

Lessons for Canada from International Productivity Experience

Andrew Sharpe¹
Centre for the Study of Living Standards

ABSTRACT

The objective of this paper is to develop a more comprehensive understanding, from a policy perspective, of key drivers of labour productivity in selected OECD countries and their impact on enhanced productivity performance. The paper first presents some general lessons from the productivity performance of OECD countries and international evidence of productivity drivers based on the OECD growth project and productivity studies by the McKinsey Global Institute. It then briefly discusses the productivity experience of six OECD countries considered of particular interest to Canada — the United States, Australia, Ireland, the United Kingdom, Finland, and Sweden — and comments on possible lessons for Canada from these experiences.

THE OBJECTIVE OF THIS ARTICLE is to develop a more comprehensive understanding, from a policy perspective, of key drivers of labour productivity in selected OECD countries and their impact on enhanced productivity performance. It is hoped that the project will inform and strengthen future policy development in the productivity area.

The report is divided into three major parts. The first part compares Canada's productivity performance to that of other OECD countries. The second section presents some general lessons from the productivity performance of OECD countries and international evidence of productivity drivers based on the OECD growth project and productivity studies by the McKinsey Global Institute. The third part discusses the productivity experience of six OECD countries

considered of particular interest to Canada — the United States, Australia, Ireland, the United Kingdom, Finland, and Sweden — and comments on possible lessons for Canada from these experiences.

Canada's Productivity Performance²

The Canadian economy has performed well on almost all indicators in recent years. Output and employment growth have been strong, inflation and unemployment are low, government deficits have long been eliminated, public debt is falling in both absolute terms and relative to GDP, and the Canadian dollar has appreciated. The one area where Canada has performed poorly is productivity growth. For the future advance in the living standards of Canadians,

1 The author is Executive Director at the Centre for the Study of Living Standards (CSLS). This is an abridged and updated version of a research report with the same title published by the CSLS in October 2006 (Sharpe, 2006). The report was prepared for the Labour Market Policy Directorate of Human Resources and Social Development Canada (HRSRC). The author would like to thank HRSDC officials, particularly Christina Caron, for comments.

2 The unabridged version of this report provides a detailed discussion of Canada's productivity performance as well as productivity growth rates and levels in OECD countries.

productivity growth is paramount, so this situation represents an important policy issue.

Canada's productivity growth record has been dismal, both from an historical and an international perspective. Since 2000, Canada's labour productivity performance has deteriorated relative to both our performance during the second half of the 1990s and relative to the performance of labour productivity in the United States in the 2000s. Business sector output per hour advanced at a 1.1 per cent average annual rate in Canada between 2000 and 2006, only about one third the annual rate of advance of 2.9 per cent recorded in Canada between 1996 and 2000 and only one third the annual rate of increase of 3.0 per cent recorded in the United States since 2000³ (Chart 1). Canada's lagging labour productivity growth has resulted in the widening of the business sector labour productivity gap from 17 percentage points in 2000 (83 per cent of the US level) to 26 points in 2006 (74 per cent the US level).⁴

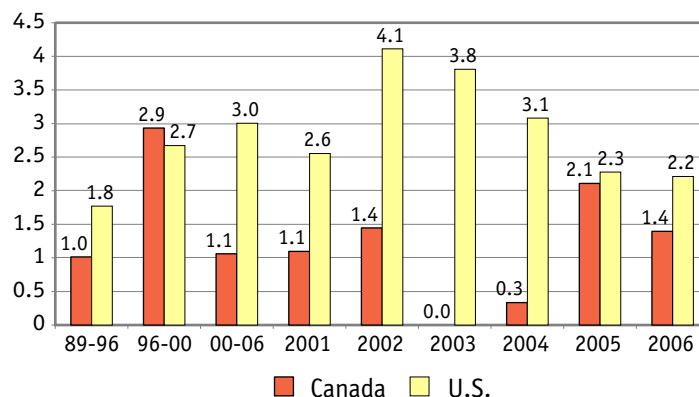
Canada's manufacturing productivity performance since 2000 has been even worse than the business sector performance. Output per hour advanced at only a 0.6 per cent average annual rate between 2000 and 2006, compared to 5.5 per cent per year in the United States (Chart 2). In other words, US manufacturing labour productivity growth has been nearly ten times as fast as that of Canada!

The causes of the fall-off in labour productivity growth in Canada after 2000 are still poorly understood. Possible explanations include measurement problems; weak productivity growth in resources industries exploiting poorer quality resources such as the oil sands; weak ICT investment; a failure to exploit advanced technologies; and weak wage growth leading to a slower rate of substitution of capital for labour (Rao, Sharpe and Smith, 2005).

Chart 1

Business Sector Output per Hour Growth in Canada and the United States

(average annual rates and annual rates of change, per cent)

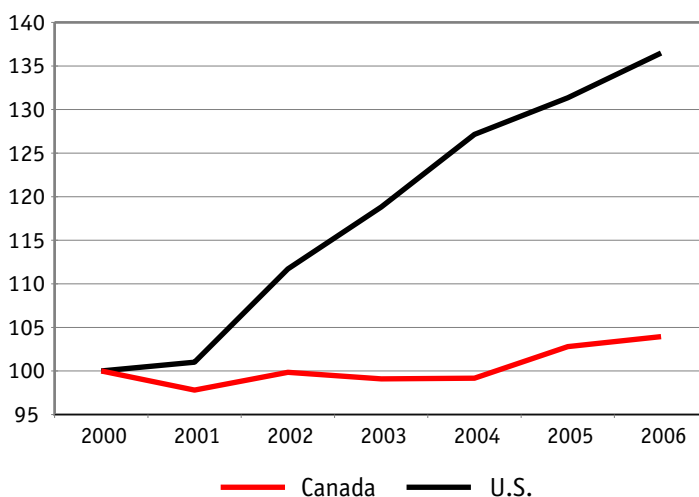


Sources: GDP in chained dollars and total hours worked from the Productivity and Costs Program of the Bureau of Labor Statistics for the United States, and the Productivity Program Database of Statistics Canada for Canada.

