Industry Perspectives on the Canada-U.S. Productivity Gap

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It is widely recognized that per capita real income in Canada is significantly less than in the United States and that the income gap reflects lower labour productivity levels, not lower employment rates. Indeed, in 2002, real GDP per capita is Canada was 86 per cent of that of the United States. The proportion of the population at work in Canada was actually 103 per cent of that in the United States while GDP per person worked was only 83 per cent (and GDP per hour worked 84 per cent) of the U.S. level. Thus the productivity gap more than accounts for the lower standard of living of Canadians relative to Americans.[1]

The objective of this paper is to shed light on the factors behind the Canada-U.S. labour productivity gap by focusing on industry perspectives on the gap. The paper is divided into five parts. The first section briefly examines methodologies issues and approaches associated with differences in productivity levels between countries at the industry level. The second section presents and analyzes data on Canada-US productivity differentials by industry. The third section synthesizes the industry productivity studies undertaken over the last 15 years by the McKinsey Global Institute (MGI). The fourth section assesses the relevance of MGI findings for the explanation of industry productivity gaps between Canada and the United States. The fifth section concludes.

Methodological Issues and Approaches in International Productivity Level Comparisons

This section briefly discusses methodologies for the estimation of productivity relatives, approaches to explain productivity differences, and casual factors explaining productivity differences.

Methodologies used in the Estimation of Industry Productivity Relatives

The estimation of differences in productivity levels across countries at the total economy level is relatively straightforward. Purchasing power parity (PPP) exchange rates are used to convert national currency GDP estimates into a common currency.[2] This measure of GDP is then divided by labour input to obtain a labour productivity level that is comparable across countries.

At the industry levels things are not so simple because the total economy or expenditure-based GDP PPP does not apply to each industry. It is necessary to develop

[1] One should of course not confuse standard of living, as defined by GDP per capita, with economic well-being, or with the even broader concept of quality of life. Canada's lower standard of living by no means implies that Canadians are worse off than Americans in terms of economic well-being (Osberg and Sharpe, 2004).

[2] Market exchange rates cannot be used because they reflect the influence of many factors, including capital flows and political risks.

bilateral industry PPPs to convert domestic currency GDP estimates into a common currency for comparable international comparisons. This however is a complex task and is not normally undertaken by statistical agencies, who focus on PPPs for expenditure categories.

There are two approaches to the estimation of industry PPPs (Wagner and van Ark, 1996). The first is the "industry of origin" approach developed by the International Comparisons of Output and Productivity Project (ICOP) based at the University of Groningen in the Netherlands. This approach develops industry PPPs or unit value ratios to convert the output value in different countries to a common currency through a detailed examination of product prices in the industry. Unit values are obtained from eaxch country's production census or survey for a benchmark year by dividing producers' sales values by the corresponding quantities of sales. Matches are then made between each pair of countries for as many products as possible.

Limitations of this approach include the limited sample of products, the validity of the assumptions employed concerning the representativity of the non-measured price relatives, insufficient adjustment for differences in product mix and product quality across countries; and the stringent requirements of separate PPPs for output and intermediate goods so value added can be obtained through double deflation as the difference between gross output (converted to a common current at output PPPs) and intermediate inputs (converted to a common currency at input PPPs).

The second approach to the estimation of industry PPPs is the application of expenditure PPPs to the industry level. Industry Canada had used this approach (Rao, Tang, and Wang, 2004; Lee and Tang, 2000). Bilateral Canada-U.S. commodity price data are converted into industry PPPs by using gross output and the input and investment structures of each industry obtained for input-output tables. Limitations of this approach include the lack of separate PPPs for intermediate goods, and the lack of adjustment for the prices of imports and exports.

There is a third method to estimate relative productivity levels that does not rely on PPPs. This is the case study method in contrast to what can be called the statistical method outlined above. In this method the productivity of plants producing similar products across countries is directly compared. This approach is complementary to the statistical method and is particularly useful when the quality and comparability of statistical data are weak. It also permits more exact product matches than in the statistical approach, to obtain physical productivity measures, to assess the role of quality differences in more detail, and to hence to shed light on the sources of productivity differentials. Limitations of this approach include the small sample size of the firms studied, and inadequate representation of firms by firm size.

The statistical and case study methods for the estimation of productivity levels should be seen as complementary. The greater detail and disaggregation of the case study method or approach is counterbalanced by the more comprehensive nature of the statistical method.

Approaches to Explain Productivity Differences

Parallel to the statistical and case study approaches to measuring productivity levels, one can identify statistical and case study approaches to the analysis of the reasons for productivity differences. The statistical approach largely originated with growth accounting techniques. In comparing productivity levels, the impact of differences in relative levels of physical and human capital, the relative size of firms, and the effect of differences in sectoral composition of productivity gaps is quantified.

A limitation of the growth accounting approach is that while it concentrates on the quantitative relation between various factors and productivity performance, it cannot explain how these relations arise and by what means they influence productivity. As noted by Wagner and van Ark (1996:9), with statistical methods one can measure the quantitative contribution of physical capital to productivity, but it is not possible to infer from that result whether an increase in investment affects productivity through changes in the age of the stock, a rise in embodied technology, a better utilization of machinery, a different type of work organization on the shopfloor. The production of more marketable products, or a combination of these factors.

Case studies, or more specifically matched plant studies, allow an assessment of qualitative explanations behind differences in human and physical endowments. From this perspective, they greatly complement the statistical approach.

Causal Factors Explaining Productivity Differences

Many factors have been identified as accounting for differences in productivity levels across countries. As summarized by Wagner and van Ark (1996:10-21), they include:

- differences in physical capital intensity, including differences in the mix of frontier and obsolete techniques used in production and in the quality of the machine stock according to type, age, origin and technology of machinery;

- differences in the training and education element or component of human capital, including average years of general and vocational education, type and nature of schooling and in-company training;

- differences in the management and work organization component of human capital, including the optimization of time and motion in the production process and production worker empowerment;

- differences in the knowledge component of human capital, including research and development, patents, systems of innovation, and technological spillovers;

- differences in product quality;
- differences in exposure to globalization and competition; and
- differences in the institutional environment and social capability, including personal attributes and culture but also the infrastructure of political and economic institutions, which includes rules and regulations concerning product, labour, and capital markets.

Estimates of Canada-U.S. Productivity Relatives by Industry

A very recent Industry Canada study by Someshwar Rao, Jianmin Tang, and Weiwin Wang (2004) has estimated Canada-U.S. productivity relatives for labour productivity and total factor productivity for 30 industries for a 1999 benchmark, updating earliest estimates based on a 1987 benchmark (Government of Canada, 2002 and Ho and Lee (2000). These estimates are based on industry PPPs derived from expenditure data. Input-output tables were used to transform expenditure PPPs into industry PPPs.

1999 Benchmark Estimates

In 1999, it was found that output per hour in the private business sector in Canada was 85 per cent of the U.S. level, a 15 point Canada-U.S. gap. Multifactor productivity in the private business sector in Canada was 89 per cent of the U.S. level, only a 11 point gap. The lower level of capital intensity in Canada (89 per cent of the U.S. level) accounted for this country's significantly better relative multifactor productivity performance.

Labour productivity

Rao, Tang and Wang provide labour productivity estimates for four industry aggregates (primary industries, construction, manufacturing, and service industries) and for 26 private business sector industries. Charts 2-4 show the labour productivity differentials by industry in 1999 the benchmark year, with the importance of each industry represented along the x-axis by its labour input share.

In terms of the labour productivity relatives of the industry aggregates, three were slightly below the private business sector level and one was much higher. Output per hour in Canada in 1999 was 80 per cent of the U.S. level in service industries, 82 per cent in manufacturing, 84 per cent in primary industries, and 151 per cent in construction.

Output per hour in 1999 was higher in nine of 26 industries in Canada than in the United States: construction (151 per cent of the U.S. level), primary metal (134 per cent), paper (117 per cent), non-metallic mineral products (114 per cent), other transportation equipment, that is excluding motor vehicles (113 per cent), wood products (111 per cent),

motor vehicles (109 per cent), mining (107 per cent), printing and publishing (102 per cent). Five of the nine industries wee natural resources industries.

In contrast, output per hour in 1999 in Canada was below the private business sector average Canada-U.S. labour productivity relative of 85 per cent in 14 industries: agriculture (80 per cent of the U.S. level), business services (79 per cent), food beverage and tobacco (77 per cent), utilities (77 per cent), plastic and rubber products (74 per cent), furniture and related products (71 per cent), wholesale trade (71 per cent), machinery and computers (70 per cent), textile and clothing (68 per cent), FIRE (68 per cent), information and cultural industries (65 per cent), electronic and electrical products (63 per cent), fabricated metals (51 per cent), and petroleum and coal products (48 per cent). It is interesting to note that all these industries were at least 20 points below the U.S, with none in the 81-85 per cent of the U.S. level range.

Perhaps surprisingly, only three industries in Canada in 1999 had a labour productivity relative between 81 and 100 per cent of the U.S. level: transportation (98 per cent), chemicals (86 per cent), and retail trade (85 per cent). Thus the output per hour relatives of Canadian industries are not normally distributed around the private business sector average relative of 85 per cent. Nine industries accounting for 18.1 per cent of business sector hours worked has higher level of output per hour in Canada than in the United States. In contrast, 14 industries accounting for 60.5 per cent of hours worked had output per hour levels 80 per cent or less of U.S. levels. Only three industries accounting for 21.4 per cent of hours worked were between four-fifths and 100 per cent of the U.S. level.

The industry contributions to the labour productivity gap of 15 points can be calculated by multiplying the industry's share of hours worked by its productivity gap. The contribution is thus a function of both an industry's size and its gap. Table 1 shows the contributions of the 26 industries in 1999 to the 15 point labor productivity gap. The six largest positive industry contributions to the total gap, not surprisingly given both their relative importance and the size of their gaps, were information and cultural industries (accounting for 30.3 per cent of the gap), business services (24.6 per cent), manufacturing (16.7 per cent), FIRE (15.8 per cent), retail trade (14.9 per cent) and wholesale trade (13.1 per cent). In contrast, constriction made a large negative contribution (25.9 per cent) to the gap because its labour productivity level was one and one half times the U.S. level.

Multifactor productivity

Rao, Tang and Wang also provide multifactor productivity estimates (MFP) for four industry aggregates (primary industries, construction, manufacturing, and service industries) and for 26 private business sector industries. Charts 5-7 show the multifactor productivity differentials by industry in 1999 the benchmark year, with the importance of each industry represented along the x-axis by its labour input share.

Given Canada's better relative performance of multifactor productivity compared to labor productivity at the private business sector level (89 per cent of the U.S. level compared to 85 per cent), most industries also had a smaller multifactor productivity gap than a labour productivity gap. About one quarter of Canada's labour productivity gap with the United States can be accounted for by our lower capital intensity.

