. Microeconomic performance is a source of serious concern, with weak labor productivity and sliding real income growth relative to the United States and other major OECD members over the past 20 years. The concerns about weak productivity and income growth will only increase, owing to the profound structural changes taking place within the global economy. These global changes will place even greater pressure on sectors and firms to improve their international competitiveness in order to survive, let alone thrive. Similar pressure will be placed on Canada's international trade and investment policy, which has lacked strategic focus.

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Canada Slipping in the Global Rankings

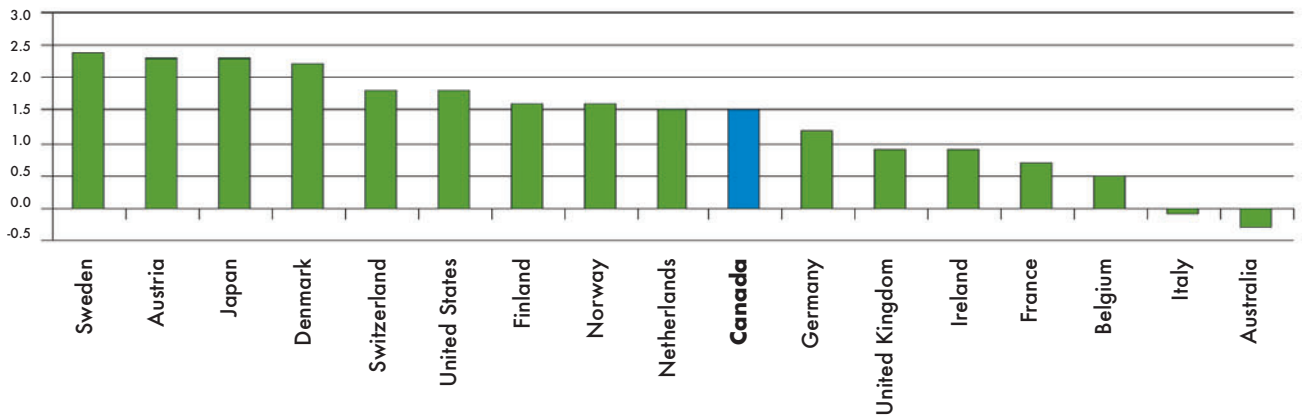
Ever since the Conference Board of Canada introduced international benchmarking a decade ago, Canada has consistently scored well. However, its relative ranking on income per capita—an important measure of a country's standard of living—has been slipping. Among all OECD countries, Canada ranked in fifth place in 1990, behind Luxembourg, Switzerland, the United States, and Iceland. The data for 2005 put Canada in the 10th spot—now also surpassed by Norway, Ireland, the Netherlands, Denmark, and Australia.

How important is such a decline? It suggests a negative trend that could be difficult to turn around. The Canadian economy is performing sufficiently well to rank among the best in the world; it is still in the gifted class among nations. Canada has the advantages of huge natural resource wealth, skilled human capital, and a free-trade agreement with the United States, the most dynamic economy on earth. But the data show that Canada is slowly being pushed to the back of the gifted class, and that it needs to recognize, admit, and address the factors that are causing it to lose ground in critical areas.

Canada is a laggard on productivity, which directly affects its standard of living. Indeed, Canada has lagged behind most major OECD countries in productivity growth for decades. From 2000 to 2005, Canada's annual productivity growth ranked 10th among 17 higher-income OECD countries (see figure 1).

The difference between Canadian and American productivity performance is particularly striking. A persistent and growing productivity gap between Canada and the United States has endured since the early 1980s. The factors behind this gap are com-

Figure 1 Growth in Labor Productivity Among OECD Countries, 2000–2005 (average annual growth rate, percent)



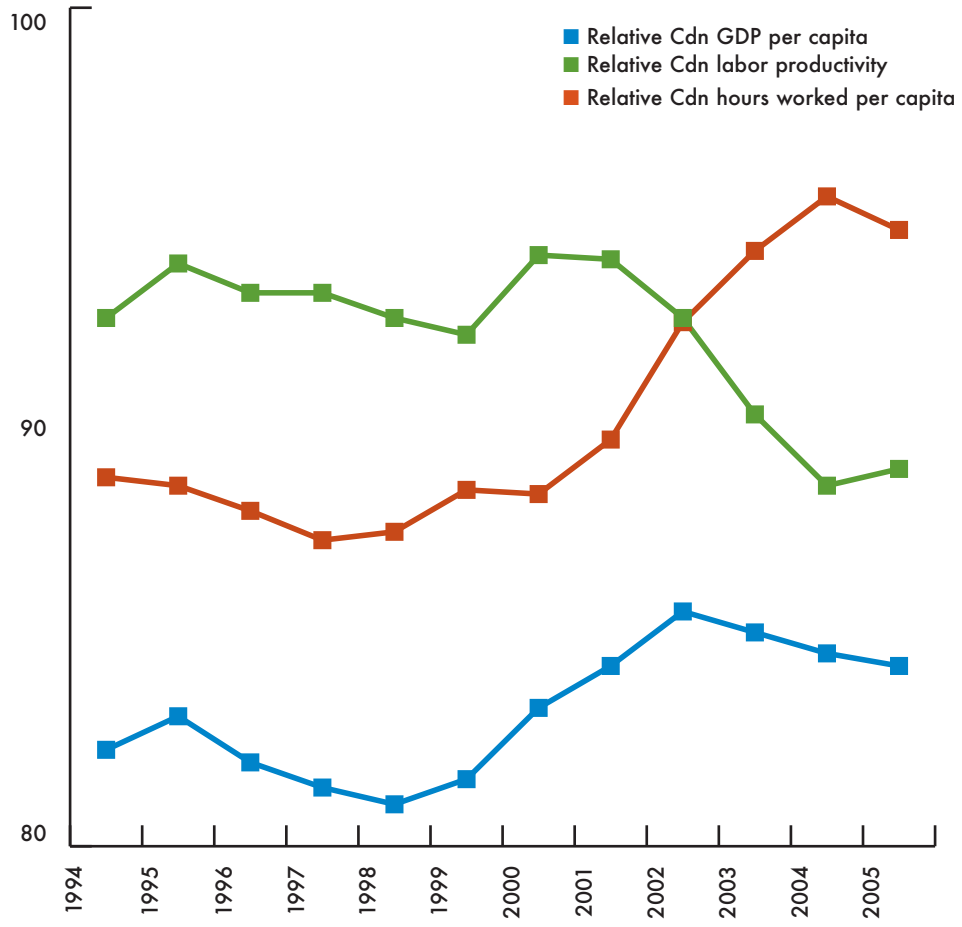
Source: OECD.