Chart 2

Output per Hour in Manufacturing, Canada and United States, 2000-2006

(2000=100)



Source: Statistics Canada and BLS.

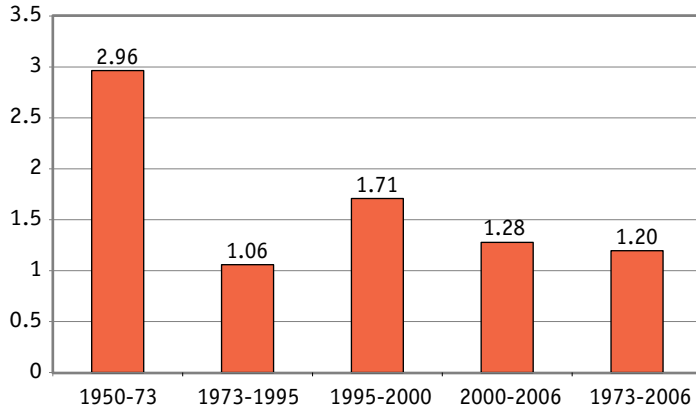
From an international perspective, Canada's relative productivity performance has been very weak. Over the 1973-2006 period, output per

³ Total economy productivity growth exhibited an almost identical pattern.

⁴ This figure is based on Industry Canada benchmark labour productivity level estimates for 2002 (Rao, Tang and Wang, 2004) and productivity growth rates after 2002.

Chart 3

Total Economy Output per Hour in Canada, 1950-2006
(average annual rates of change, per cent)



Source: Groningen Growth and Development Centre and the Conference Board, Total Economy Database, February 2007, <http://www.ggdc.net>.

hour in Canada advanced at only a 1.2 per cent average annual rate (Chart 3), down from 3.0 per cent in the 1950-73 period, a drop of nearly two thirds. Since 1973 Canada has had the third lowest rate of growth in output per hour among 23 OECD countries, with only New Zealand and Switzerland doing worse (Appendix Table 1). This resulted in Canada's level of output per hour falling from third highest in the OECD in 1950 and in 1973 to 16th in 2006 .

Reviving productivity growth represents the biggest economic challenge facing this country. Lessons from international productivity experience may be useful for the development of effective policies to meet this challenge.

General Lessons from OECD Productivity Experience

OECD Growth Project

The OECD growth project (OECD 2003, 2004b) analyzed the sources of economic growth based upon aggregate data and using cross-country regression analysis, with a particular emphasis on the ways in which policies affect outcomes. It is argued that the causal variables

looked at are able to explain much of the observed growth differences over time and across countries. It was found that investment in physical and in human capital was important to growth; that sound macro policies yield higher growth; and that the overall size of government in the economy may hinder growth if it becomes too large, although the pattern was mixed. Some government spending was found conducive to growth, while high levels of direct taxation (taxes on wages and profits) discouraged growth. R&D activities by the business sector had high social returns, and hence contributed to growth, but there was no evidence in this analysis of positive effects from government R&D. The study found some evidence that financial markets are important to growth, through helping to channel resources towards the most rewarding activities and through encouraging investment.

A very interesting and surprising result is that "exposure to international trade" is an important determinant of output per working age person. The analysis concludes that an increase of 10 percentage points in trade exposure (an adjusted average of exports and imports as percentages of GDP) raises output per person by 4 percentage points. This result, if taken at face value, gives strong support to the view that increased globalization improves economic performance. It suggests that all OECD countries should move aggressively to remove remaining barriers to trade, and do so for their own advantage.

Human resources and skills development issues related to productivity also receive particular emphasis. For example, the OECD has found that policies of certain countries to reintegrate low-skilled workers, while resulting in a widening of the employment base and increased potential growth, temporarily depressed productivity growth through a negative composition effect on labour quality.

In summary, the OECD identified at the macro level education, innovation, deregulation

and investment as the basic determinants of productivity growth. It also identified inflation, fiscal policy, international trade, and the financial system as policy and institutional determinants of growth. At the industry and firm level, the OECD has identified market conditions, competition, and innovation and R&D as key productivity drivers.

McKinsey Global Institute Productivity Studies

The McKinsey Global Institute (MGI) is a think tank based in Washington, D.C. founded in 1990 by McKinsey & Company with the objective of analyzing international productivity levels from both economic and management perspectives. Over the last fifteen years, MGI has studied most of the world's major economies. In each case, MGI uses microeconomic analysis on a sector-by-sector level to study the effects that industry decisions ultimately have on national productivity. This section synthesizes some of these findings to see what potential lessons can be drawn regarding productivity level differences between Canada and other countries.

Time and again, the McKinsey Global Institute's studies have returned to the same story in trying to explain productivity gaps between countries: a lack of competitive intensity. To the extent that certain European and Japanese sectors seem to consistently trail the United States in productivity, these sectors are nearly always characterized by a small number of domestic firms who engage in little price or service competition because of regulatory protection in the form of product market restrictions and trade barriers. MGI finds that such restrictions lead to managerial complacency, a consequent lack of innovation in production processes, and ultimately to a productivity performance below that of the technological leader. Potential factors related to competition that have been identified

by MGI as directly affecting productivity are the following.