In terms of the labour productivity relatives for the industry aggregates, three were around the private business sector level average and one was much higher. The level of multifactor productivity in industries in Canada in 1999 was 149 per cent of the U.S. level in construction, 90 per cent in manufacturing, 85 per cent in service industries, and 76 per cent in primary industries. Both service industries and manufacturing had smaller MFP gaps than labour productivity gaps because their capital-labour ratios were below those of their U.S. counterparts (86 per cent and 77 per cent respectively). In contrast, the capital-labour ratio in the Canadian construction industry and in primary industries exceeded that in the United States (102 per cent and 117 per cent respectively) so that the Canada-U.S. MFP relative gap was greater than the labour productivity relative in these two sectors.

The level of MFP in 1999 was higher in nine of 26 industries in Canada than in the United States: construction (149 per cent of the U.S. level), other transportation equipment, that is excluding motor vehicles (136 per cent), primary metal (131 per cent), printing and publishing (127 per cent), non-metallic mineral products (122 per cent), motor vehicles (107 per cent), wholesale trade (105 per cent), food beverage and tobacco (104 per cent), and FIRE (102 per cent).

It is interesting to note that three industries in Canada had higher MFP than their U.S. counterparts but lower labour productivity: food, beverage and tobacco (104 per cent of US MFP versus 77 per cent of U.S. labour productivity due to a very low relative capital intensity ratio of 55 per cent); wholesale trade (105 per cent U.S. MFP versus 71 per cent of U.S. labour productivity to an incredibly low capital intensity relative of 26 per cent), and FIRE (102 per cent of U.S. MFP versus 68 per cent of U.S. labour productivity given the capital intensity relative of 50 per cent)

Equally, three industries in Canada had higher labour productivity than their U.S. counterparts, but lower MPF: paper (117 per cent of U.S. labour productivity versus 99 per cent of U.S. MFP because of a relative capital intensity of 150 per cent of the US level; wood products (111 per cent of U.S. labour productivity versus 92 per cent of U.S. MFP because of relative capital intensity 160 per cent of the U.S. level); and mining (107 per cent of U.S. labour productivity versus 85 per cent of U.S. MFP because of relative capital intensity of 140 per cent).

In contrast, MFP in 1999 in Canada was below the private business sector average Canada-U.S. relative of 89 per cent in 9 industries: machinery and computers (87 per cent), plastic and rubber products (86 per cent), furniture and related products (86 per cent), mining (85 per cent), information and cultural industries (80 per cent), textile and

clothing (80 per cent), fabricated metals (66 per cent), utilities (64 per cent), and petroleum and coal products (47 per cent).

The remaining 8 industries had MFP relatives between 89 and 100 per cent of the U.S. level: agriculture (90 per cent), wood products (92 per cent), chemicals (93 per cent), retail trade (93 per cent), business services (96 per cent), transportation (97 per cent), electronic and electrical equipment (98 per cent), and paper (99 per cent).

The nine Canadian industries with MFP levels above their U.S. counterparts accounted for 29.5 per cent of business sector hours worked In contrast, 9 industries with below average relative MFP levels (89 per cent of the U.S. level) accounted for 22.2 per cent of hours worked. Eight industries accounting for 48.4 per cent of hours worked were between 89 per cent and 100 per cent of the U.S. level.

Extentions of 1999 Benchmark Estimates

Canada-U.S. productivity relatives for 1999 based on benchmark estimates can be pushed back and forward in time with relative productivity growth rates. For the business sector and manufacturing labour productivity growth rates are available back to 1947 and 1977 respectively, and up to 2003. At the detailed industry level productivity growth rates are only available to 2001 for the United States (but to 2003 for Canada), limiting the extension of industry productivity relative estimates to that year.

Since 1999 business sector output per hour growth has been significantly slower in Canada than in the United States: 7.0 per cent versus 15.3 per cent This means that the 8.3 point labour productivity growth differential over the 1999-2003 period reduced the Canada-U.S. output per hour relative from the 1999 benchmark value of 85 per cent to 79 per cent by 2003 (Chart 1). In other words, the Canada-U.S. labour productivity gap increased from 15 points in 1999 to 21 points in 2003. About one half the widening of the gap took place in 2003, when output per hour advanced 4.5 per cent in the United States, compared to only 0.1 per cent in Canada.[3]

Since 1999 manufacturing labour productivity growth has also been slower in Canada than in the United States: 8.2 per cent versus 22.5 per cent. This means that the 14.3 point labour productivity growth differential over the 1999-2003 period reduced the Canada-U.S. output per hour relative from the 1999 benchmark value of 82 per cent to 72 per cent by 2003 (Chart 1). In other words, the Canada-U.S. labour productivity gap increased from 18 points in 1999 to 28 points in 2003. Most of the widening of the gap took place in 2002 and 2003, when output per hour advanced 9.3 and 5.1 per cent respectively in the United States, compared to only 2.8 and 1.2 per cent in Canada.[4]

[3] The annual growth rates of business sector output per hour in the other years were as follows: Canada – 2000 3.9; 2001 1.0; and 2002 1.9; United States – 2000 2.9; 2001 2.2; and 2002 4.8.

[4] The annual growth rates of manufacturing output per hour in the other years were as follows: Canada – 2000 5.9; and 2001 -1.8; United States – 2000 6.3; and 2001 0.4.

Rao, Tang and Wang (2004) have extended the 1999 relative labor productivity benchmark estimates for four industry aggregates and 26 industries to 2001. Charts 8-10 show the labour productivity differentials by industry in 2001, with the importance of each industry represented along the x-axis by its labour input share. There has no change in the business sector relative at 85 per cent. There were however large changes at the industry level, particularly in manufacturing.

The following Canadian industries, mostly in manufacturing, experienced significant improvement in their relative labour productivity levels between 1999 and 2001:

- construction rose from 151 per cent to 162 per cent of the U.S. level;
- food, beverage and tobacco rose from 77 per cent to 99 per cent;
- wood products increased from 111 per cent to 131 per cent;
- printing and publishing jumped from 102 per cent to 122 per cent;
- chemicals also soared from 86 per cent to 107 per cent;
- non-metallic mineral products increased from 114 per cent to 138 per cent; level.
- primary metals increased from 134 per cent to 151 per cent; and
- other transport equipment (excluding motor vehicles) increased from 113 per cent to 130 per cent..

Two Canadian industries experienced significant deterioration in their relative labour productivity levels between 1999 and 2001:

- mining fell from 107 per cent to 97 per cent of the U.S. level; and
- electronic and electric equipment plummeted from 63 per cent to 44 per cent.

The relative labour productivity levels in Canadian services industries, unlike in manufacturing, were largely stable between 1999 and 2001. The largest change was an increase in output per hour in business services from 79 per cent of the U.S. level in 1999 to 86 per cent in 2001.

In terms of the contributions of labour productivity gaps in individual industries to the overall business sector labour productivity gap, the situation in 2001 was little changed from that in 1999 (Table 1). The food, beverage and tobacco industry accounted for 3.9 per cent of the private business sector labour productivity gap in 1999, but only 0.2 per cent in 2001. Retail trade, information and cultural industries, and FIRE all made

large contributions in 1999 and even larger contributions in 2001. Business services, on the other hand, saw its contribution fall between 1999 and 2001, from 24.6 per cent to 19.8 per cent.

The McKinsey Global Institute's Productivity Studies: A Synthesis[5]

The McKinsey Global Institute (MGI), founded in 1990 by McKinsey & Company, analyzes international productivity levels from both economic and management perspectives. Over the last fifteen years, MGI has studied most of the world's major economies, from the open and mostly-open models of the United States and United Kingdom to the more sheltered economies of Western Europe and Sweden to the export-intensive yet heavily protected Japanese system. 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.

In most cases, large productivity gaps between countries can usually be explained by market conditions and managerial decisions at the sectoral level. It is the opinion of MGI that productivity stems from innovative managerial behaviour, which itself is necessitated by a competitive market. In this respect, the United States sets productivity benchmarks in most sectors by virtue of being the world's most competitive economy. This section of the paper synthesizes some of the McKinsey findings to see what comparisons and potential lessons can be drawn to shed light on Canada-U.S. productivity gaps at the industry level. The section first looks at factors affecting competition

Competitive Factors

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 factor 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 protection. This is true in the German automotive market, which has always faced substantial import tariffs by itself and through the EU; it is true in the Swedish construction industry, which faces supply oligopolies and cartels for most of its inputs; it is true in the enormous Japanese food processing sector and countless other markets throughout the world. In every case, protection from competition domestic or foreign has led to managerial complacency and a lack of innovation in production processes, the end result being that the United States, the world's most exposed country to competition, has

[5] This section is based on Kellison (2004)

surged ahead in productivity because of its ability to adapt to global best practices in both manufacturing and services. Competitive intensity almost always drives managerial innovation, and so MGI has evaluated the effects that both direct and indirect regulations can have on competitive intensity. Direct regulations include concentration laws, trade protection, and conversely, deregulation. Indirect regulations include minimum wage standards, union work rules, and zoning laws.

Concentration

The 1997 MGI study on the banking sector in the Netherlands found it to be the most productive in the world. Why? Its relatively high level of concentration. This is not necessarily contradictory to the idea of market competition, either. It is true that some of Europe's state monopolies and oligopolies have been non-competitive, but that has primarily been because of barriers to foreign entry and product market restrictions (such as pricing rules, hours of operation restrictions, and zoning laws), not simply market share. As markets that are open to global competition have shown, sometimes it only takes two firms to generate intense competition. In Sweden, Volvo and Scania alone have been able to achieve world-class productivity levels by competing with each other and with foreign firms. In the Netherlands, three banks controlling 75 per cent of the market still competed to develop the most efficient electronic payments system in the world.

In sectors with high concentrations, the impact of managerial or technological innovation is usually greater as it is crucial to achieve economies of scale. In their 2001 report on productivity growth in France and Germany, the McKinsey Global Institute preached consolidation in several sectors, including telecommunications, road freight, and especially banking once the Netherlands' IT adoption advantages had become apparent. The same has been true in American wholesaling, where productivity growth reached record levels in the late 1990s as consolidation allowed for the widespread adoption of warehouse automation. As they point out, while low competitive intensity may create a situation of concentration, concentration in and of itself does not necessarily create a situation of low competitive intensity.

Trade Protection

While there are several indirect ways to shelter domestic producers within a sector, there is no more obvious direct method than through trade protection in the form of tariffs or import quotas. While trade controls may firmly establish a domestic sector within a country, in general that sector ends up being non-competitive and well behind in global productivity because of its lack of exposure to global best practice. MGI concludes that trade protection has rarely been desirable in the long view of things. In the automotive industry, for example, sheltering US car producers did give them time to adjust their production processes to prepare for pending Japanese competition, but it was only when the market was finally opened up that they achieved close to the productivity levels realized by Japan. The German auto market, meanwhile, remained sheltered and has always trailed the United States and Japan significantly in terms of productivity

levels; the EU now puts a 10 per cent tariff on imported vehicles, so the automotive sectors in France and the UK are in the same position.