plex and vary considerably among and between sectors. Detailed sectoral analysis by the Conference Board of Canada and Industry Canada indicates that Canadian productivity performance is equal or superior to U.S. performance in only 10 of 29 industrial sectors.[2] The bottom line on productivity is that Canadians are growing wealth much more slowly than Americans.

Statistics Canada recently released a report comparing Canadian and U.S. performance in terms of average real incomes, hours worked, and productivity.[3] The good news is that the income gap between Canada and the United States has narrowed slightly since 2000, with Canadian incomes rising to 84 per cent of the U.S. level (figure 2). However, Canadians have had to work more hours in order to reduce the income gap, because Canadian productivity relative to the United States has continued to decline.[4] In essence, the data confirm that in order to grow their real incomes, Canadians are working harder, not smarter.

A key factor behind the productivity gap is Canada's sliding performance in attracting foreign direct investment (FDI), where Canada ranks near the bottom of the OECD in terms of inward FDI relative to GDP. Moreover, A.T. Kearney's latest FDI Confidence

Figure 2 Canada–U.S. Income, Productivity and Hours Worked (U.S.=100)



Note: Canada as a percentage of United States.
Sources: Statistics Canada; Canadian Productivity Accounts; Bureau of Labor Statistics: Bureau of Economic Analysis; and Bureau of the Census.

Index, which measures the attractiveness of an economy for FDI, ranked Canada 21st out of the 25 countries surveyed, a drop from 16th place in the previous year. The signal from foreign investors is very clear: Canada is slipping as an investment destination. Canada also ranks low among OECD countries on machinery and equipment (M&E) investment relative to GDP. High Canadian taxes on capital investment are an important factor in our weak relative performance on FDI and M&E investment.

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Fundamental Changes in the Global Economy

Canada's sliding overall economic performance occurs at a time when the engine of global economic growth is shifting from aging industrial economies to China and the larger emerging economies. Many factors are contributing to this shift, with demographics and reforms to economic policy being two of the main ones.

In many mature industrialized countries (such as Japan, Germany, and Italy), long-term growth potential is slowly declining as aging populations reduce the growth rate of the labor force. More workers are retiring, with fewer new workers to replace them. This problem is compounded by fiscal deficits, high public debt, and rigid microeconomic policies that inhibit adjustment. While real incomes remain high in Western Europe and Japan, economic growth potential has dipped to 2 percent or lower, and it will fall further in the coming years.

The United States is an anomaly among industrialized countries: it will maintain potential economic growth at 3 percent until at least 2020. This growth is due to higher fertility rates than in other industrial countries, strong immigration that contributes to strong labor-force growth, and an economy that is relatively flexible and innovative.

Meanwhile, many emerging market countries have significantly boosted their underlying economic growth potential by embracing market-oriented reforms and integrating into the global economy. China's extraordinary rise leads the way, catalyzed by the country's entry into the World Trade Organization (WTO) in the late 1990s. China's takeoff is joined, to varying degrees, by India, Brazil, Mexico, and many other countries in the developing world.

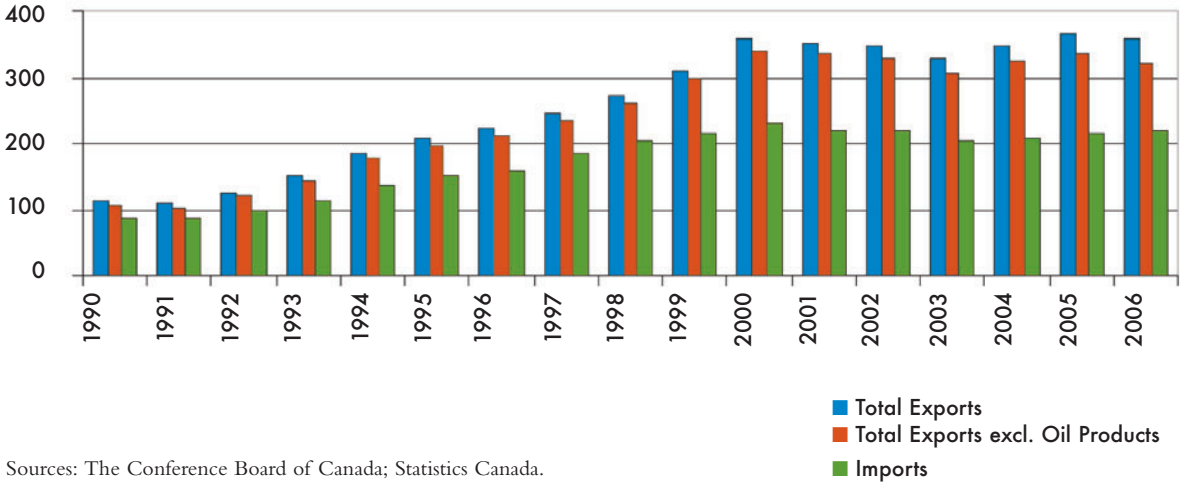
The result is a fundamental shift in the global economic tectonic plates. Powerful forces are changing the distribution of global status, power, and influence—and these are still early days. As a consequence, Canada will find it hard to avoid falling further in the global rankings. It will also be trading less with mature economies similar to its own, and more with large developing economies with low wages, large domestic markets, and weak economic institutions. All these factors change the competitiveness equation ahead for Canada.