- **Concentration:** A high market share held by a small number of firms is not necessarily inconsistent with intense competition. Concentration can improve productivity through achieving economies of scale, and it can also boost productivity if it allows a small number of large firms to compete intensely with each other. Examples of highly concentrated yet highly competitive industries include the Dutch banking industry and the Swedish automobile industry.
- **Trade Protection:** Tariffs and quotas reduce productivity through shielding industries from international competition, making the adoption of global best practices unnecessary. The automobile industry in Germany, France and the United Kingdom, the food processing industry in Japan, and many Swedish service industries are all examples highlighted by MGI of industries whose productivity performance has been hindered by trade protection.
- **Deregulation:** MGI highlights the airline, telecommunications and banking industries as cases in which deregulation has boosted productivity, and in which countries that have chosen to delay or forgo deregulation have consequently suffered lower productivity levels than the early deregulators. Other competition-related factors can affect productivity in a more indirect fashion.
- **Minimum Wages:** Higher wages typically have the effect of reducing the number of low-skill jobs, as the benefit of these low-skill services is outweighed by the higher cost of providing them. While this has the effect of raising conventionally-measured average labour productivity, MGI argues that overall “service productivity” is negatively affected because the range of services that is offered shrinks.

- **Work Rules:** MGI recognizes that some labour market inflexibilities can be beneficial. However, collective agreement terms that are not adjustable to market realities can negatively affect productivity by preventing productivity-enhancing reorganizations of work.
- **Zoning Laws:** Some European countries have zoning regulations that have a negative impact on productivity by making it difficult for firms to purchase parcels of land of a required size, and by creating an artificial scarcity of land and thereby making land overly expensive. This affects productivity because high rents hinder the ability of smaller firms to innovate, and because larger firms have difficulties achieving optimal scale.

Perhaps even more important than the market conditions under which a firm operates is the way managers choose to react to those conditions. Competitiveness is the main driver of managerial innovation, but that managerial innovation (or lack thereof) is what affects productivity, first at the firm level, then the industry level, and ultimately at the national level. MGI makes the following observations related to managerial innovation.

- **Best Practice:** Managers need to be aware of best practices in a given industry, and be prepared to implement them. MGI states that sufficient exposure to competition will ensure that this is the case.
- **Human Capital:** MGI finds little evidence that labour skills at the production level differ greatly across countries. However, the qualifications of managers can have a significant impact on productivity, through entrepreneurship and the training of production workers.
- **Marketing:** MGI finds that the U.S. telecommunications sector's productivity performance has been positively affected

through marketing, since the resulting greater demand for telecommunication services means that there is greater output for a given investment in fixed capital.

- **Information Technology:** Although few would dispute that investment in information technology can have a significant impact on productivity growth, MGI concludes that realizing its full benefit requires an appropriate application. In addition to the effect of IT use on productivity growth, the presence and strong productivity performance of industries producing IT goods also positively affect overall manufacturing productivity growth.
- **Capital Intensity:** MGI finds that improvements in capital intensity are a necessary but not sufficient condition for improvements in productivity. This is because increasing the amount of capital per worker does not necessarily mean that the capital is being used efficiently. Improvements in capital productivity are often dependent on other managerial and competitive factors.

The McKinsey Global Institute has not produced a report on Canadian productivity. However, the findings from the McKinsey productivity studies on industry productivity differentials between the United States and a number of major developed and developing countries may have relevance for the explanation of industry productivity differentials between the United States and Canada. In some respects, the Canadian economy is a bit of a hybrid between the U.S. free-market system and the more sheltered, socially-conscious systems of countries like France or Sweden. Canada is more globally-exposed than most EU countries, yet it also retains a certain level of trade protection and restricts entry to some domestic sectors. It also has a more developed welfare state than the United States in terms of more government control of social programs such as health care and pensions.

Lessons from Country-Specific Productivity Experience

United States

The United States has seen remarkable labour productivity growth since 1995.⁵ Given the similarities between Canada and the United States, the productivity experience of the United States, and in particular the reasons for that country's superior productivity growth, are very relevant to Canada.

A key development in the United States has been the massive introduction of information and communication technologies (ICT) into the workplace, which have revolutionized production processes and supply-chain management. Many believe that this development has ushered in a "new economy" characterized by large technology-driven productivity gains. A large literature has developed around this question of a new economy. The generally accepted conclusion seems to be that information and communications technologies (ICT) were indeed responsible for much of the post-1995 labour productivity growth acceleration in the United States through economy-wide ICT capital deepening, MFP growth among ICT users, and MFP growth of ICT-producing industries.⁶

However, this is not an entirely satisfying explanation of the U.S. labour productivity growth acceleration, because it leaves the sources of the ICT revolution unaddressed. Veugelers (2005) identifies the US university

system as probably the most important factor that facilitated the take-off of ICT production and use. The combination of competition between private and public universities with the system of peer-reviewed research grants ensures that the best students are attracted to the United States, and consequently that the United States is always a world leader in research. More importantly, the world-class research produced by U.S. universities gives a strong incentive for linkages to form between the higher education sector and private businesses in terms of commercializing this knowledge.

Other aspects mentioned by Veugelers as driving the ICT revolution include strong intellectual property rights; flexible labour markets in terms of both international and internal migration of highly skilled workers; a large and unified market that is mostly free of barriers related to language, customs and standards; and well-developed and flexible financial markets.⁷ This latter factor is especially important in terms of providing entrepreneurs and innovating firms with access to venture capital and other sources of finance. Above all, intense product market competition, embodying traditionally strict laws against anti-competitive practices, ensures that the most innovative firms are able to grow quickly and thereby challenge less innovative firms to improve their performance or exit the market. Such competitive intensity would appear to be crucial in motivating the diffusion of ICT, as industries protected from com-

5 Furthermore, it is now widely accepted that, in addition to the original acceleration in labour productivity growth in 1995-2000 relative to 1973-1995, the United States has experienced an additional post-2000 labour productivity growth acceleration. Labour productivity growth decelerated in 2005 and 2006, but is still advancing at around a respectable 2 per cent per year.

6 There is a large literature on this issue. See Bosworth and Triplett (2007) in this issue for a recent contribution. Also see Gordon (2000), Jorgenson, Ho, and Stiroh (2002), Oliner and Sichel (2000 and 2002), Rao and Tang (2001), and Stiroh (2001).