Similarly, Japanese food processing productivity has been less than a third of the United States' because of excessive protection. Although Japan initially protected most of its sectors as "infant industries" in the early post-war period, it relaxed those conditions somewhat in the sectors it promoted for export like cars, electronics, and steel, and all three sectors ended up having more productive labour than either the United States or Germany. Japan has kept its other sectors sheltered from the global marketplace, however, creating a dual economy as they have failed to develop productively. In food processing, three times the number of firms than in the United States only produce a third of the output. As well, the employment in food processing is so large that its productivity gap more than negates Japan's labour productivity advantages in its export sectors, placing Japan behind the US in overall labour productivity. The same is true in the German beer industry, where protection has allowed small, craft-based breweries to survive without having to consolidate to achieve economies of scale like the large breweries in the United States. The study makes no adjustments for quality, however.

Deregulation

Deregulation has been primarily an American phenomenon. The most commonly cited example has been the U.S. airline industry, which deregulated in the late 1970s and engaged in price wars through the 1980s that created such intense competition that the hub-and-spoke system developed. By establishing hub airports that had scheduled waves of flights coming in and going out at certain periods during the day, the major U.S. airlines increased congestion and all but eliminated the inter-airline transfers of the previous, more linear system of flights, but were also able to offer consumers the highest frequency of flights at the lowest costs. Europe has begun the process of deregulation more recently, but as most countries had state-run monopolies or duopolies in the 1980s, Europe's average total factor productivity was only about 75 per cent of the U.S. level.

As national carriers have consolidated (or been eliminated) and specialized regional carriers have sprung up, the US airline market has become almost impenetrable for European competitors. Deregulation did not create immediate and total competition in the US; airlines like TWA were still able to operate in a state of bankruptcy for years. But the long-run impact on competition has been undeniable, and as Europe seeks to close its productivity gap through deregulation, a complete opening of their markets to American competition may make the transition quicker than it was in the United States.

Minimum wage

On the side of indirect anti-competitive regulations, one of the most obvious social and economic distinctions between the United States and European labour markets is the difference in their respective minimum wages. Other than the United Kingdom, which instituted a minimum wage in 1999 roughly in line with the US minimum wage in absolute terms, the average minimum wage in Europe is significantly higher than in the

United States. As the lowest wages tend to go to the lowest-skill positions, a higher minimum wage naturally affects employment and productivity figures in low-skill sectors, most particularly general merchandising retail.

The net effect of higher average retail wages is that the lowest-skill positions, such as grocery baggers in supermarkets, are phased out because their cost outweighs the average consumer's willingness to pay for their services. To the extent that these are therefore marginal jobs, their marginal labour productivity is also low, and so while employment may fall with their elimination, average labour productivity is higher. From a measurement standpoint, this creates a comparison problem between the United States and countries like France, Sweden, and Germany because European productivity is overstated by the lack of low-skill jobs. At the same time, if the United States is able to supply more retail service for the same quantity of sales, its retail productivity will be understated.

Real minimum wages in the United States and Europe were about equal in 1975, but over the following twenty years the US wage was nearly halved while the European wage nearly doubled.[6] This is the primary reason why a branch of a retail firm in the United States may have 50 per cent more employees than its European counterpart; a full 26 per cent of the US labour force (30 million people) is employed below the minimum wage level in either France or Germany. The actual productivity levels between those branches are not that different; employees at a US IKEA store are no more or less productive and efficient than those at a French IKEA store. Because an American branch can afford to hire more employees, however, the differences between the two countries manifest themselves in service levels like longer hours and more checkout lines. When these lower-productivity services are accounted for – and retail services, while not physical output, are consciously consumed just as retail goods are - any European advantage in productivity statistics from having fewer employees disappears. MGI's practice is to combine traditional output productivity with the more nebulous concept of service productivity.

Work Rules

There are other factors that can make a country's labour markets relatively inflexible, such as high levels of unionization and stringent work rules. The United States and United Kingdom are far ahead of the rest of Europe by most flexibility measures such as a quicker turnover between hiring and firing, and most noticeably, more job creation in service sectors rather than in manufacturing. The existence of a lower minimum wage is partly responsible for these effects, but at the same time, the United States and the United Kingdom rely much more heavily on part-time labour and have

[6] The existence and level of a minimum wage is a social issue within each country. The McKinsey Global Institute has frequently argued that the effect of the minimum wage on low-skilled labour unemployment at least negates the living standards benefits its creates. MGI recommends a lower minimum wage in most European countries combined with an earned income tax credit or negative income tax for low-wage workers that is designed to have the same effect.

nowhere near the amount of long-term contracts and institutionalized collective bargaining that can be found in continental Europe.

Work rules serve to reduce productivity in certain ways. In particular, their effect is most often felt in small and medium-sized sectors that may be less willing to absorb the legal and financial settlement costs of laying off employees and so restrict their hiring in the first place. In Sweden, for example, both the automotive and construction industries were impeded by strict unionism. Sweden was relatively open to trade during the 1980s and only felt global competitive pressure once Japanese brands like Lexus began competing in the luxury car market with Saab and Volvo, at which point strict work rules began to hinder their ability to adopt best practice and a productivity gap emerged. As Sweden's unions are organized along craft lines, not sector lines, job mergers were almost impossible; only the recession from 1990 to 1993 could eventually force the unions to relax their layoff and merger conditions and allow the Swedish auto manufacturers to restructure the labour force. Similarly, having a union for nearly every major building task made construction highly disintegrated and costly compared to the much more streamlined process in the United States.

Perhaps ironically, work rules also helped make Sweden the global leader in public transport productivity. In comparing bus and train systems between European countries (since the United States is much larger and uses public transport to a much lesser degree), Sweden and in particular Stockholm were easily the most productive by virtue of their efficient use of labour. Almost 60 per cent of paid driver hours in Sweden are spent driving, compared to only 35 per cent in a country like the Netherlands, and as costs for similar levels of service are thus lower, the Swedish transit system has been able to expand more. As more people use the larger system and traffic congestion decreases, buses are able to travel faster and provide even more service, thus achieving benefits from scale.

Sweden and the Netherlands have similar public transport unions and see similar benefits, but the difference is that Sweden's unions have revised their work rules to improve productivity in exchange for higher pay and performance incentives. So while drivers in both countries may have similar aggregate break times, for example, Swedish drivers have more frequent, shorter breaks, allowing them longer periods of continuous driving time and thus more service. At the same time, Swedish municipalities basically own the rolling capital stock for bus service, decide on the level of route provision, and allow private services to bid on three-to-five-year contracts for portions of the network. As this has opened the system to competition, it has also put more of an emphasis on productivity. As Baily and Zitzewitz (2001) point out, Sweden saw a 45 per cent gain in productivity from competition, a similar system in the United Kingdom has increased transport productivity by 71 per cent, and Japan has also moved toward such a competitive environment.

Zoning Laws

Zoning laws and other product market restrictions are yet another area where regulation tends to adversely affect European productivity in terms of output with respect to the United States. Land in Europe tend to be comparatively more expensive than in the United States and is often parceled in much smaller plots. This artificial scarcity of land keeps prices up and leaves landowners trying to realize speculative profits. But quite simply, the lower the input prices in a sector, the higher the output, and land is no exception. Land is four times more expensive in Germany and the Netherlands than in the United States, and more than twice as expensive in France. The Netherlands has a government subsidy program to finance designated "growth" areas in an attempt to mitigate this, but the government has still only designated 8 per cent of the country's land for housing versus 70 per cent for agriculture.

In France in particular, zoning laws also limit retail innovation. Specialty chains end up paying much higher rental fees than traditional large-format French retailers like hypermarkets and department stores. As well, high entry fees tend to discourage foreign chains from entering the French market, and so format innovation is at a minimum. Germany suffers from the same problem, not because of its rental system but because of its exorbitant land prices. The Netherlands has even more restrictive retail zoning laws than France does. All three countries' governments have also mandated restrictive opening, closing, and weekend hours in an effort to protect traditional retailers and limit entry, and so productivity is much lower in both countries than in the United States where a general-format retailer like Wal-Mart is allowed to expand more and stay open longer. Zoning laws effectively restrict to product market and limit firms from expanding and hiring low-skill labour much like the minimum wage does. Though capacity utilization may appear higher as a result, these firms lack the business innovation American chains must develop because of competitive pressure.

Managerial Factors

Perhaps even more important than the market conditions under which a firm operates is the way its managers choose to react to those conditions. Competitiveness is the main driver of managerial innovation, but that managerial innovation is what affects productivity, first at the firm level, then the industry level, and ultimately at the national level. In the relatively competitive American markets, managers are usually forced to pursue more economic goals where European managers may be able to concentrate on more social ones; most of the productivity differences between the US and Western Europe stem from this distinction in one way or another. This section examines the idea of adopting global best practice, looks at potential differences in labour skill between countries, and analyzes the effects of marketing. It also deals with the newer challenge of IT (information technology) investment and its effect on capital intensity.

Adopting Best Practice

The whole reason the McKinsey Global Institute advocates having competitive, exposed sectors is because of the concept of "best practice." Theoretically, if a production process takes place in several different countries, one of those countries (or at least one firm within the country) will have developed the best, most efficient method of

production. As that firm becomes more productive and other firms within the country follow its example, the country itself will gain a productivity advantage over other countries within that sector. The easiest way for other countries to catch up is to change their production processes as well, but some may be unwilling or unable to do this. If a firm faces little competition within its own borders, it may have little incentive to undertake the initial costs necessary to improve productivity through best practice if its profits do not depend on it. Similarly, a domestic sector protected by barriers to foreign competition is not considered "exposed" to best practices and need not worry about keeping pace with foreign rivals. To the extent that best practice represents best productivity, this is why competition drives the most crucial aspect of managerial behaviour: managers in competitive sectors must adopt best practice or fail, while managers in non-competitive sectors need not worry about changing their original processes.

The quickest way a country can become exposed to global best practice is through foreign direct investment, or transplant operations like Japanese automotive plants in the United States. This is often considered a more palatable option than simple trade since it also improves productivity and employment within the transplant country, although it is still far more common in the United States, the most "exposed" country in the world, than in Japan or Europe. With mostly deregulated sectors and relatively easy entry into the market for corporate control, the United States has adopted the best practice of other countries to a much greater degree than any country in the world.

In electronics, for example, Japan became the world leader in the 1970s and 1980s when its previously protected industries became exposed through export competition, and the United States and Germany were forced to catch up. Since the United States was open to Japanese transplant operations, it developed best-practice processes fairly quickly and ended up scaling its industry back to high-end consumer electronics only and outsourcing the rest or restructuring into high-tech. While there were frictional problems in the short-run, this specialization has helped the United States in the long-term in both industries. German electronics, on the other hand, remained a protected sector. This was less of a problem since the German market primarily remained closed to Japanese imports, but once Japanese electronics and software companies began setting up transplant operations in the UK and elsewhere, Germany began to face direct competition and found itself lagging badly.