Reaching the Limits of North American Economic Integration

As already noted, bilateral economic integration between Canada and the United States has grown since the Free Trade Agreement (FTA) came into force in 1989. To capture the full benefits of increased integration, Canadians have a strong interest in eliminating the remaining obstructions to the efficient movement of goods, services, investment, and people within the continent. The public in both countries needs to appreciate the enormous economic benefits of mutual interdependence.

At the same time, however, the structure of Canada–U.S. economic integration is changing in important ways. During the 1990s, Canada's exports to the United States rose dramatically as a result of a combination of three key factors: a remarkably strong U.S. economy, a relatively weak Canadian dollar, and the trade-liberalizing effect of the FTA and the North American Free Trade Agreement (NAFTA). The U.S. share of Canadian

Figure 3 Canada–U.S. Merchandise Trade, 1990–2006 (billions C$)



Sources: The Conference Board of Canada; Statistics Canada.

exports grew from 74.9 percent in 1990 to 83.9 percent in 2005. But Canadian exports to the United States have grown much more slowly since 2000 owing to a series of jolts, including the "tech wreck," 9/11, and the appreciation of the Canadian dollar.

The profile of Canada's exports to the United States is also changing. Current export growth is increasingly sustained by the energy and resource sectors, incorporating a strong upward oil and natural gas price component—a feature that is likely to continue in a U.S. economy hungry for energy imports. In contrast, Canada's recent nonenergy trade growth, including in automotive and most nonresource-based manufactured goods, has been discouragingly weak.

Other key features of bilateral economic integration show a similar pattern of slowing growth or even decline. Canadian imports of U.S. goods and services, which grew at a less dramatic pace through the 1990s, have been gradually tailing off both in absolute terms and as a share of total Canadian imports. And growth in Canada–U.S. FDI, which was high in the mid to late 1990s, has slowed, largely due to slower growth in Canadian FDI in the United States.

Original research recently published by the Conference Board of Canada confirms progress in the development of more integrated North American supply chains during the 1990s, but deeper integration of supply chains essentially came to an end after 2000. This evidence reinforces the argument that the Free Trade Agreement has reached its limit in terms of reshaping Canada–U.S. business competitiveness in aggregate.[5]

Canada's economic relationship with the United States, within a larger North American region, will continue to predominate for the foreseeable future and will remain linked to the growth trajectory of the U.S. economy. But the current trends in regional economic integration suggest that the FTA (and NAFTA) effect is mature and tapering off under the terms of the existing agreement, while the market forces that pulled Canada into the FTA in the first place may be taking both countries in new directions. NAFTA was already a hub-and-spoke agreement, with only limited increases in trade and investment flows between Canada and Mexico. The United States has since aggressively embraced two-way trade with and investment in China, often through pan-Pacific integrated supply chains created by U.S. outward investment. Canada, in contrast, generally

has not. Consequently, China is on a path to replace Canada as the United States' number one trade partner.

The summary message is that the Canada–U.S. economic relationship is both vital and changing. The popular vision of a steady, lockstep march toward ever-increasing levels of bilateral economic integration across all fronts will not automatically become reality. Close economic alignment with the United States is also unlikely to shield Canada from global competitive realities, both directly and via the United States. At this stage, a clear understanding is required of exactly where regional economic integration is headed, how it is being affected by the rapidly changing global economy, and what steps could be taken to pursue Canada's economic interests directly in the U.S. market and as a gateway to the global economy.

What Next?

If both countries have reached the limits of North American economic integration under the existing FTA, what might be done to re-energize the Canada–U.S. economic relationship and enhance Canada's competitiveness? Action is required on three fronts.

Accelerate Domestic Reform: Reduce Regulation and Increase Competition

To make itself more internationally competitive, Canada needs to tackle the vast web of regulatory and other barriers that currently pervade the Canadian economy, and it must also reduce barriers to competition in specific sectors. Often these regulations and barriers are legitimately intended to serve the public good, but collectively they contribute to lagging productivity by raising the costs of doing business and by sheltering Canadian industry from domestic and international competition. If Canada hopes to compete internationally and to remain competitive within North America, this situation cannot continue.

The optimal end-state would be the creation of a single Canadian market, through elimination of regulatory barriers among and between provinces, reduced barriers to competition in many sectors, and improved regulatory alignment. The national business and regulatory environment could then become a boost to productivity rather than a drag on productivity as it is today.

As an agenda, improving the design and implementation of Canadian domestic regulation may not be the most enticing priority for governments and political leaders—but the good news is that it is largely within Canada's own power to deliver. On that score, the Trade, Investment and Labor Mobility Agreement between British Columbia and Alberta, which came into force in April 2007, is an important step forward toward the construction of a more integrated single Canadian market. Other specific domestic reforms should

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The time has come for Canada to consider the advantages of seeking a more common, regional approach to free trade and investment with countries and regions outside North America.

include improving federal-provincial alignment on regulatory processes and business taxes, increasing labor mobility through more common professional and credential standards among provinces, and creating a one-stop website that provides businesses with the various federal, provincial, and municipal regulations that must be met in a given location.

Prepare to Take the FTA to Another Level

The United States will continue to be Canada's top bilateral trade priority. The FTA played a critical role in promoting Canada–U.S. trade, but it is now a mature, fully implemented agreement that has reached the limit of its influence on economic structural change. Meanwhile, the United States is pursuing its own bilateral trade interests, and Canada risks becoming marginalized in U.S. trade policy—without a credible bilateral or regional alternative.