7 To all of these factors behind the U.S. ICT revolution might be added the large U.S. government expenditures over the past several decades associated with national defence and space research. While much of this expenditure was motivated by the Cold War or simply the protection of such a large homeland, it fostered much cutting edge research. For example, the method used to send data over the internet was pioneered in response to government funding to establish an emergency communication system. Research originally directed towards space or defence applications in many cases proved useful and groundbreaking in other contexts or provided essential knowledge for progress in other fields of research.

petition would find the reductions in costs and enhancements to efficiency afforded by ICT less necessary.

Since 2000, ICT investment has fallen off in the United States, but labour productivity growth has accelerated. One possible explanation for this development is that the effectiveness with which ICT is used has continued to increase, so that the overall productivity-enhancing effect of ICT is only realized with a lag. Organizational practices and production processes have been modified in response to ICT. Productivity growth may also have been facilitated by increased workplace training that gave workers the skills needed to maximize the potential of ICT.

In short, the United States economy possesses just about all of the virtues that are typically associated with improving productivity growth. In this sense, there is much to learn from the U.S. experience, although questions remain. First, how did these numerous factors come precisely together to create the phenomenal productivity success since the mid-1990s? Second, could these factors produce such productivity success if transplanted to other countries?

While much research still remains to be done on these questions, it is possible that the intense competition and strong market forces present in the United States have been responsible for, or have at least played a major facilitating role, in the development of the many factors that have proven crucial for the U.S. productivity growth resurgence. Such competition attracts the brightest talent to the country, gives a strong incentive to commercialize the knowledge produced by that talent, and ensures a large market for such successful innovations as firms adopt them as part of their comprehensive and ongoing efficiency improvement efforts. However, while competition may have been the integral ingredient bringing all of these positive factors together in the United States, it is unclear

whether such an ingredient exists that would ensure success in Canada and other countries.

Ireland

Output per hour growth in Ireland has averaged 4.1 per cent per year since 1973 (Appendix Table 1). This was the second fastest (after Korea) productivity growth rate experienced among OECD countries over the period. The level of output per hour in Ireland in 2006 exceeded that of most other industrial countries, and is beginning to challenge U.S. productivity levels.⁸

Rapid Irish productivity growth was not driven by only one single factor. According to Cassidy (2004), the main drivers behind the fast productivity growth were: (1) the substantial foreign direct investment inflows from the United States; (2) the continuing shift of economic activity and employment from the primary sector to the secondary and tertiary sectors, especially the high-technology sectors including the chemical and the ICT sectors; (3) the availability of a young, relatively well-educated workforce; and (4) the increased European integration and increased subsidies from the European Union.

Economists believe that economic policy can have a central role in determining the productivity potential of an economy. This is especially true when we review Irish policy development as Irish public policy has been very active in promoting economic growth since the 1950s. Its main strategy has three components:

- promote free trade and monetary integration;
- develop a regulatory environment favourable to business and entrepreneurship; and
- provide free secondary and post-secondary education.⁹

In sum, Irish commercial, industrial, tax and education policies have been very supportive of

⁸ See Fortin (2001) have a discussion of the Irish economy in the 1990s and lessons for Canada.

the rapid pace of long-term productivity growth. This strong and consistent support is not recent, but began to develop in the 1950s and matured in the 1970s. The goals of these policies included but were not limited to the promotion of greater openness to foreign trade and investment, the development of a business-friendly environment, and the provision of a highly skilled labour force. The right policies eventually paid off.

Australia

Australia and Canada are very similar. They both are relatively small economies and have similar economic structures. During the 1990s, Australia was an outstanding economic performer among leading economic nations in the world. Its real growth per capita averaged above 4 per cent per year, outperforming Canada, and this was driven by significant advances in productivity (Appendix Table 1).

Australia's ability to grow so strongly, even in the midst of economic challenges such as the Asian financial crisis, has led some to label Australia as the "miracle" economy. However, according to Parham (2002), this was no miracle. The productivity surge was certainly remarkable, but it was also "predictable."

There are several drivers of this success behind Australia's outstanding economic performance. Gans and Stern (2003) point out that relative macroeconomic stability and a substantial modernization of the tax system contributed to this substantial level of achievement. However, the policy reform in Australia that has "fostered a transition to more competitive, open, flexible, innovative and resilient economy" has been particularly important to promote productivity growth (Parham, 2004). Parham points out that the approach of the reforms was not to attempt to raise productivity growth via a targeted or industry-specific strategy. Rather, the approach

was largely to release the shackles that had previously restricted productivity growth and to pursue social objectives through more targeted and less distortionary instruments.

The policy reforms mainly included but were not limited to: deregulation of access to finance; floating the currency; marked reductions in barriers to trade and foreign direct investment; commercialization (and some privatization) of government business enterprises; strengthening competition policy; enhancement of public utilities in key infrastructure areas such as telecommunications and energy; and enabling greater labour market flexibility.

Australia began to introduce these reforms in the mid-1980s and continued to apply them throughout the 1990s. But according to the McKinsey Global Institute's evaluation in 1995 (MGI, 1995b), Australia's economic reforms did little to improve its relative performance at that time. However, the post-1995 period saw Australia begin to enjoy a faster rate of growth in productivity.

Among those drivers that promote Australia's efficiency gains, three policy-related factors have been given particular attention.

- Sharper competition — through lower trade and foreign investment barriers and domestic deregulation and pro-competition regulation — "has provided greater incentives for business to improve productivity by seeking out more value-adding products and new markets and by reducing costs" (Parham, 2002). The reform of public sector services has improved efficiency and has especially benefited businesses.
- The promotion of innovation — through encouraging rigorous domestic competition and establishing strong protection of intellectual property — has transformed Australia from an adopter to a producer of global

9 The unabridged version of the paper reviews in detail Ireland's policy strategy in such key areas as commercial policy, tax policy, industrial policy, innovation policy, and education policy.

technology. The development of a national innovation system, which includes a common innovation infrastructure, the cluster-specific environment and the quality of linkages (Gans and Stern, 2003), has strengthened Australia's innovative capacity and stimulated the development even of traditional industries such as wine and agriculture.