Dispersion of best practice can also be an entirely domestic phenomenon, as Wal-Mart has proven in the US retail sector. Wal-Mart became the largest retailer in the United States through a combination of scale, supply chain efficiency, and basic technological innovations like electronic tracking and scanning. And while Wal-Mart's growth has pushed several firms out of the retail market, it has also forced other competitors like Target to adopt many of the same techniques to remain profitable, thus reshaping the formats and services offered by most firms within the sector. Most notably, however, is that despite the growth of Wal-Mart's operation, a full two-thirds of productivity growth in the United States between 1995 and 2000 is attributable not just to Wal-Mart, but to competitors following Wal-Mart's example.

Labour Skill

Perhaps the most important reason for concentrating on managerial behaviour is the fact that MGI finds little reason to believe that labour skills are all that different between countries. Productivity differences originate in the boardroom, not the shop floor; if there is a German or Japanese work ethic, as was frequently bemoaned in the United States during the 1980s, it is one manifested in efficient production processes that have since been imported by the United States, where the workers seem just as capable when organized similarly.

The most in-depth study in this area was the 1993 MGI manufacturing report, especially with regard to American automotive production versus Japanese automotive production. What differences exist between workers in each country is not a result of intrinsic skills but of training, which is the responsibility of management. Japanese transplant factories in the United States, using American labour, were able to achieve similar productivity levels to initially superior Japanese plants, as were domestic US plants once they were exposed to Japanese practices. Ultimately, American automotive plants have achieved about 95 per cent of the productivity of their Japanese counterparts, with the approximately 5 per cent being lost to training costs.

Marketing

One area of managerial behaviour that becomes far more important in a competitive environment is marketing, and there is perhaps no greater example of its impact on productivity than in the telecommunications sector, where the United States is routinely more productive than Europe. Telecommunications requires a large network of fixed capital and labour productivity has traditionally been fairly equal in the United States, France, and Germany. The reason the United States continually comes out ahead in total factor productivity is because its capital productivity is so much higher; that is to say, the fixed network in the United States is used much more heavily than in Europe. This is almost entirely the result of aggressive marketing on the part of American phone companies.

In the United States, emphasis on flat-rate long-distance plans, toll-free numbers, and services like call waiting and voicemail have made call volume per capita more than double any European nation. This is partly a reflection of the United States' size and population dispersion, particularly where long-distance calling is concerned, but even so, telephone usage has never been encouraged on such a scale in France or Germany. There is less social emphasis on phone use in Europe; it was even the policy of Deutsche Telekom for a while to tell consumers to keep their calls short, which practically amounts to anti-marketing.

Marketing is the same as IT expenditure; companies have little incentive to pursue it unless they face intense competition, in which case it may become a necessity to stay productive. As a result, heavy marketing in Europe has generally occurred after a sector

has been deregulated, as was the case with Swedish banking. It can also be a result of capital intensity, which is why it has been much more successful recently in German telecom with ISDN and less so in British software. Both conditions will be discussed in the next section.

IT and Productivity Growth

The story of the US economy in the second half of the 1990s is one of tremendous labour productivity growth. Labour productivity grew by 2.5 per cent per year from 1995-2000 after only growing 1.4 per cent per year from 1972-1995. Over the same period, IT (information technology) investment nearly doubled as well, and it was often posited that this heavy investment was the primary driver behind labour productivity growth. This was not entirely true; the US labour productivity boom was driven mainly by six "jumping" sectors (semiconductors, computers, telecommunications, retail, wholesale, and securities), but IT only played a crucial role in a few cases. Most of the time, productivity was driven by a less high-tech factor, such as heated competition in the case of retail (Wal-Mart) and semiconductors (Intel, AMD), device innovations outside the computer manufacturing sector itself, or low-tech warehouse automation in the wholesaling industry. As well, a lot of IT investment was simple maintenance, such as Y2K preparedness and PC upgrades, and not designed to improve productivity benefits.

That being said, few would dispute that IT investment plays an important role in productivity growth. Although the application of IT may not have been a direct factor in productivity growth, the production of IT in the form of computers and semiconductors certainly was, as these two sectors alone represented 20 per cent of U.S. productivity growth from 1995-2000. IT is different from regular capital investment; under proper circumstances, it can have a far greater magnifying growth effect on labour productivity than traditional capital like machinery and tools. But it requires appropriateness and timeliness in its investment.

Other than the six "jumping" sectors, the remaining 70 per cent of the US economy accounted for only 0.3 percentage points of the productivity growth acceleration, yet consumed 62 per cent of the acceleration of IT intensity. In particular, hotels, retail banking, and long-distance data transmission saw almost no growth despite heavy IT investment, and some of the sectors that did grow, like retail, owe far more to basic managerial innovation than to technological development. In fact, the only two industries where IT investment undisputedly increased labour capacity were securities and telecom, mostly because of internet trading and cellular equipment.

The key to IT investment is "vertical" investment, or industry-specific investment that affects the core production process within the industry. Online trading in the securities industry is a perfect example, because it all but eliminates the more labour-intensive traditional methods. Supportive investment that intends to realize future gains instead of immediate ones does little to impact productivity growth, as was the case with online banking considering that the United States has traditionally been slow to adopt electronic banking systems. In addition, some of the IT investment in retail banking and

most of the IT investment in the hotel industry was devoted to collecting extensive customer data that to this point has been underused. In most other cases, IT investment merely redesigns the product or service being offered without actually impacting the core production process.

The 2002 McKinsey report on productivity growth in France and Germany went farther and outlined how IT investment is most useful in industry where it aids in the leveraging of scale, particularly in highly-consolidated industries. In fragmented industries (retail banking is again an example), IT investment is usually not standardized enough to become efficient on a sector-wide basis. Even so, it must still be direct instead of supportive and combined with managerial innovation more than anything else.

Capital Intensity

As a side note to IT investment, capital intensity is often looked to as the result of heavy investment, IT or otherwise. Capital intensity is the amount of capital per worker within a sector. In and of itself, capital intensity does not immediately equate to productivity; varying amounts of capital may still be used more efficiently or less efficiently within countries, so capital productivity and thus total factor productivity are not directly linked to capital intensity. In German manufacturing, for example, capital intensity has always been greater than in the United States since labour tends to be less flexible and more costly and capital is substituted for labour to a higher degree. At the same time, however, that capital is underused because there are fewer workers, and so capital productivity is lower. As the McKinsey Global Institute pointed out in their 1996 study on capital productivity, however, it is often the case with low productivity that capital is used inefficiently regardless of the level of investment, suggesting that the issue is a managerial one, not strictly a physical one.

Capital intensity may not directly influence productivity, but it does play a complicated role in economic growth, and low capital intensity was the key area for improvement in the 1998 study of the United Kingdom. In both manufacturing and service sectors, the UK's capital intensity is about 20 per cent lower than in the United States and 30 per cent lower than in either France or Germany. To an extent, this has exacerbated the UK's low labour productivity. Labour is much cheaper in the UK than France or Germany, and so labour has been substituted for capital in a reverse of the situation in Germany. With more low-skill workers and less capital for each to use, labour productivity is lower. However, this does not entirely explain the discrepancy in total factor productivity with the United States because capital productivity in the United Kingdom is also low, again suggesting that efficient use is independent of the level of investment.

Demand Factors

After establishing market conditions and ascertaining how managers will react to them, the final link in the chain is of course how consumers will respond to the behaviour of the firm. If a competitive market forces a firm to innovate in order to create better

goods and services at lower prices (and costs), then there should be an increase in demand for those improved products, which should more than justify the initial costs of innovation and increase firm profits. As the rest of the industry reacts to this leader firm – Wal-Mart, for example – the industry becomes even more competitive and the cycle of innovation and productivity begins again.

That said, there are still independent demand factors that affect how consumers will behave toward firms, and in most cases entire sectors must adjust their practices accordingly. Briefly, income levels and general consumer preferences can affect the format, output, and ultimately productivity of a firm.

Income

The largest single influence on consumer behaviour is the average disposable income level. As income increases, consumers tend to shift their focus away from durables and necessities and concentrate more on high-value goods, services (particularly in retail), and convenience in general. In retail, for example, as incomes rise the demand for luxury goods increases. As these goods tend to have large margins, productivity in terms of value-added rises. Despite concerns in the United States that the success of such chains as Wal-Mart, Costco, and Target signified a demand shift toward mass-produced, low-value-added goods with cheap prices, according to MGI's 2001 study, substitution toward high-value goods in fact represented nearly half of the large productivity jump in retail from 1995-2000.

To the extent that higher incomes drive higher productivity, however, they also represent higher productivity. GDP per capita is approximately 30 per cent lower in France and Germany than in the US because of lower labour productivity and lower labour input for all the reasons that have previously been mentioned. With 30 per cent less goods produced and 30 per cent less income to spend, it becomes harder to increase productivity through spending alone.

Preferences and Output Mix

The most obvious example of the influence of consumer preferences is the fact that firms within a sector usually vary their output mix, or the variety and quality of their products. This can affect productivity because certain countries or regions may have preferences for goods that are more or less productive to make, either in taking more hours to produce per unit, or in having less value-added for each hour worked. A third of the German electronics industry, for example, is devoted to producing TVs and radios versus only about 10 per cent of the Japanese electronics industry, which produces far more VCRs and DVD players. Since televisions create far more value-added per hour of work, this skews productivity figures in favour of the German electronics industry (at least in this one small way). The same is true in the United States, where a full 50 per cent of the consumer electronics industry is devoted to television production. Furthermore, Japan has always specialized in the development of cutting-edge products, which tend to be highly capital-intensive until they are produced on a much wider scale.

There are plenty of other examples. Germany's food processing sector has far more bakeries per capita than the United States or Japan. A full quarter of Japan's food sector makes goods that are not produced or consumed in any other country. German consumers prefer powder detergent to liquid detergent, which lowers labour productivity because of the more intense process involving in making it. Americans use their telephone and utility networks much more heavily than their European counterparts. Americans make far more bank transactions per capita. And as mentioned, the income advantage in the United States has shifted its retail sector slightly in the direction of more high-value goods. In each case, MGI has weighted these factors and attempted to adjust productivity figures accordingly.

Insights on Canada-U.S. Industry Productivity Gaps from the MGI Studies

The McKinsey Global Institute has not yet produced a report on Canadian productivity. The objective of this section is to assess whether the findings from the McKinsey productivity studies on industry productivity differentials between the United States and a number of major developed and developing countries have relevance for the explanation of industry productivity differentials between the United States and Canada.