The answer to preserving some special status with the United States is for Canada to show leadership by seeking to reduce the remaining bilateral barriers to the American market. A coherent, practical, step-by-step approach to managing the relationship with the United States offers the best promise of addressing Canada's economic concerns while protecting other Canadian interests and values. Canada needs renewed political determination to press forward in those areas where we can maximize our advantage and better secure our place in the U.S. market. In turn, Canadian foreign policy with the United States should be geared to creating the right negotiating environment. A positive political relationship at the highest levels of government, for instance, was critical to the successful negotiation of the initial FTA.

Specific areas for priority action should include:

- Major investments in the Canada–U.S. border, to balance security with openness to trade, investment, and movement of people—investment in border-related infrastructure, intelligent technology, and simplified reporting processes.
- Greater cooperation on or even harmonization of regulations and other nontariff barriers, without sacrificing Canadian policy objectives.
- Elimination of remaining Canada–U.S. tariff differences.
- Simplification or elimination of rules-of-origin requirements.
- Liberalization and integration of trade-related services, with transportation a top priority.

Treating energy as a priority sector, particularly oil and gas, would give Canada added leverage in its trade relationship with the United States, but it must be accompanied by improved policy alignment on climate change and reduction of greenhouse gas emissions.

Finally, as the less-powerful partner in its major economic relationship, Canada has a strong interest in seeing international rules-based dispute resolution work. However, as the softwood lumber issue demonstrates, any system of dispute resolution is only as good as the will of the parties to enforce it. The development of rules-based dispute resolution has been an important Canadian achievement, and Canada has a strong interest in keeping it as a priority in its trade policy.

Consider a Common Front with the United States on Third-Party Trade Liberalization

When it comes to extending bilateral or regional free trade and investment beyond North America, Canada suffers from a paradox. Countries that are interested in negotiating bilateral agreements with Canada tend to be marginal to its economic interests,

while larger countries or regions with greater economic potential tend to be less interested, viewing Canada more as an adjunct of the United States. That certainly appears to be the case in our relationship with the European Union. Not surprisingly, Canada has signed only three bilateral agreements since NAFTA, while the United States has signed 13 such agreements.

Given that hard reality, the time has come for Canada to consider the advantages of seeking a more common, regional approach to free trade and investment with countries and regions outside North America. No doubt there will be political and economic challenges in trying to advance this approach. Hard analysis will be needed on the costs and benefits to Canada of specific potential bilateral agreements, with and without the United States as a full partner. Canada would face the risk of being pushed aside as the junior partner to the United States at the bilateral or regional negotiating table. There is also the issue of Mexico, a NAFTA partner but still at a different stage of economic liberalization.

These challenges are real and cannot be dismissed. Nevertheless, the absence of material progress by Canada bilaterally with other major trading nations or regional blocs is a clear signal that the time has come to examine an alternative approach, especially with the renewed European interest in freer trade with the United States and the rumbles of a free-trade area for the Asia-Pacific region.

Conclusion

Canada's mediocre productivity performance over the past two decades, combined with a need for greater clarity on the next steps in our trade relationship with the United States, presents an opportunity to refocus the Canadian economic and trade policy agenda. Canada could reposition itself as an attractive access point to North America, inviting global and U.S. companies to use the Canadian market as a platform for regional and global business opportunities or to engage directly with Canadian companies and consumers.

But to do so, action is required on three fronts. First, Canada needs to create a single Canadian market in order to strengthen the competitive position of Canadian businesses at home, in the United States, and globally. Second, Canada needs to re-energize progress toward a second stage of the Free Trade Agreement, while ensuring that physical border crossings work with optimum efficiency. And third, Canada should seek enhanced access to other markets by examining the advantages of a more common, regional approach, along with the United States, to free trade and investment with countries and regions outside North America.

Notes

1. See the recent Conference Board of Canada publication *Mission Possible: Stellar Canadian Performance in the Global Economy* (available at www.conferenceboard.ca).
2. As noted in the Conference Board of Canada, *Performance and Potential 2004–05,* 64, four of the 10 sectors where Canada outperforms the United States on productivity are resource sectors; and all 10 of these sectors are generally open to international competition.
3. Statistics Canada, "GDP Per Capita and Productivity in Canada and the United States, 1994–2005," *The Daily*, March 26, 2007.
4. There is an ongoing debate among economists about the measurement of hours worked in Canada-U.S. comparisons. This article will not try to resolve that debate—Canadian labor productivity remains well below the U.S. level regardless of the methodology used.
5. See Danielle Goldfarb and Kip Beckman, "Canada's Changing Role in Global Supply Chains," Conference Board of Canada, March 2007.

Jack E. Triplett

Recent U.S. Productivity Performance

In the past decade, the U.S. economy has generated a surge in productivity that contrasts markedly with its stagnant productivity performance in previous decades. Between 1995 and 2005, my colleague Barry Bosworth and I calculate that labor productivity (LP), or output per hour, grew at 2.5 percent per year in the U.S. private nonfarm sector (excluding government growth).[1] LP growth has been measured variously at around 1.4 to 1.5 percent per annum before 1995, depending on the calculation period.

A broader productivity measure is called "multifactor productivity" (MFP)[2]—the ratio of output growth to the growth of all inputs (or all inputs that can be counted). LP is the ratio of output growth to growth in the labor input only. Economists often prefer MFP because it is more comprehensive and therefore closer to a measure of efficiency. MFP also accelerated in the United States after 1995, from less than 1 percent per year before that date to 1.6 percent after it.

Canadian productivity growth initially accelerated in step with the U.S. rate, but after the turn of the 21st century, Canada's productivity growth fell behind.[3] The recent American productivity surge also exceeds the productivity performance of European countries, which as a group have seen their productivity, both LP and MFP, grow more slowly over the past decade than previously.[4]

Changes in these productivity growth-rate numbers may seem small, but productivity is the key to advancing living standards. Over 20 years, an economy whose LP advances by 2.5 percent per year will have more than 60 percent more output per worker. If the distribution remains the same, living standards can rise apace. Alternatively, more resources can be put into social programs, without reducing private consumption. Economists and government policy analysts are therefore greatly interested in the reasons why the U.S. economy's productivity performance has been so much better recently than in the past, and so much better than the productivity performance of other comparable countries, including Canada and the members of the European Union.