- Businesses are able to adjust production and distribution processes more flexibly, due to a newly-established ability to negotiate work arrangements at the enterprise level, rather than relying on arrangements imposed through centralized "one-size-fits-all" bargaining. The greater flexibility in the labour market has provided the workforce with a greater incentive to invest in education and training, which in turn has influenced productivity growth positively. The greater openness accompanied with greater flexibility has encouraged greater specialization and has provided easier access to up-to-date technology and know-how.¹⁰

In summary, Australia experienced a resurgence of productivity growth in the 1990s. The fact that most other OECD countries did not share this experience suggests that domestic factors must have played an important role in this resurgence. According to the studies reviewed above, policy reforms that were introduced in the mid 1980s have been major drivers and enablers of Australia's impressive productivity performance. Policy reforms have enhanced competitive pressures; opened the economy to trade, investment and technology; raised investment in R&D; and encouraged firms to become more flexible in terms of adjusting all aspects of production, distribution and marketing. On top of these foundations, the widespread use of ICT, the increased labour market flexibility and the

strengthened national innovative capacity have been specific factors driving the remarkable productivity growth.

United Kingdom

The United Kingdom in 2006 had a labour productivity level above that of Canada, reflecting the fact that its labour productivity growth over the 1973-2006 period was double that of Canada (Appendix Table 1). The UK has undergone a number of market-oriented reforms that may have relevance for Canada.

Before 1979, labour productivity growth in the UK was one per cent per year slower than that for Germany or France. The timing of the disappearance of this growth rate differential after 1979 coincides with the economic reforms enacted by the Conservative government under Margaret Thatcher's leadership. These reforms sought to reduce government intervention in labour and product markets and increase the efficiency with which they operated, two measures that fostered productivity gains observed over the next two decades (Card and Freeman, 2002). Evidence of the market-oriented nature of these reforms comes from the change in UK's ranking with respect to measures of competitiveness and "market friendliness". In the late 1970s, several of these indices ranked the UK in the middle of a group of Western economies. By the late 1990s, the UK stood at or near to the top of several of these indices and in some cases ranked ahead of the US. Thus, economic reforms in the UK over the past 20 years appear to have yielded benefits in the form of higher productivity growth and halted the relative decline in living standards, at least with respect to France and Germany.

What UK policy reforms helped to halt the relative decline in labour productivity and raise its growth rate? Card and Freeman (2002:48) identify three reforms in particular that have

10 The unabridged version of this paper provides a discussion of Australia's experience with ICT, its labour market, and the innovation system.

promoted growth in labour productivity over the past two decades.

- Reductions in trade union power. This has increased labour market flexibility, promoted competition among workers and made it easier to implement and reform labour market regulation. These policies also successfully increased the freedom of business to manage its workplace. Each of these measures has growth promoting effects.
- Privatization of state-owned industries. Privatization has raised labour productivity of the UK economy as a whole as industries and firms were made more responsive to market conditions and shed excess labour.
- Creation of incentives for self-employment and share ownership of firms. The creation of share ownership plans aligned the incentives of the firm with that of the workers. Workers now had a direct stake in the success of their firms which has a direct consequence of their productivity.¹¹

Despite the pick-up of productivity growth, the UK productivity level still remains well behind that of many other OECD countries. The definitive reason for why the UK has lagged behind its international competitors remains elusive. In reality, the explanation is likely to consist of a set of factors. Three factors in particular have been identified by those who have studied the gap.

- Under-investment in education. The failure to provide sufficient numbers of well-educated and highly skilled workers to industries has limited the development of the UK economy's capacity to innovate. In turn, this has reduced the potential for productivity growth.
- Low rate of ICT diffusion. Low rates of ICT usage has led to reduced opportunities for firms and organizations to compete with

their international counterparts through cutting prices or providing fast and efficient service. This has exacerbated the UK's "skill shortage".

- Excessive government regulation. Despite earlier efforts at reform, regulations still prevent labour and goods markets from being truly competitive. There still exist barriers to entry or expansion by best-practice operators. These barriers also hinder the adoption of best-practice techniques and reduce the competitive pressure on industry participants to raise their productivity.¹²

Finland

Finland, a small country of five million people located far from the centre of Europe, has enjoyed great economic success in recent years. According to the OECD (2004a), the transformation of the Finnish economy over the last decade has been one of the few examples of the "new economy" taking hold in Europe. Labour productivity growth since 1973 at 2.8 per cent per year was among the highest in the OECD (Appendix Table 1).

Finland is not only one of the EU leading producers of ICT (together with Ireland and Sweden), but also a prominent example of leap-frogging with respect to the rest of the OECD. Among OECD countries, it has made the most progress in the world ranking of IT producers since the early 1990s.

Finland since 1990 has gone from being a net importer to a net exporter of high-tech goods. Indeed, Finland has the largest per capita surplus in foreign trade in communications equipment in the world. The Finnish ICT sector accounted for 15 per cent of the value of market production (10 per cent of GDP) in 2001, up from 8.0 per cent in 1995, 5.8 per cent in 1990, and 3.7 per cent in 1975.

11 The unabridged version of the paper discusses how these three reforms contributed to productivity growth.

12 The unabridged version of the paper discusses how these three factors account for the productivity gap.

Nokia is the leading Finnish company accounting for about one half of the overall IT contribution to aggregate value added, and 3.3 per cent of GDP. The firm accounts for one fourth of Finnish exports, one third of business R&D, and 5 per cent of manufacturing employment. Perhaps surprisingly, Nokia was until 1990 a conglomerate with many business lines. The deep recession of the early 1990s propelled the firm's leadership to re-orient toward electronics and drop other activities, with cell phones becoming the dominant product line. Nokia's success has attracted much international venture capital to Finland in search of the "next Nokia."