As shown in Chart 3, out of 26 industries in 1999, 15 had labour productivity relatives 80 per cent or less that of their U.S. counterparts. These industries, in ascending order of the productivity gap (or descending order of the productivity relative) were forestry and fisheries; textile and clothing; business services; food, beverage, and tobacco; utilities; plastic and rubber products; wholesale trade; furniture and related products; machinery and computers; FIRE; information and cultural industries; electronic and electrical equipment; fabricated metals; and petroleum and coal products. The largest contributions to the gap were made by retail trade, business services, and information and cultural services.

In some respects, the Canadian economy is a bit of a hybrid between the US 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, restricts entry to some domestic sectors, and gives the government greater control over social programs like healthcare and pensions. Canada is more unionized than the United States, although the average real minimum wage is about equivalent. By virtue of Canada's size, however, Canadian firms have difficulty achieving economies of scale within the country's borders, and the less-developed high-tech sector has not integrated with universities to the same degree as in the United States, creating a human capital gap. Whatever Canada's differences with the US, though, those differences must outweigh the similarities because the US has opened up a labour productivity gap of ten to twenty percent (Sharpe, 2003).

As noted earlier in the paper, MGI identifies three sets of factors affecting productivity:

- competitive intensity within a country, both in terms of direct regulation such as trade protection and indirect regulations such as minimum wage;

- the reaction of mangers to competitive conditions and their desire an ability to adopt best-practices to improve productivity; and

- the influence of demand factors on firm and industry behaviour.

Competitive Intensity

It is possible that competition is on average less intense in Canada than in the United States, particularly in service-producing industries that are less subject to international competition than goods-producing industries and have a smaller market in Canada. The large labour productivity gaps in finance, insurance and real estate and in information and cultural industries may hence stem in part from a less competitive environment. Equally, the high productivity levels of natural resource industries such as primary metals, wood products, and mining is likely directly related to the competitive pressures these industries face to compete on world markets. However, the surprisingly high labour productivity relative (151 per cent of the U.S. level) for construction, a sheltered, non-traded industry, does not fit the pattern, unless the competitive intensity of the sector is greater in Canada than in the United States.

American anti-trust law appears more aggressive in challenging large concentrations of corporate power (e.g. AT&T, Microsoft) that Canadian competition policy. Restrictions on foreign ownership and control in certain industries such as the cultural industries (e.g. book retailing, newspapers) and banking may reduce competitive pressures, particularly in situations where domestic competition is not intense. Indeed, as noted above, there are large labour productivity level gaps in cultural and informational industries and FIRE, although more industry disaggregation is needed to ascertain if it is the protected industries within these broad industry groupings that are responsible for Canada's lower productivity levels.

Such restrictions may be less harmful to productivity in industries where there is robust domestic competition such as air passenger transport. Indeed, Canada's level of labour productivity in transportation is comparable to that in the United States.

Unlike many countries studied by the MGI, Canadian industries are not heavily sheltered from foreign products. In addition, trade barriers have fallen greatly in recent decades. But non-tariff barriers are still important in certain sectors such as agriculture. Restrictions on imports in the egg, poultry, and dairy industries administered by marketing boards certainly have reduced competitive pressures and may have contributed to the relatively low labour productivity level in agriculture. While trade barriers have greatly fallen in the context of the North American Free Trade Agreement (NAFTA), barriers facing other countries, particularly low cost countries, in labour-intensive

industries remain. The low labour productivity levels relative to those in the United States in furniture and related products, textiles and clothing, and plastic and rubber products; and food, beverage and tobacco may reflect the negative impact of these barriers on competition and productivity.

Canada, following the lead of the United States, has deregulated many sectors of the economy in recent years, including air passenger transport, trucking, and much of telecommunications. The comparable labour productivity levels between Canada and the United States in the transportation industry may reflect this relative lack of regulation common to both countries. Again, greater disaggregation of productivity levels in the transportation industry is needed. Outside of agriculture, there are few industries that are now much more heavily regulated in Canada than in the United States, in contrast to other countries. Consequently, it is unlikely that any failure of Canada to deregulate product markets is responsible for low productivity levels relative to those in the United States.

Canada's minimum wage (a weighted average of provincial minimum wages) is low by European standards and comparable to that in the United States in real (PPP-adjusted) terms. Consequently, it is unlikely that productivity levels have evolved differently in the two countries because of this factor. This lies in contrast to the situation in Europe where the minimum wage has risen significantly and lead to the disappearance of many low wage service jobs, increasing average labour productivity through a composition effect.

Canada's unionization rate is more than double that in the United States. The impact of unions on productivity is controversial. Unions can have positive effects on labour productivity by providing voice for workers, thereby reducing turnover, and by increasing wages, inducing greater substitution of capital for labour. They can also have a negative effect through the imposition of work rules which create reduce the employer ability to reallocate workers to appropriate tasks and to adjust production quickly in response to changes in the external environment. The McKinsey Global Institute productivity studies focus on this negative role and document cases in Europe where union-imposed work rules have reduced productivity, particularly in low-competition industries (and cases where work rules actually produced work-class productivity results). However, it is unlikely that work rules are significantly different between most Canadian and U.S. industries despite the higher unionization rate in this country. Indeed, there are few industries in Canada that currently have rigid work rules imposed by unions. Many of these rules that did exist in the past have been targeted by employers in collective bargaining and given up unions.

The McKinsey Global Institute identifies zoning laws as a major impediment to productivity, particularly in housing and the retail sector, because such laws prevent the construction of large housing developments and large retail outlets. Zoning laws in Canada are likely much closer to practices in the United States than in Europe and hence is unlikely that this factor can account for much if any of the labour productivity gap. Indeed, the level of labour productivity in the construction industry is much higher in

Canada than in the United States, suggesting zoning laws may be more conductive to productivity in this country than in the United States!

Managerial factors

In addition to its emphasis on competitive conditions, the MGI studies also looks at traditional drivers of productivity growth such as physical and human capital accumulation and innovation. The studies sees managerial behaviour as the key determinant of the drivers and make use of the concept of "best practice" to assess differences in the drivers across countries and implications of these differences for industry productivity levels.

It was earlier mentioned that the MGI found that with the right managerial practices, the productivity of workers on the shopfloor can be identical in different countries even when the educational attainment of the workers differs dramatically. This is an important insight for the ability to raise productivity in countries with low levels of educational attainment, but it has little relevance for Canada-U.S. productivity differentials as the average educational attainment in Canada is comparable to that in the United States. It is of course possible that the skill levels of Canadian workers are below their U.S. counterparts because of the greater ability of U.S. employers to train and motivate their workers. But given the great similarity in managerial cultures between the two countries, this appears unlikely.

The MGI studies of course recognize the importance of differences in capital intensity for industry differences in labour productivity across countries and they use the basic growth accounting techniques. From this perspective they would likely accept the results reported earlier in this paper than about one quarter of the business sector Canada-U.S. labour productivity gap is attributable to the greater capital intensity of production in the United States. But they also note that in addition to the quantity of capital per worker employed determining productivity, it is also the effectiveness in which the capital is actually used in production that affects productivity. Again, given the similarities in managerial behaviour between Canada and the United States, there are no obvious examples of where capital is employed much less productively in Canada than in the United States.

It is now well recognized that information and communication technologies (ICTs) account for much of the acceleration in productivity growth in the United States in the second half of the 1990s. MGI has focused on this issue in the content of the contribution of the Walmart and other retail chains to aggregate productivity growth achieved through the application of ICTs. Indeed, MCI found that that two-thirds of the post-1995 pick-up in productivity growth was due to this one sector. Canada's retail industry in 1999 attained only 85 per cent of the labour productivity level of its U.S. counterpart, suggesting that our lag in the application of ICTs linked to managerial behaviour may explain much of the continued gap.

Consumer Behaviour

In addition to competitive conditions and managerial behaviour, MGI studies have focused on how consumers respond to the choices made by firms and the implications for productivity. The level of income and income distribution influence consumption patterns. According to MGI, a shift in demand toward high-value goods has taken place in U.S. retailing and this development has contributed significantly to productivity growth in the sector. The increase in income inequality in the United States may be behind this demand shift. There has been less of an increase in income inequality in Canada which may account for our slower productivity growth in retail trade.

MGI productivity studies found that differences in output mixes within an industry based on difference consumer preferences can account for productivity differences across countries. It is unlikely that this factor is very important in explaining industry productivity differences between Canada and the United States given the greater similarities in tastes between Canadians and Americans. Canada tastes tend to closely follow those south of the border in most areas.

Conclusion

This paper has attempted to provide industry perspectives on the Canada-U.S. productivity gap by comparing levels of labour and multifactor productivity by industry in Canada relative to their U.S. counterparts and assessing to what degree the McKinsey case studies of productivity levels in other countries can shed light on the Canadian experience. A major limitation of the paper is the lack of discussion to industry case studies of the Canada-U.S. productivity differentials.

The Centre for the Study of Living Standards and the Conference Board of Canada are currently undertaking a project on the Canada-U.S. productivity gap that provides detailed case studies of productivity trends and levels in Canada and the United States in eight industries: retail trade, machinery, oil and gas, banking, trucking, electronic and electrical products, chemicals, and wood products. These studies will be released in October 2004.

Two key findings of this paper are highlighted in this conclusion. First, not surprisingly given its size, it is the service sector that is responsible for the Canada-U.S. productivity gap. In 1999, nearly one third of the business sector Canada-U.S. labour productivity gap of 15 percentage points was attributable to informational and cultural industries alone, one quarter to business services, and around one seventh each to FIRE, retail trade, and wholesale trade. Manufacturing accounted for about one sixth of the gap, but this contribution was more than offset by Canada's very high relative productivity level in construction.

Second, the MGI productivity studies provide fascinating insights into the differences in productivity levels at the industry level between the United States and other major developed and developing countries. Some of these insights may be relevant

to Canada. But given the similarities between Canada and the United States, which are much greater than between the United States and Europe, Japan, Brazil, and India, the findings of the MGI studies cannot be indiscriminately applied to Canada-U.S. productivity differences at the industry level. Further work is needed to dig more deeply into the Canada-U.S. industry productivity gaps and the MGI studies do put forward a number of useful working hypotheses for such analysis..