U.S. Productivity Growth Before and After 1995

Annual U.S. private nonfarm productivity growth was roughly 80 percent higher, both in LP and MFP, after 1995 than before (table 1). Part of this increased growth originated in the goods sector—LP and MFP growth in goods production accelerated by about 30 percent. Services sector productivity grew much more. Services sector LP doubled, and services MFP growth rose from 0.5 percent to 1.3 percent per year. This dramatic change in the services sector drove much of the famed post-1995 revival of U.S. productivity growth.

In the early 21st century, U.S. LP and MFP growth continued apace, led by the services sector. Indeed, goods sector LP and MFP growth both declined slightly after 2000, but services sector LP and MFP continued to accelerate. The post-2000 services sector MFP acceleration is not as dramatic as in 1995–2000, but the sector's MFP growth in the new century is three times its pre-1995 rate.

Strong services industry MFP growth is significant news. The services sector has long been regarded as an unproductive part of the economy, one where productivity improvements lagged far behind those in the goods sector. Consistent with this notion, in the pre-

1995 period services productivity growth rates were only two-fifths (LP) to one-quarter (MFP) of the goods productivity rates. Because all advanced economies are increasingly services economies, a stagnant services sector is a recipe for reduced economic growth. But after 1995, the services sector constituted a large proportion of the U.S. acceleration in MFP, a figure that is without historical precedent. Productivity in the U.S. services sector as a whole is very quickly approaching parity with goods sector productivity. The conversion from stagnant to vibrant productivity performance in the U.S. services sector is one of the most remarkable—and overlooked—economic transformations of any era.

Moreover, services sector productivity growth in the European Union and in Canada has lagged behind that in the United States. Services productivity growth accounts for most of the difference between the recent productivity performance of the United States and that of other advanced countries. Thus, services must feature prominently in any attempt to explain international differences in productivity growth rates.

What Accounts for Productivity Change?

Economists point to several factors as sources of LP growth. First, workers are more productive when they have more capital equipment. In recent years, investment in information technology (IT) equipment has been a major form of increased capital in the United States as well as in other advanced countries.[5] A post-1995 investment boom in the United States, centered in high-tech IT investment, increased LP by increasing the ratio of capital to labor hours. Bosworth and I estimate that in the closing years of the 20th century, more than a third of aggregate U.S. LP growth could be attributed to increased investment, most of it in IT—a view that corresponds with findings by other economists. Because IT investment goes overwhelmingly to services industries, it was an even more important source of LP increase in services, where it accounted for about half of the total. Even though the IT bubble burst after 2000, the capital contribution to LP

Productivity Growth in Nonfarm Business, Goods, and Services-Producing Sectors, 1987–2005

Average Annual Rates of Change			
	1987–95	**1995–2000**	**2000–05**
LABOR PRODUCTIVITY			
Private nonfarm	1.4	2.5	2.5
Goods-producing sector	2.4	3.0	2.9
Services-producing sector	1.1	2.3	2.4
MULTIFACTOR PRODUCTIVITY			
Private nonfarm	0.9	1.6	1.7
Goods-producing sector	1.8	2.3	1.9
Services-producing sector	0.5	1.3	1.5

Sources: Computed from the new Bureau of Economic Analysis NAICS-based industry data set, December 2006 release

The conversion from stagnant to vibrant productivity performance in the U.S. services sector is one of the most remarkable—and overlooked—economic transformations of any era.

In recent years, investment in information technology (IT) equipment has been a major form of increased capital in the United States as well as in other advanced countries.

growth continued in the opening years of the 21st century, as other forms of capital made up for the decline in IT. Through the entire 1995–2005 decade of high LP growth, therefore, capital's contribution was substantially higher than in the pre-1995 period. Capital contribution, nearly constant across the 1995–2000 and 2000–2005 intervals—and substantially higher than it was before 1995, is one of the reasons that Bosworth and I have said that the late 20th- and early 21st-century U.S. productivity expansions are similar, not different.

Second, LP at the establishment and industry level can rise because intermediate inputs (goods and services) increase relative to labor hours. One example is the contracting out of activities formerly produced within the establishment. Though intermediate input growth has been prominent in the United States at the industry level, it will increase *aggregate* LP only if the establishments that do the contracted work are more productive than the workers who are displaced at the contracting firm. Often, specialization does increase efficiency.

Third, LP rises when MFP rises. MFP is a measure of how efficient the establishment is at using all its inputs combined, so it contributes to LP beyond the contributions of capital and intermediate inputs. At the aggregate level, MFP accounted for about three-fifths of LP advance over the whole decade, and about the same proportion within the services sector. Indeed, within the services sector, the contribution of MFP exceeded the vaunted contribution of IT investment.

In economics, MFP is, notoriously, a residual—the growth in output that remains after the output effects of all productive inputs have been accounted for. It is worth asking why the MFP effect has been so large in the United States in recent years. What accounts for this growth in MFP?

Despite many plausible speculations, economists don't know the exact or even the proximate causes of recent MFP growth. One explanation focuses on omitted inputs: if any productive inputs are left out of the analysis, the influence of their growth will fall into and inflate MFP. Other than omissions of this kind, MFP growth represents increased efficiency and the fruits of technological change.