The reasons why Finland has been so successful in exploiting new globally available technologies are still poorly understood. Lane (2004) has suggested the following factors:

- a university education system heavily oriented toward science and technology;
- high levels of R&D undertaken by both the business and non-business sectors;
- a focus on all aspects of IT products, with world leadership in both goods (Nokia cell-phones) and services (Linux software);
- the early liberalization of the telecom sector;
- an historical lack of monopolization of the Finnish telephone network by the State, ensuring that competitive pressures to invest in R&D existed even before deregulation; and
- the liberalization of the financial sector, leading to better access to capital for IT start-ups.

Finland experienced a severe recession in the early 1990s, with output falling steeply between 1990 and 1992 and with unemployment rising to nearly 20 per cent. The causes of this recession included the abrupt loss of the Russian market linked to the collapse of the USSR, recession in other EU countries, the overheating of the Finnish economy in the late 1980s, a credit and banking crisis, and inappropriate policy response to deal with the financial crisis.

The crisis appears to have had a transformative effect on Finland, with a dynamic market economy emerging out of a highly regulated one. According to Daveri and Silva (2004:129), two changes arising from the recession were critical from the point of view of productivity: markets took over from the State in allocating resources and the stock market took over from the banks in the allocation of credit. Capital was now used more efficiently, and many firms actually shed capital, resulting in a drop in the capital-labour ratio and considerably higher total factor productivity in certain sectors (Maliranta, 2001).

Nokia, the world leader in cellular phone production, directly and substantially contributed to enhanced productivity growth in the Finnish ICT sector. However, productivity gains outside Nokia and a few other IT-related service industries have been small, temporary or short-lived, or non-existent. Daveri and Silva (2004) find that not only has the scope of productivity gains been narrow in Finland, but what has been observed cannot be clearly ascribed to the technological champion in that country. The authors consequently conclude (page 123) that "...even in a country endowed with a world-class national champion, the 'new economy' takes a long time to show up. And in contradiction to commonly held tenets in public debates, IT diffusion has shown a limited potential in speeding up this process in Finland."

The Finnish labour market has many of the characteristics of the Nordic model which some economists believe hinders productivity growth. Taxes on labour are high, wage differentials between low and high skilled workers are low, social benefits are generous, input from the labour market or social partners (i.e. business and labour) is highly valued, and collective bargaining is centralized. These features do not appear to have seriously impeded (and may have even facilitated) Finland becoming an IT leader.

At least three major lessons can be gleaned from the Finnish productivity experience. First, a vibrant high-productivity growth ICT-producing sector does not necessarily diffuse robust productivity gains to non-ICT producing sectors, especially in a small open economy. Second, an above average performance on innovation indicators such as R&D does not necessarily translate into above average living standards. GDP per capita in Finland is still only close to the OECD median country despite its innovative economy. Third, robust productivity growth across all sectors requires adaptable labour market institutions, and innovative financial markets, and a workforce well trained in science and technology. The availability and diffusion of best practice technologies is a necessary condition, but by no means a sufficient condition for productivity advance.

Sweden

Sweden's labour productivity growth experience in the 1980s and especially the 1990s provides an interesting perspective on the factors associated with a successful productivity performance. The Swedish manufacturing sector achieved world-class productivity growth in the 1990s, while the service sector, accounting for a much larger share of the economy, saw much slower labour productivity growth and little or no improvement in this regard relative to the 1980s. This extremely asymmetrical performance affords the opportunity to attempt to identify both the factors behind the manufacturing sector's success and the factors behind the rest of the economy's less impressive performance.

Two comprehensive studies of the Swedish economy — one by the McKinsey Global Institute (1995a) and the other a recent country survey by the OECD (2004c) — identify competition as a source of both the manufactur-

ing sector's rapid productivity growth and the poorer growth of service industries.¹³

While Sweden's productivity performance in the 1980s and 1990s is interesting in its own right, the lessons to be drawn for other countries are not immediately obvious, given the relatively unique characteristics of Sweden such as a single dominant industry, a high degree of income redistribution and significant employment protection even by European standards, and the polarization of its economy into some highly competitive sectors and other heavily protected sectors. Nonetheless, some general points can be made.

- A comprehensive approach to promoting competition — encompassing deregulation and product market competition, the free movement of labour and capital, openness to trade, among other factors — is necessary for maximizing the potential for productivity gains.
- The reliance on a single industry or even firm for aggregate productivity increases can subject a country to the greater possibility of suffering a prolonged stagnation in labour productivity and hence living standards. Indeed, the present slowdown in the telecommunications industry internationally will probably mean that Sweden's aggregate labour productivity growth will fall far below the impressive rate experienced in the 1990s.
- As in Finland, the productivity-enhancing ICT revolution in Sweden is linked almost exclusively to ICT production rather than ICT use, and is dependent on a single firm. It is therefore not yet possible to state that Sweden has entered a “new economy” phase of development, defined as an acceleration in labour productivity growth that is broadly based across industries. This may in turn imply that the new economy-style produc-

13 See the unabridged version of the paper for a discussion of these two studies.

tivity growth at the aggregate level experienced by Sweden in the 1990s may not be sustainable.

- In a small open economy such as Sweden or Finland, most technological spill-overs occur across international boundaries, and there appears to be very limited scope for other industries and firms to benefit from the R&D and productivity performance of the national leaders. This underlines the importance of openness for innovation and productivity growth.

Lessons for Canada from International Productivity Experience

Four important lessons for Canada emerge from this review of the productivity experiences of the six OECD countries in this article. They are highlighted below.