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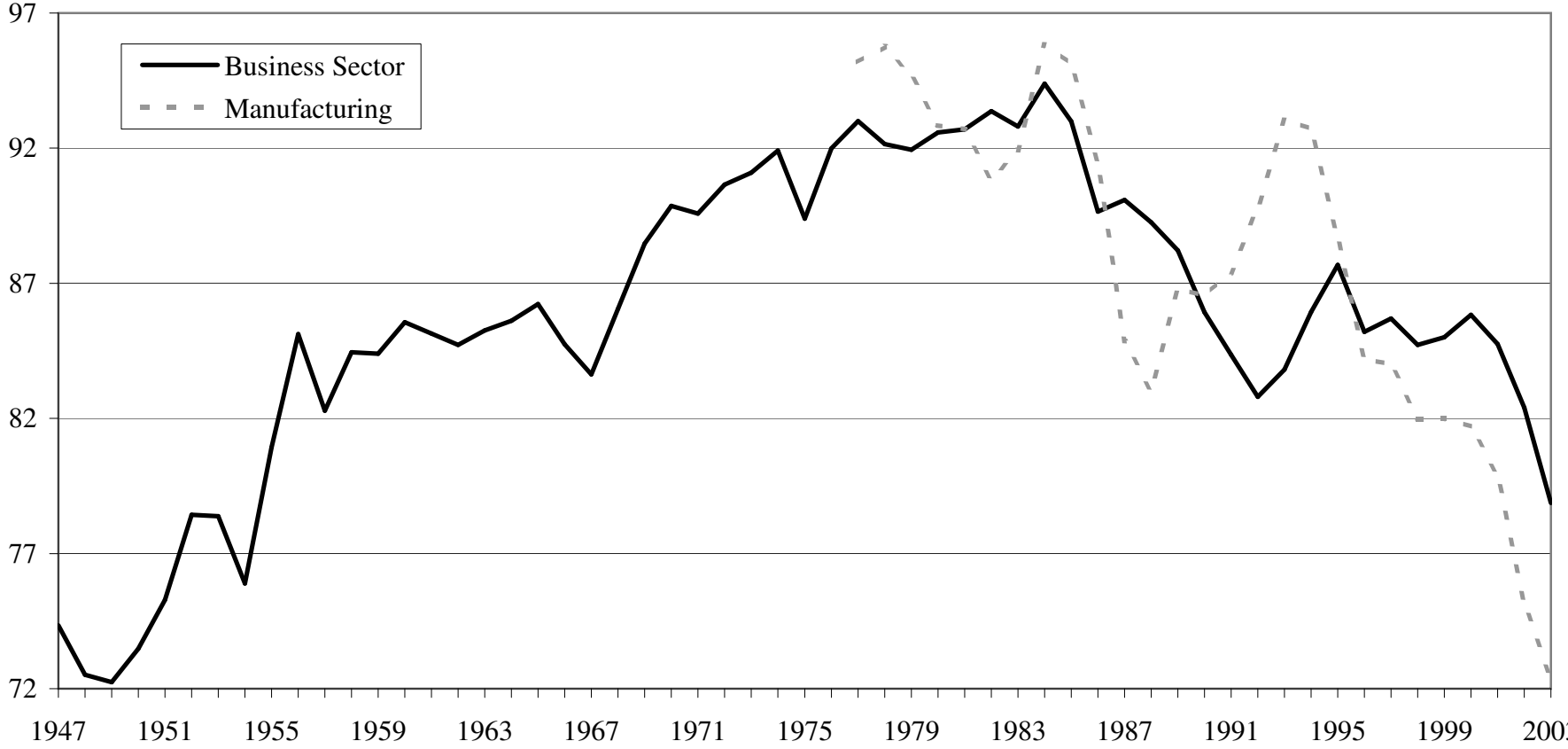
Contents

Table 1: Industry Contributions to the U.S.-Canada Labour and Multifactor Productivity Level Gaps for the Private Business Sector

	Absolute Gaps (United States-Canada, United States=100)			Absolute Contributions (percentage points)		Relative Contributions (per cent)	
	Labour Productivity		MFP	Labour Productivity		Labour Productivity	
	1999	2001	1999	1999	2001	1999	2001
Primary Industries	16	12	24	1.14	1.29	7.6	8.6
Agriculture	20	16	10	1.27	1.23	8.5	8.2
Mining	-7	3	15	-0.13	0.07	-0.8	0.4
Construction	-51	-62	-49	-3.88	-5.71	-25.9	-38.1
Manufacturing Industries	18	20	10	2.50	1.10	16.7	7.3
Food, beverage and tobacco	23	1	-4	0.58	0.03	3.9	0.2
Textile and clothing	32	38	20	0.61	0.88	4.1	5.8
Wood product	-11	-31	8	-0.20	-0.67	-1.3	-4.5
Paper	-17	-23	1	-0.22	-0.35	-1.4	-2.4
Printing and publishing	-2	-22	-27	-0.03	-0.45	-0.2	-3.0
Petroleum and coal products	52	39	53	0.11	0.10	0.7	0.7
Chemicals	14	-7	7	0.16	-0.10	1.1	-0.7
Plastic and rubber products	26	23	14	0.27	0.29	1.8	2.0
Non-metallic mineral product	-14	-38	-22	-0.07	-0.24	-0.5	-1.6
Primary metal	-34	-51	-31	-0.36	-0.65	-2.4	-4.4
Fabricated metal	49	48	34	0.93	1.11	6.2	7.4
Machinery and computers	30	35	13	0.35	0.49	2.3	3.3
Electronic and electrical equipment	37	56	2	0.47	0.86	3.1	5.7
Motor vehicle	-9	-3	-7	-0.20	-0.08	-1.3	-0.5
Other transportation equipment	-13	-30	-36	-0.12	-0.35	-0.8	-2.3
Furniture and related product	29	27	14	0.21	0.24	1.4	1.6
Services Industries	20	19	15	15.24	18.32	101.6	122.1
Utility	23	21	36	0.32	0.35	2.1	2.3
Wholesale trade	29	31	-5	1.96	2.54	13.1	16.9
Retail trade	15	18	7	2.24	3.25	14.9	21.7
Transportation	2	-3	3	0.12	-0.23	0.8	-1.5
Information and cultural industries	35	40	20	4.55	6.30	30.3	42.0
FIRE	32	35	-2	2.37	3.14	15.8	20.9
Business services	21	14	4	3.68	2.97	24.6	19.8
Private business Sector	15	15	11	15	15	100	100

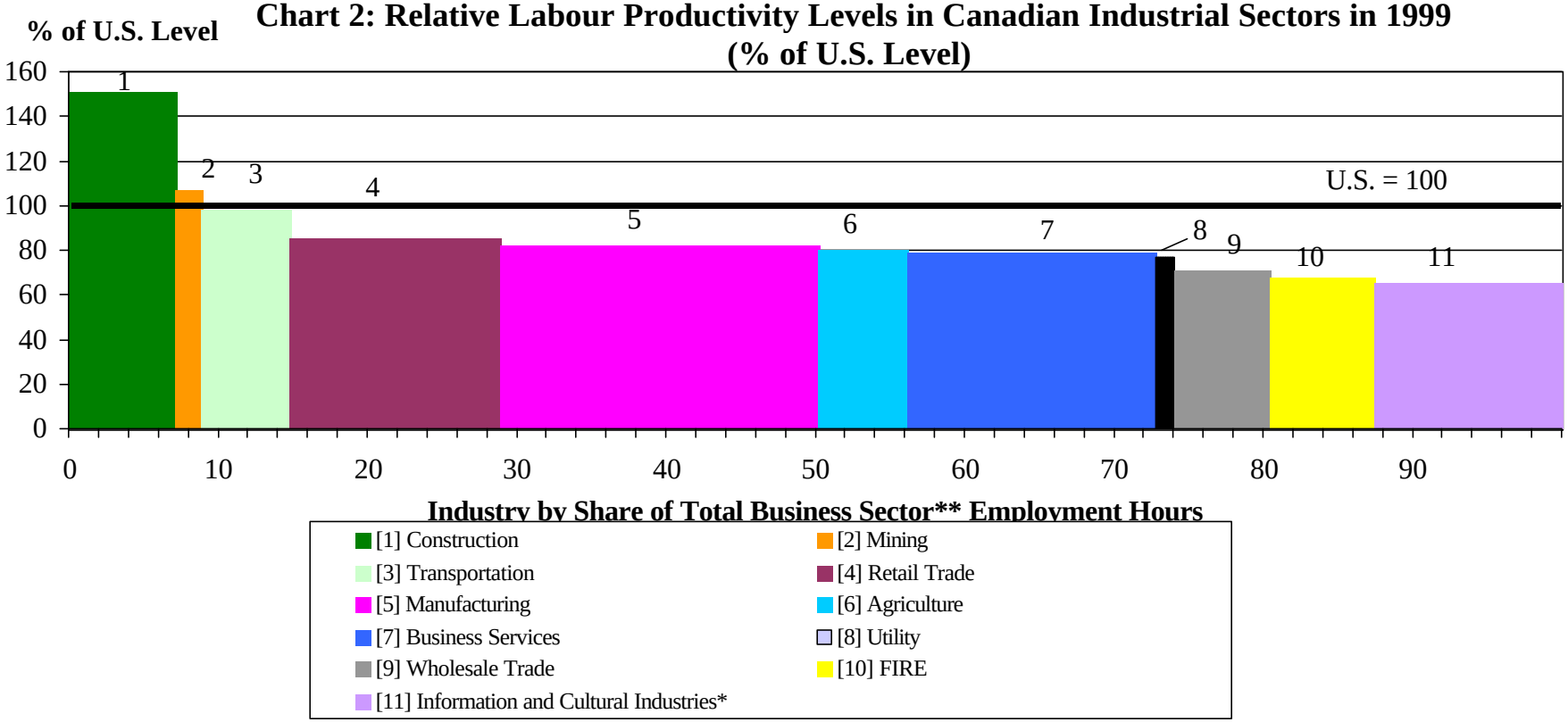
Source: Productivity level gaps from Rao, Tang and Wang (2004). Labour shares from the Labour Force Survey.
Notes: Absolute contributions to the private business sector gap are calculated by multiplying the gap in a given industry by that industry's share of hours worked in the private business sector in the closest year for which data are available. These contributions were then re-based such that, at the most detailed industry level, they sum identically to the actual gap at the private business sector level.

Chart 1: Levels of Output per Hour in Canada Relative to the United States in the Business Sector and Manufacturing, 1947-2003, United States=100



Sources: Calculated by the Centre for the Study of Living Standards based on output per hour data from the Bureau of Labor Statistics and Statistics Canada. For the business sector, data are from BLS series PRS84006093 for the United States, and from CANSIM series v720290 for 1947-1987 and series v1409153 for 1987-2003 (quarterly converted to annual averages) for Canada. Manufacturing data from BLS series INU0005US0 and INU0005CA0 for Canada and the United States respectively for 1977-2002, extended to 2003 using BLS series PRS30006093 for the United States and CANSIM series v21575213 for Canada. Benchmark labour productivity relative levels in 1999 from Rao, Tang and Wang (2004). May 31, 2003.