Whatever the hidden sources of MFP improvement, they have to fit some demanding plausibility conditions to explain recent MFP growth. First, the new phase of U.S. productivity growth emerged rather suddenly. It did not necessarily develop instantaneously across all industries, but statistical tests indicate that 1995 is a good year to date the emergence of the new regime. Accordingly, the hidden sources must be factors that either emerged abruptly or whose effects emerged abruptly in the mid-90s. Furthermore, because the new productivity regime is most strongly demonstrated in the unprecedented acceleration of MFP in the services sector, the sources ought to apply most strongly to services industries. It is known, for example, that the "product cycle" in semiconductor production speeded up around 1995 and provoked an acceleration of MFP growth in electronics production;[6] electronics, in turn, accounted for a large part of the acceleration in goods sector MFP (see table 1). But semiconductor and electronics MFP growth does not carry over into services MFP growth—and services MFP growth made an even larger contribution to total U.S. productivity change after 1995 than the much-touted revolution in electronics production.[7]

Second, the hidden sources must have emerged strongly in the U.S. economy but be present in a lesser degree in Europe and Canada. Again, the sources must apply to the services industries because services are the sector where the productivity performance of

the United States differs most strongly from that of other countries. Recent productivity literature has been dominated by a focus on IT, but the direct effects of IT investment on services industries LP have been accounted for in international comparative studies; the differences among countries are instead in their services MFP growth, which is calculated net of the direct effect of IT.

Several hypotheses have been advanced about the underlying sources of recent MFP change. Among them are speculations that MFP growth must be related in some manner to burgeoning IT investment.

One particular hypothesis ties IT indirectly to MFP growth. Because some of the "coinvestments" that accompany IT investment are not included in the standard measures of investment in national accounts, their omission from the analysis means that their (unmeasured) productivity effects fall into the MFP residual, likely with a lag. Examples of coinvestments and intangible investments are organizational and workplace changes, worker training programs, and research and development (R&D) programs that accompany a decision to "computerize" a process. Like other investments, the gains from these intangible investments accrue over time, so their omission from national accounts undercounts investment activity, understates the inputs to production (in particular, the capital input), and overstates MFP growth.

The hypothesis is appealing. Investment in a modern economy, particularly in a services economy, involves more than the traditional buildings and equipment that make up the bulk of investment in the national accounts. Indeed, one recent estimate put the stock of intangible investments at one-quarter of the stock of traditional investments. If this estimate stands up to further analysis, it suggests the importance of adding intangible investments to national accounts, and particularly to data used for the analysis of industry productivity, because the intangibles are certainly distributed differently among various sectors of the economy. Moves are under way to add R&D investment to national accounts, and both the United States and Canada have prepared experimental estimates, but R&D is only a fraction of the intangible investment total.

In the absence of the right data, some economists have speculated that the intangible investments are correlated with IT investments, so that their effects can be estimated econometrically by lagged values of IT investment at the industry level. Bosworth and I tested this proposition on the industry data we used in our study (57 industries whose data conform to U.S. national accounts). We found no confirmation for the hypothesis, contrary to reports of some other researchers who have used similar U.S. data. However, our conclusion was similar to a study that used data from European Union countries. This question is subject to further research still in process, and a consensus has not yet emerged. The coinvestment hypothesis is more or less compatible with the abrupt timing of the MFP acceleration in the United States because IT investment accelerated at the same time. As well, some studies suggest that European implementations of IT have been accompanied by lower coinvestments, though others have found no evidence for the lagged link between MFP and IT, as the hypothesis requires.

Another hypothesis emphasizes management, an input normally omitted from the usual productivity accounting methods. Shifts in the productivity relation between measured inputs and outputs reflect management initiatives to improve productivity as well as simple "bright ideas." This explanation merges to an extent with some of the coinvestment literature, because "organizational intangible investments" may be just another name for omitted management inputs. It also complements to an extent the lagged IT hypothesis. Many fun-

damental changes in the ways of doing business are no doubt "IT enabled" (for example, streamlining supply-chain management, which has been emphasized in the literature on management changes and IT, depends on IT for successful implementation).

Timing presents some problems to this hypothesis. Many structural changes that have been documented in business practices require IT, but the conditions for implementation did not emerge abruptly in 1995. For example, using computers to link checkout data in retail stores with inventories and ordering began around 1970, so was not an innovation of the 1990s. Did management broadly institute similar changes from innovations developed earlier (but not adopted) in an abrupt wave that began in 1995? Some studies suggest that Europeans have been less successful at integrating IT and management changes than have U.S.-owned firms operating in Europe—a difference that is consistent with the lag between recent European and U.S. productivity performances.

A third hypothesis couples government regulation of economic activity with management initiatives. Economists are agreed that excessive regulation is deleterious for productivity. Typically, regulation is offered as an explanation for differences between U.S. and European productivity performance, and to an extent for differences between the United States and Canada. However, this hypothesis does not sit well with the timing of the burst in U.S. productivity growth. Deregulation in the United States began in the 1970s with the Carter administration; even if the process took time and its effects were felt only after a lag, deregulation does not seem consistent with the abrupt emergence of a new productivity regime in the United States in 1995.

Something happened in the United States around 1995 that permitted or encouraged management to make innovations that greatly increased U.S. productivity growth. Research has not yet determined what those hidden causes were, though there are some intriguing hypotheses. In the end, there were probably multiple interacting causes, including a favorable and steady macroeconomic environment, rather than one single, simple line of causation. Providing an explanation for the great leap in U.S. productivity—and why other countries have lagged behind—is a major challenge for productivity researchers.

Notes

1. Barry P. Bosworth and Jack E. Triplett, "The Early 21st Century U.S. Productivity Expansion Is *Still* in Services," *International Productivity Monitor*, no. 14 (spring 2007): 3–19.
2. It is also called "total factor productivity" (TFP). The terms are completely equivalent.
3. Andrew Sharpe, "Lessons for Canada from International Productivity Experience," *International Productivity Monitor*, no. 14 (spring 2007): 20–37.
4. Robert Inklaar, Marcel P. Timmer, and Bart Van Ark, "The End of Convergence: Market Services Productivity in Europe," unpublished paper, University of Gronigen, The Netherlands, March 2007.
5. In the U.S. national accounts data that are the basis for the economic trends discussed here, IT equipment includes not only computers and semiconductors but also software, communications equipment, copying equipment, instruments, and other information-handling devices, all of which have been transformed by the revolution in electronics.
6. Dale W. Jorgenson, "Information Technology and the U.S. Economy," *American Economic Review* 91, 1 (2001): 1–32, emphasized this point.
7. The performance-corrected prices of computers, semiconductors, and related electronic equipment have been falling at 20–30 percent per year for 50 years, and the industries that produce them have exhibited correspondingly high productivity changes over that same interval. Their prices dropped by more than 30 percent annually after 1995, and they exhibited extremely rapid productivity advance as well (we estimated electronics MFP at more than 11 percent per year between 1995 and 2000); these rates, however, are less extraordinary when viewed relative to their past history.