- Competition and productivity are closely intertwined. Sectors that have been opened up to market forces, both domestic and international, have generally registered significant productivity gains, as seen most strikingly in the United Kingdom. The existence of a competitive environment is an essential condition for productivity advance. One of the most important steps, if not the most important step, that governments can take to promote productivity growth is to ensure that markets, whether it be product markets, labour markets, or capital markets, are as competitive as possible.
- Human capital is the foundation of productivity advance, driving innovation. Countries that have focused on human capital investment, particularly in the higher education area, have seen a major payoff in productivity growth. The basis of the U.S. productivity resurgence is that country's world class system of research universities, which have created the knowledge that led to the emergence of productivity-enhancing ICT. Ireland's productivity success is also closely linked to the massive expansion of opportunities for higher education in that country. Thus support of the higher education sector, including both research and teaching, likely represents the most effective means by which government resources can be used to promote productivity growth.
- R&D intensity (R&D/GDP) is crucial for innovation and productivity growth, but it is not the complete story. The strong productivity performance of Sweden and Finland is closely related to the rapid growth in these countries of ICT-producing industries, in turn related to high R&D intensity. But the Swedish and Finnish experiences have shown that the presence of highly successful firms in certain high tech industries in a country does not automatically lead to the diffusion of productivity-enhancing ICT to the non-ICT producing sectors. Rather, it is the overall openness of these sectors to world technological developments that is crucial for their adoption of leading technologies. Since Canada through its R&D efforts accounts for a very small proportion of the world supply of innovations, the wide diffusion of best practice techniques in this country depends critically on the ability of Canadian firms to keep themselves abreast of world technological developments and to assimilate those developments. As the Swedish and Finnish cases illustrate so well, R&D intensity in itself may be necessary for rapid productivity growth, but it is certainly not sufficient. Sweden and Finland have the two highest R&D intensities, yet have labour productivity levels below the United States and at least eight other European countries.
- As a general rule, institutional rigidities impede productivity advance while institutional flexibility supports it. Many examples

of this general principle came to light in the six country studies. For example, both Sweden and Finland have recognized that certain of the characteristics of their labour market institutions — such as centralized collective bargaining and limited earnings differentials between high and low skilled workers — can have negative implications for productivity growth. Both countries have shown flexibility in adapting their institutions to make them conducive to, or at least not inimical to, productivity advance.

Based on the four key lessons for Canada highlighted above, a number of specific policies that could be usefully considered in the Canadian context are outlined below.

In terms of the first lesson concerning the importance of market forces, some specific policies that could foster productivity growth in Canada are the following.

- An enhanced competitive environment through deregulation. A step in this direction for the telecommunications industry was recently recommended in the recently released final report of the Telecommunications Policy Review Panel (2006). Such a move would foster faster adoption of information and communications technologies (ICTs) through greater ICT investment, an area where Canada significantly lags behind the United States (Sharpe, 2005). ICT have been identified as a key source of productivity growth and responsible for the acceleration of productivity growth in both Canada and the United States in the second half of the 1990s.
- A gradual winding down of marketing boards which limit the supply of certain agricultural products such as milk. Such a measure would spur the entry of producers with innovative ideas and the exit of low productivity firms, thereby increasing pro-

ductivity through a composition effect. As these industries affected by production restrictions are relatively small, this measure would likely not have a major impact on productivity. There would likely be strong opposition to such a move as the benefits of marketing boards are concentrated in the hands of a small number of producers, but the costs are borne by all the population through higher prices. The producers have much more incentive to organize against such a policy than the beneficiaries to organize in favour of it.

In terms of the second lesson, the federal government has recognized the importance of human capital for productivity growth. Since 1997, the federal government has taken a number of measures to boost post-secondary education, including the establishment of the Canada Research Chair program and additional funding for the granting councils. Two policies in the human capital area that could be pursued more vigorously are outlined below.

- A reduction in the underemployment of the human capital of recent immigrants to Canada through programs that better and more quickly foster the integration of immigrants into the workforce. Such programs would include language training, subsidies for employers to provide recent immigrants with Canadian work experience, and different types of integrative assistance (e.g. information on Canadian requirements in licensed occupations, individual counseling for the development of plans for recent immigrants to find appropriate employment, retraining programs to meet Canadian requirements, seminars on job search skills in the Canadian context, etc.) to immigrants so that they can meet Canadian occupational requirements, both before and after arrival in Canada. The boost to productivity growth from such measures is potentially

huge. The skills of immigrants have already been acquired at no cost to Canadian taxpayers. With a small investment in workplace integration, the skills of these immigrants could become fully utilized and contribute significantly to the economy.

- A greater emphasis on the basic skills of the workforce. A characteristic of the workforce of a number of the countries studied in this report (e.g. Sweden, Finland, Ireland) was its high level of basic skills. Indeed, it has been shown that improvements in basic skills such as literacy and numeracy can significantly boost productivity growth (Coulombe, Tremblay, and Marchand, 2004). There is much room for Canada to improve the basic skills of its workforce. Policies in this area, such as basic literacy programs, would potentially have a large payoff (Fortin, 2005). One specific program is to extend Employment Insurance (EI) benefits to low skill workers who take education or training leaves as part of a formal training plan (Jackson, 2005).

The third lesson concerns the importance of the adoption of new technologies, as opposed to the creation of new technologies through R&D. This lesson was in particular identified with Ireland, a country with a relatively low R&D intensity, yet very rapid productivity growth. Specific policies that could be considered in this area for Canada include the following.

- The expansion of programs that foster the adoption of best practice technologies and management practices by small and medium-sized enterprises (SMEs) by providing these firms with information on the latest technological developments in their industry and with technical advice on how to best adopt the latest technology in their situation. The Industrial Research Assistance Program (IRAP) run by the National Research Council is an example of a pro-

gram that has been recognized as effective in fostering the adoption of new technologies by SMEs. The expansion of IRAP and similar technology transfer programs would likely have a significant productivity payoff.