Chart 2: Relative Labour Productivity Levels in Canadian Industrial Sectors in 1999 (% of U.S. Level)



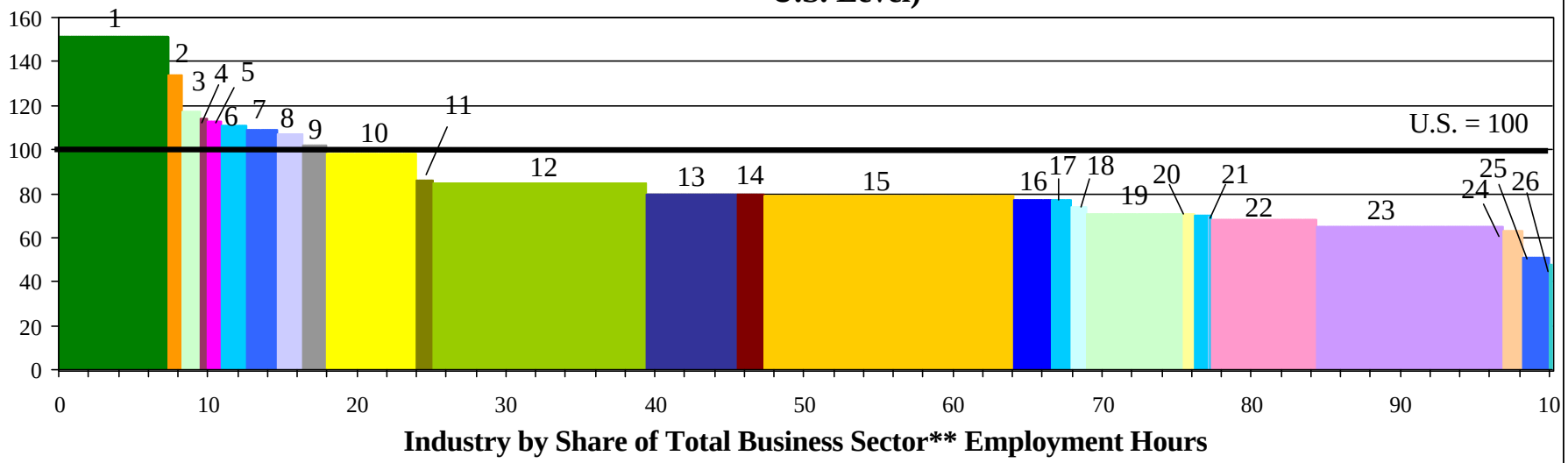
**Information and cultural Industries is made up of amusement and recreation services [96], library services [854], museums and archives [855], and communication industries [48], plus all accomodation [92] and food and beverage [93].

**The hours estimate for the private business sector was obtained by removing government services, education services (with the exception of library and museums and archives), and health and social services from total economy employment.

Employment hour shares are based on 1997 data, obtained from the LFS.

Source: Rao, Tang, and Wang (2004), MEPA, Industry Canada.

Chart 3: Relative Labour Productivity Levels in Canadian Industries in 1999 (% of U.S. Level)



- [1] Construction
- [2] Primary metal
- [3] Paper
- [4] Non-metallic mineral product
- [5] Other Transportation Equipment
- [6] Wood Product
- [7] Motor Vehicle
- [8] Mining
- [9] Printing and Publishing
- [10] Transportation
- [11] Chemicals
- [12] Retail Trade
- [13] Agriculture
- [14] Textile and Clothing
- [15] Business Services
- [16] Food, Beverage, Tobacco
- [17] Utility
- [18] Plastic and Rubber Products
- [19] Wholesale Trade
- [20] Furniture and Related Product
- [21] Machinery and Computers*
- [22] FIRE
- [23] Information and Cultural Industries*
- [24] Electronic and Electrical Equipment
- [25] Fabricated metal
- [26] Petroleum and Coal Products

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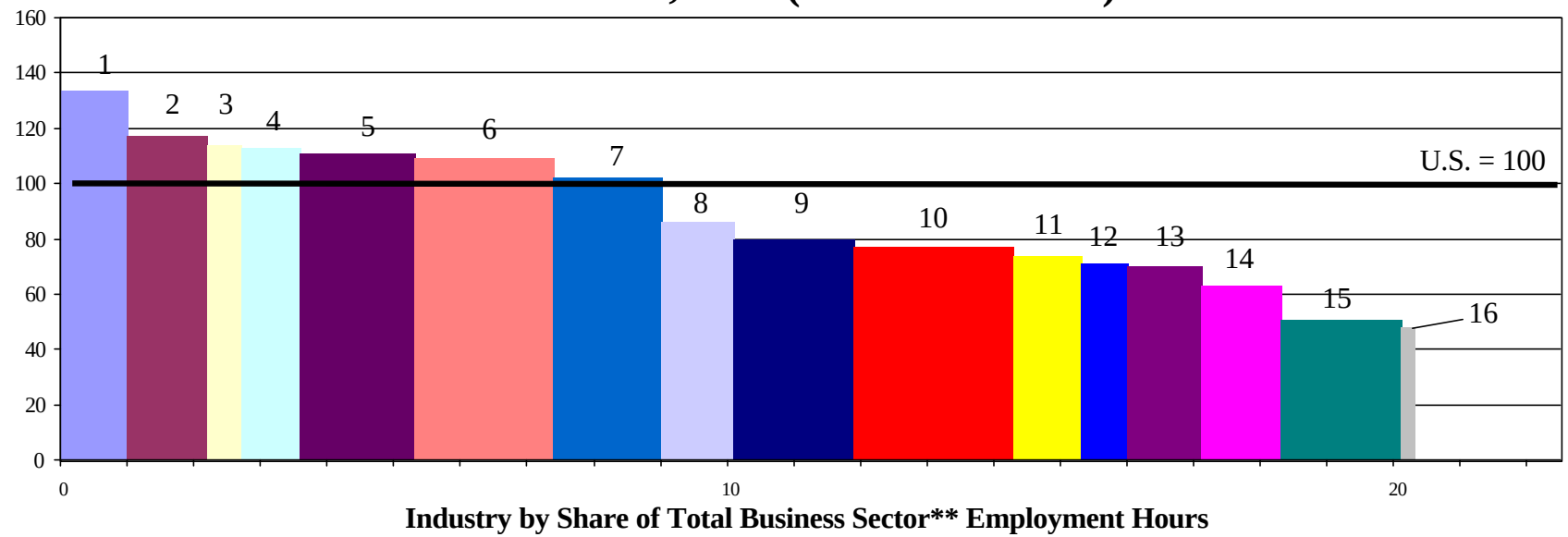
Source: Rao, Tang, and Wang (2004), MEPA, Industry Canada.

Chart 4: Labour Productivity Levels in Canadian Manufacturing Industries, 1999 (% of U.S. Levels)



Industry by Share of Total Business Sector Employment Hours**

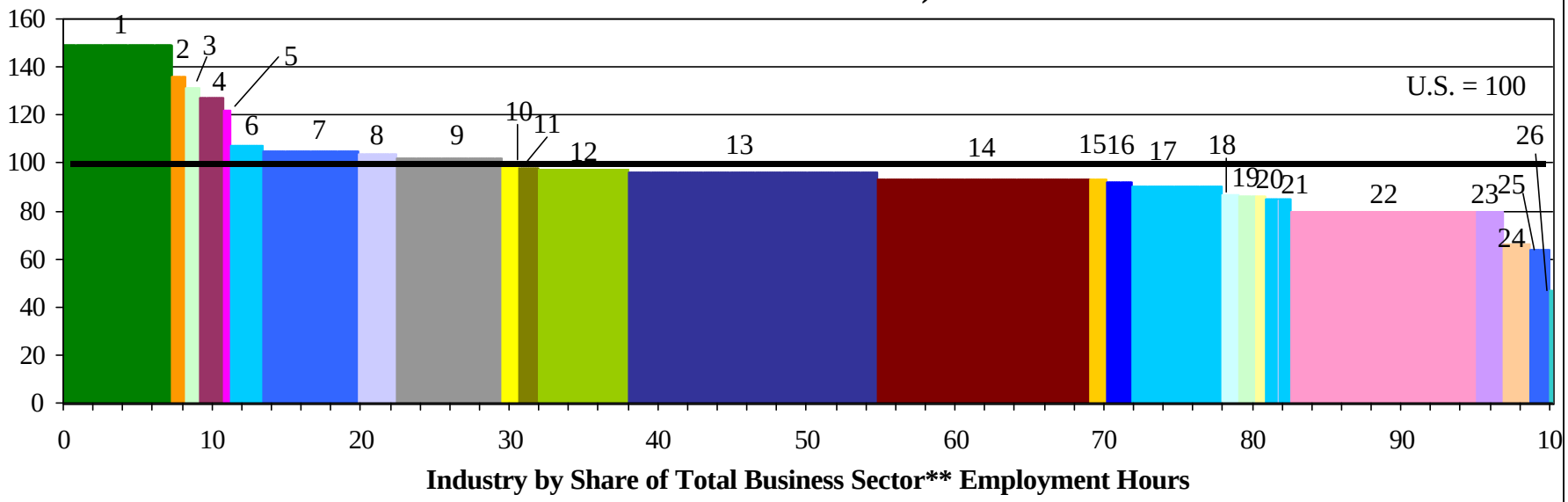
- [1] Primary metal
- [2] Paper
- [3] Non-metallic mineral product
- [4] Other Transportation Equipment
- [5] Wood Product
- [6] Motor Vehicle
- [7] Printing and Publishing
- [8] Chemicals
- [9] Textile and Clothing
- [10] Food, Beverage, Tobacco
- [11] Plastic and Rubber Products
- [12] Furniture and Related Product
- [13] Machinery and Computers*
- [14] Electronic and Electrical Equipment
- [15] Fabricated metal
- [16] Petroleum and Coal Products

Note: *336, Computers and Office Equipment was removed from Electronic and Electric Products and placed in Machinery *336, Computers and Office Equipment was removed from Electronic and Electric Products and placed in Machinery.

**Hours estimate for the business sector was obtained by removing government services, education services (with the exception of library and museums and archives), and health and social services from total economy employment. Employment hour shares are based on 1997 data, obtained from the LFS.

Source: Rao, Tang, and Wang (2004), MEPA, Industry Canada.