Glen Hodgson's Response

It is a pleasure to comment on Jack Triplett's insightful article on the factors behind the recent surge in U.S. productivity growth. He has taken a complex topic that is often debated only among economists and done his utmost to render it accessible to a wider readership of leaders. It must be emphasized at the outset that productivity is not the only factor affecting international competitiveness. Things as diverse as the tax regime, the relationship between domestic savings and investment, and the exchange rate are also central to the ability to compete successfully. Nevertheless, there is little doubt that productivity performance is critically important to international competitiveness.

In an effort to bridge our two essays, I will arrange my comments under two broad headings: an assessment of the findings themselves; and the messages for the Canada–U.S. economic relationship going forward.

Assessing the Findings

Triplett's core hypothesis is that the recent surge in U.S. productivity growth is the result of accelerated productivity growth in the services sector. After explaining the measures of productivity growth that are in most common use—labor productivity (LP) growth, or the increase in output per hour worked, and multifactor productivity (MFP) growth, or the increase in output relative to all the inputs that can be counted (labor, capital, materials)—he describes how U.S. productivity has taken off after 1995.

The statistical evidence offered by Triplett clearly supports his hypothesis that the services sector drove much of the post-1995 revival of U.S. productivity growth. His calculations show that LP growth in the services sector doubled after 1995, and MFP growth nearly tripled. This is significant news, which Triplett calls "one of the most remarkable … economic transformations of any era"—a bold statement indeed. Here it should be emphasized that many economists have pointed to investments in information technology (IT) as the factor boosting key U.S. productivity growth. Triplett's analysis acknowledges the importance of investment in IT for all sectors, and particularly for services, but his analysis shows that IT is only one factor behind the true productivity driver—the services sector.

Yet, while identifying the services sector as the statistical source of faster productivity growth is a good start, explaining in depth what is behind the takeoff in services productivity is quite another matter. As the article notes, MFP is a residual in economic thinking—it is what is left after the measurable factors, such as labor and capital, have been

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accounted for. So how can this mysterious residual, the "hidden sources of growth" buried within MFP in services in particular, be explained? Here the analysis is still far from complete. Triplett offers a number of possible hypotheses—the indirect benefits of investment in IT, coinvestments such as organizational and workplace changes, improved management practices, the impact of deregulation—but the question remains unresolved.

Triplett's work brings policymakers and businesses one step closer to a deeper understanding of U.S. productivity, but we do not yet have a firm grasp of either the specifics behind strong services sector productivity growth or the concrete actions that can boost services productivity performance. As we say in the think-tank business, more research is required.

Bridging to the Canada–U.S. Economic Relationship

Triplett does not delve into the Canada–U.S. trade and investment relationship or explore the issue of cross-border competitiveness. He limits himself to observing that a takeoff in services sector productivity has not occurred to the same degree in Canada or Europe, where differences in services productivity growth account for most of the difference between U.S. performance and that of other advanced economies. This finding is consistent with past work by the Conference Board of Canada that examined the Canada–U.S. productivity difference on a sector-by-sector basis, with significant productivity gaps found in key services sectors.

Although Triplett's analysis is tightly focused on U.S. services sector productivity performance, it is also consistent with the analysis and recommendations in my companion article, in which I emphasize that the original Free Trade Agreement (FTA) is mature and providing no further dynamic benefits to Canada and the United States through enhanced bilateral trade and investment. The FTA focused largely on tariffs in manufacturing, leaving aside services sectors (such as education and culture) that were deemed too politically sensitive to touch at that time. More important, significant differences in regulatory standards and processes were not addressed, and they remain in place between Canada and the United States, affecting key services sectors such as transportation, telecommunications, finance, and professional services.

Differences in regulatory standards and processes form important nontariff barriers that constrain services firms (as well as manufacturers) in both the United States and Canada from reaching their full competitive potential internationally. Both parties would benefit from a second round of bilateral free-trade negotiations, aimed specifically at a reduction in nontariff barriers as one key element. Expanded free trade in services would increase competition in home markets, while firms would gain access to a greater number of customers and have opportunities to build international value chains. As the smaller partner, with much less impressive productivity performance in services, Canada would likely benefit significantly from reduced barriers to trade in services; but the United States should also expect to benefit from reductions in nontariff barriers, since U.S. firms would be able to move to a more optimal business model in terms of scale and positioning of their value chains.

In sum, the two articles provide further complementary evidence of the potential benefits of building a deeper economic relationship between Canada and the United States.

Jack E. Triplett's Response

Glen Hodgson raises some very general considerations that many economists believe have an effect on national economic performance. He lists the level of taxes, especially on investment, and the amount of government regulation, and he stresses particularly the barriers to trade. Few economists would argue with this list.

Hodgson also says that "the factors behind this [U.S.–Canada] productivity gap are complex and vary considerably among and between sectors." Again, I agree. Looking at the sectors is important because national productivity performance is the aggregate of all the changes that occur at the industry and sector level. The question, therefore, is: To what extent can we be sure that the list of general considerations accounts for the gap in recent productivity performance? On this, Hodgson does not have much to say. I don't either, so I think we agree that too little is known about the direct linkages between the general considerations he mentions and productivity change in specific sectors.