- As noted earlier, information and communications technologies are a key driver of productivity growth. Yet Canada badly lags the United States in ICT investment per worker across almost all industries. Measures to increase ICT investment thus could boost productivity growth. One such measure is the ICT tax credit recently proposed by the Telecommunications Policy Review Panel (2006). This measure would be targeted at SMEs and would apply on an incremental basis to all expenditures on ICT capital goods as well as complementary investments in training and reengineering needed for effective ICT adoption. A second measure is the harmonization of provincial sales tax systems with the GST. The PST in certain provinces (Ontario, British Columbia, Manitoba, Saskatchewan, and Prince Edward Island) is applied to ICT spending, increasing its cost compared to other more long-lived asset types, and discouraging ICT investment. Harmonization with the GST (under which ICT investment is not taxed) would reduce this current bias of the tax system against ICT investment.

The fourth lesson concerns the role of institutional rigidities in impeding productivity growth and the identification of these rigidities and their removal. Specific rigidities in Canada include the following.

- The Employment Insurance (EI) program, which provides income support for the unemployed in seasonal occupations, discourages to some degree mobility to regions where permanent employment prospects are more promising. Given the recent increase in interprovincial mobility in this country

from high unemployment to low unemployment regions (the population of Newfoundland fell from 580 thousand in 1992 to 520 thousand in 2003, with many of the out-migrants going to Alberta), it is important not to overemphasize the importance of this rigidity to mobility. Nevertheless, during this time of very low national unemployment, from a national perspective there is no better occasion to encourage the unemployed to leave high unemployment areas to seek work through a shift from a passive income support role of EI to a more active role for EI that attempts to integrate the unemployed into jobs by fostering mobility and retraining.

- Reduction in interprovincial barriers to labour mobility in the professions and the trades to allow a greater role for market forces to influence the reallocation of workers from low productivity/low wage to high productivity/high wage jobs, an important source of productivity growth. Jurisdiction over occupational certification resides with the provincial level of government. It is essential that the federal government work with the provinces to develop certification programs that are recognized in all provinces. The Red Seal program for the apprenticeable trades is an excellent example of a program that promotes mobility throughout the country. This program, and similar programs for other occupations, should be expanded.

Conclusion

This report has surveyed the international productivity experience of six OECD countries and drawn out lessons for Canada. While there is much to learn from international experience, it is important to recognize that policies that work in one country flow from the particular context or situation of that country and are likely not transferable holus bolus to another

country. Policies to improve productivity growth in Canada, while informed by the experience of other countries, must be based on the institutional, political and economic realities of this country.

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Appendix Table 1

Output per Hour Levels and Growth Rates in OECD Countries, 1950-2006

	(United States= 100)					(compound average annual growth rates)				
	1950	1973	1995	2000	2006	1950-1973	1973-1995	1995-2000	2000-2006	1973-2006
Australia	73.4	75.3	82.1	82.2	78.2	2.68	1.62	2.31	1.49	1.70
Austria	30.0	62.9	89.2	92.4	89.1	5.91	2.83	3.01	1.71	2.66
Belgium	49.1	79.7	105.2	102.6	95.7	4.75	2.50	1.77	1.16	2.15
Canada	81.0	88.5	85.5	83.2	78.1	2.96	1.06	1.71	1.28	1.20
Denmark	56.5	74.6	97.3	91.8	85.9	3.81	2.44	1.11	1.20	2.01
Finland	33.9	54.5	80.0	81.8	81.7	4.71	2.99	2.75	2.31	2.83
France	42.1	73.9	104.9	104.1	100.1	5.11	2.84	2.13	1.65	2.52
All Germany			88.2	87.0	82.5			2.01	1.42	
West Germany	36.7	75.4	108.3			5.83	2.90			
Ireland	29.0	44.3	79.8	96.7	98.1	4.47	3.96	6.27	2.59	4.06
Italy	42.9	75.9	99.4	93.2	81.2	5.14	2.47	0.97	0.00	1.79
Japan	18.3	51.3	74.0	71.9	71.7	7.27	2.92	1.69	2.28	2.62
Luxembourg	66.7	84.7	106.6	107.2	102.4	3.63	2.28	2.40	1.55	2.17
Netherlands	56.8	84.6	98.9	96.4	91.1	4.36	1.94	1.75	1.38	1.81
New Zealand*	92.0	67.6	64.5	61.8	56.3	1.20	1.01	1.40	0.75	1.02
Norway	51.2	73.8	114.0	114.2	111.1	4.21	3.24	2.31	1.86	2.85
Portugal	18.1	43.3	51.5	54.4	48.3	6.53	2.02	3.39	0.33	1.92
South Korea**	17.8	17.0	38.4	41.2	44.6	2.36	5.03	3.71	3.69	4.59
Spain	21.2	44.5	80.1	71.1	60.7	5.92	3.96	-0.12	-0.33	2.54
Sweden	57.4	80.6	84.5	85.3	86.4	4.09	1.44	2.46	2.56	1.80
Switzerland	73.1	88.7	84.0	81.0	76.9	3.43	0.97	1.55	1.44	1.14
United Kingdom	61.9	66.0	86.6	86.4	84.4	2.85	2.48	2.22	1.94	2.34
United States	100.0	100.0	100.0	100.0	100.0	2.57	1.22	2.28	2.33	1.58
Unweighted Average***	48.1	67.0	86.5	85.0	81.2	4.26	2.46	2.23	1.57	2.25

Source: Groningen Growth and Development Centre and the Conference Board, Total Economy Database, February 2007, <http://www.ggdc.net>.

* Data for New Zealand are available for 1956 onwards only. The relative level shown for 1950 is actually for 1959, the first year for which data are available for both New Zealand and the United States. The growth rate shown for the 1950-1973 period is actually for 1956-1973.

** Data for South Korea are available for 1963 onwards only. The relative level shown for 1950 is actually for 1963, the first year for which data are available for both South Korea and the United States. The growth rate shown for the 1950-1973 period is actually for 1963-1973.

*** The average excludes the United States for relative levels but includes the United States for growth rates. For 1950 and 1973 and the 1950-1973 and 1973-1995 periods, West Germany is included and All Germany is not included. For 1995, 2000 and 2006 and the 1995-2000, 2000-2006 and 1973-2006 periods, All Germany is included and West Germany is not included.