The general considerations may be thought of as enabling conditions. Enabling conditions permit productive performance, but they do not necessarily cause it. As an example, consider another enabling condition, mentioned by Hodgson in passing: stable macroeconomic performance. Both our two countries have good macroeconomic records in recent years, and Canada's is probably better than that of the United States. Canadian inflation is roughly 2 percent per year, for example, whereas in the United States it is about 3 percent (and, because a number of improvements to the U.S. Consumer Price Index in recent years have had the net effect of lowering its rate of increase, 3 percent today might have been measured as 4 percent or more a decade ago). But achieving stable, low-inflationary macro performance, desirable as it is for many reasons, evidently does not by itself assure that a country will achieve high productivity performance.

So, without disagreeing that the list of enabling conditions (deregulation and so forth) represents desirable conditions for economic growth, and that they might be endorsed on a number of grounds, I would like to see more evidence that links them to Canadian productivity performance. The links are particularly important in those 19 (of 29) sectors where Hodgson notes that Canadian performance has fallen behind that of the United States.

I emphasized the services sector as a source of recent good U.S. productivity performance. The sector as a whole is one that recent analysis in Canada has also identified as a source of the U.S.–Canada productivity gap. I also emphasized that, because what changed in the U.S. services sector is its much more rapid MFP growth in recent years, we cannot be sure we understand the forces that led to the revival of the U.S. services sector. More strongly, we cannot be sure what led to the U.S.–Canada productivity gap in the services sector.

On this score, Hodgson does not say very much about services or about trade in services. Both the United States and Canada are services economies, in the sense that both

If an open economy promotes economic efficiency, then perhaps lack of openness in the services sector has something to do with Canada's lagging services sector productivity.

employment and the percentage of GDP in services are high. Has NAFTA really reached its limits, as Hodgson suggests? Perhaps it has in goods, but in services? My impression, based on anecdotes spun among professional economists who do consulting in the two countries (I am in that group), is that we do not have economic integration in North American in the selling of services. Unlike the sale of goods, selling services in another country requires crossing the border, not to do the work but to obtain the contract or to deliver the product. Canadian immigration officials seem to see this initiative as Americans crossing the border to work in Canada without a work permit, or perhaps as potential tax evasion, and they ferret it out even to the extent of questioning attendance at professional conferences that have nothing to do with consulting. I am told that U.S. Immigration behaves in the same way toward Canadian professionals.

If an open economy promotes economic efficiency (as Hodgson suggests, and I agree), then perhaps lack of openness in the services sector has something to do with Canada's lagging services sector productivity. Since I have not seen a study on this question, I can recommend (with little chance of making an error) a study of openness in the services trade as a topic for future Canadian productivity research.

Glen **Hodgson**

Glen Hodgson is senior vice-president of the Conference Board of Canada, where he has served since 2004 as chief economist specializing in international and financial issues. Prior to joining the Conference Board, he spent 10 years at Export Development Canada, where he held several senior positions, including vice-president of policy and deputy chief economist, as well as 10 years with the federal Department of Finance. From 1984 to 1988, Hodgson served at the International Monetary Fund as advisor/assistant to the executive director for Canada, Ireland, and the Caribbean.

In his current position, Hodgson is the Conference Board's chief spokesperson on economic issues and plays a central role in public policy analysis. He is also responsible for over-

seeing the tourism, conferences, custom research, and macroeconomic outlook products programs. He is fluent in both English and French and has written extensively on Canadian international economic and financial issues.

Hodgson is co-author of *Mission Possible: Stellar Canadian Performance in the Global Economy* (2007), one of four volumes forming the final report of *The Canada Project*, a three-year program of research and facilitated dialogue intended to improve Canada's standard of living and its place in both North America and the world. In 2006, he took the lead in launching the Conference Board's new International Trade and Investment Centre, designed to help Canadian leaders better understand the dynamics of the global economy and their implications for Canadian businesses and government policymakers.

Hodgson has a B.A. (Honors) from the University of Manitoba (1978), with an M.A. in economics from McGill University (1981), and completed additional doctoral studies in economics at McGill.

Jack E. **Triplett**

Jack Triplett has been a visiting fellow in economic studies at the Brookings Institution in Washington, D.C., since 1997. Prior to that, he was chief economist of the U.S. Bureau of Economic Analysis. From 1971 to 1985, Triplett held positions at the U.S. Bureau of Labor Statistics, including associate commissioner for research and evaluation and chief of the Price Research Division. In 1979, he served as assistant director for price monitoring at the Council on Wage and Price Stability. Prior to his government positions, Triplett taught economics at Washington University in St. Louis and at the University of Oregon, where he was also assistant director of the Institute of Labor and Industrial Relations.

Triplett has written extensively on problems of economic measurement, including price indexes, national accounts, capital stock and labor input, and productivity and technical change. He has edited or co-edited several books, among them *The Measurement of Labor Cost* (1983), *Fifty Years of Economic Measurement* (1992), *and Measuring the Prices of Medical Treatments* (1999). In addition, as co-author with Barry P. Bosworth of *Productivity in the U.S. Services Sector: New Sources of Economic Growth* (2004), he won the 2005 Harry Freeman Award for exceptional contribution to knowledge of the U.S. service economy.

Triplett is also the author or co-author of a number of book chapters and articles in professional and academic publications. These include: *Integrating Cost-of-Disease Studies into Purchasing Power Parities* (2002), *What's New About the New Economy? IT, Economic Growth and Productivity* (2001), *What's Different About Health? Human Repair and Car Repair in National Accounts and in National Health Accounts* (2001), *Productivity in the Services Sector* (2001), *The Solow Productivity Paradox: What Do Computers Do to Productivity?* (1999), *Economic Statistics, the New Economy, and the Productivity Slowdown* (1999), and *Measuring Consumption: The Post-1973 Slowdown and the Research Issues* (1997).

Triplett serves as a consultant to the statistical agencies of a number of countries and to numerous international organizations on issues of economic measurement and economic studies. He is an elected fellow of the American Statistical Association and is the 1997 winner of the Julius Shiskin Award for Economic Statistics.

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