Chart 5: Relative Multi-Factor Productivity Levels in Canadian Industries in 2001 (% of U.S. Level)



Industry by Share of Total Business Sector Employment Hours**

- [1] Construction
- [2] Other Transportation Equipment
- [3] Primary metal
- [4] Printing and Publishing
- [5] Non-metallic mineral product
- [6] Motor Vehicle
- [7] Wholesale Trade
- [8] Food, Beverage, Tobacco
- [9] FIRE
- [10] Paper
- [11] Electronic and Electrical Equipment
- [12] Transportation
- [13] Business Services
- [14] Retail Trade
- [15] Chemicals
- [16] Wood Product
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- [20] Furniture and Related Product
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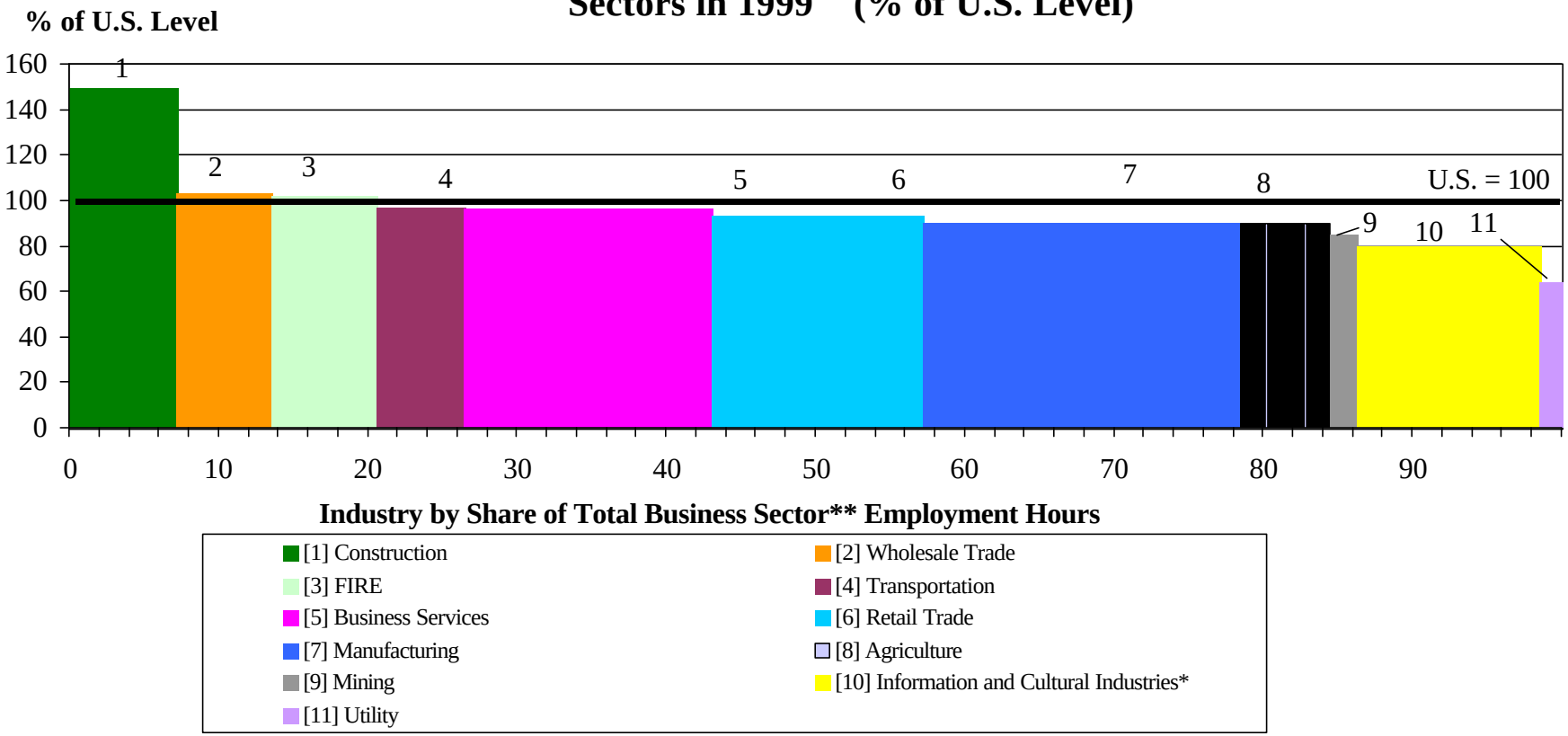
Source: Rao, Tang, and Wang (2004), MEPA, Industry Canada.

Chart 6: Relative Multi-Factor Productivity Levels in Canadian Industrial Sectors in 1999 (% of U.S. Level)



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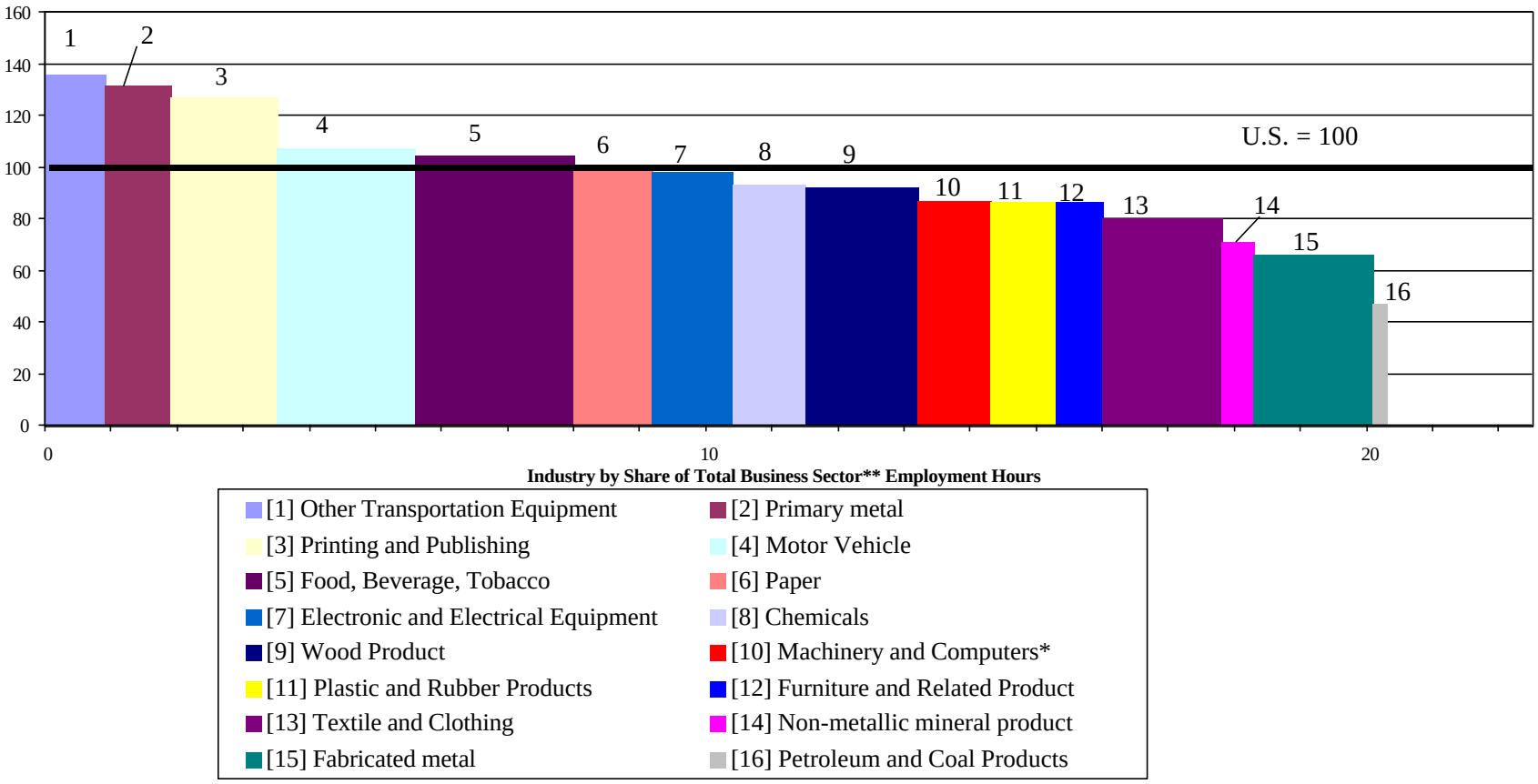
Source: Rao, Wang, and Tang (2004), MEPA, Industry Canada.

Chart 7: Relative Multi-Factor Productivity Levels in Canadian Manufacturing Industries, 1999 (% of U.S. Levels)



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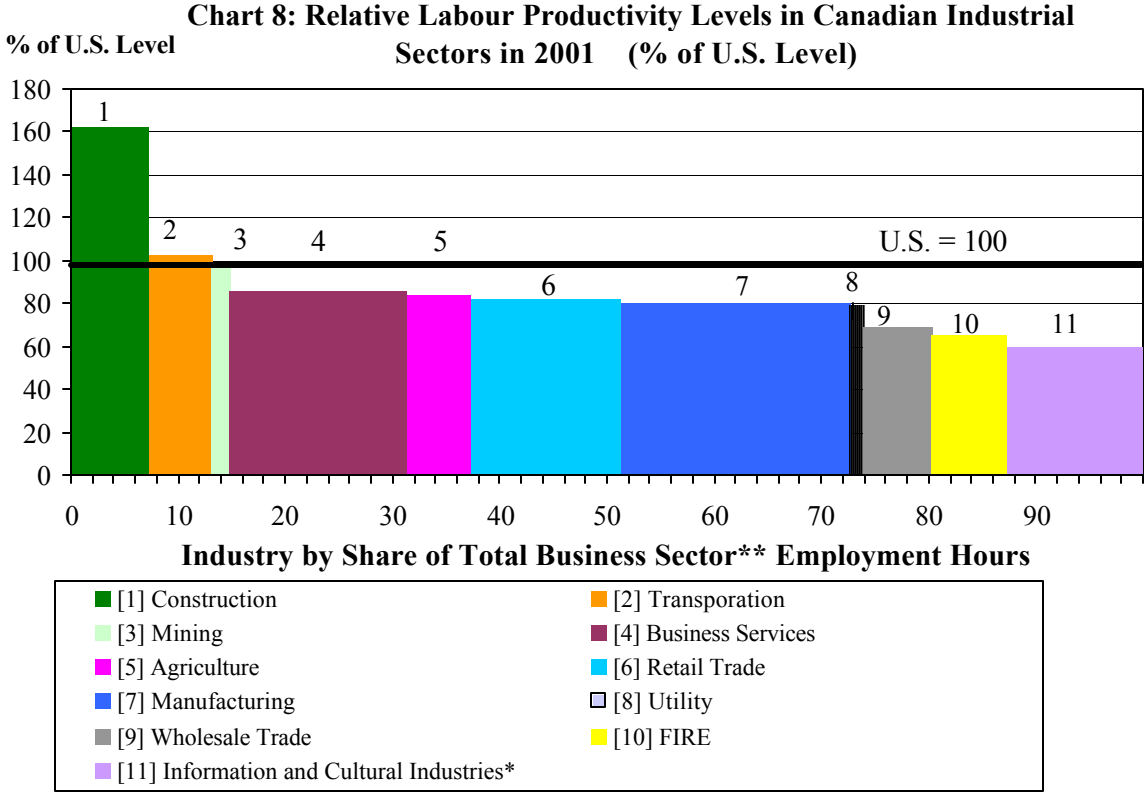
Source: Rao, Tang, and Wang (2004), MEPA, Industry Canada.

Chart 8: Relative Labour Productivity Levels in Canadian Industrial Sectors in 2001 (% of U.S. Level)



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Source: Rao, Tang, and Wang (2004), MEPA, Indsutry Canada.

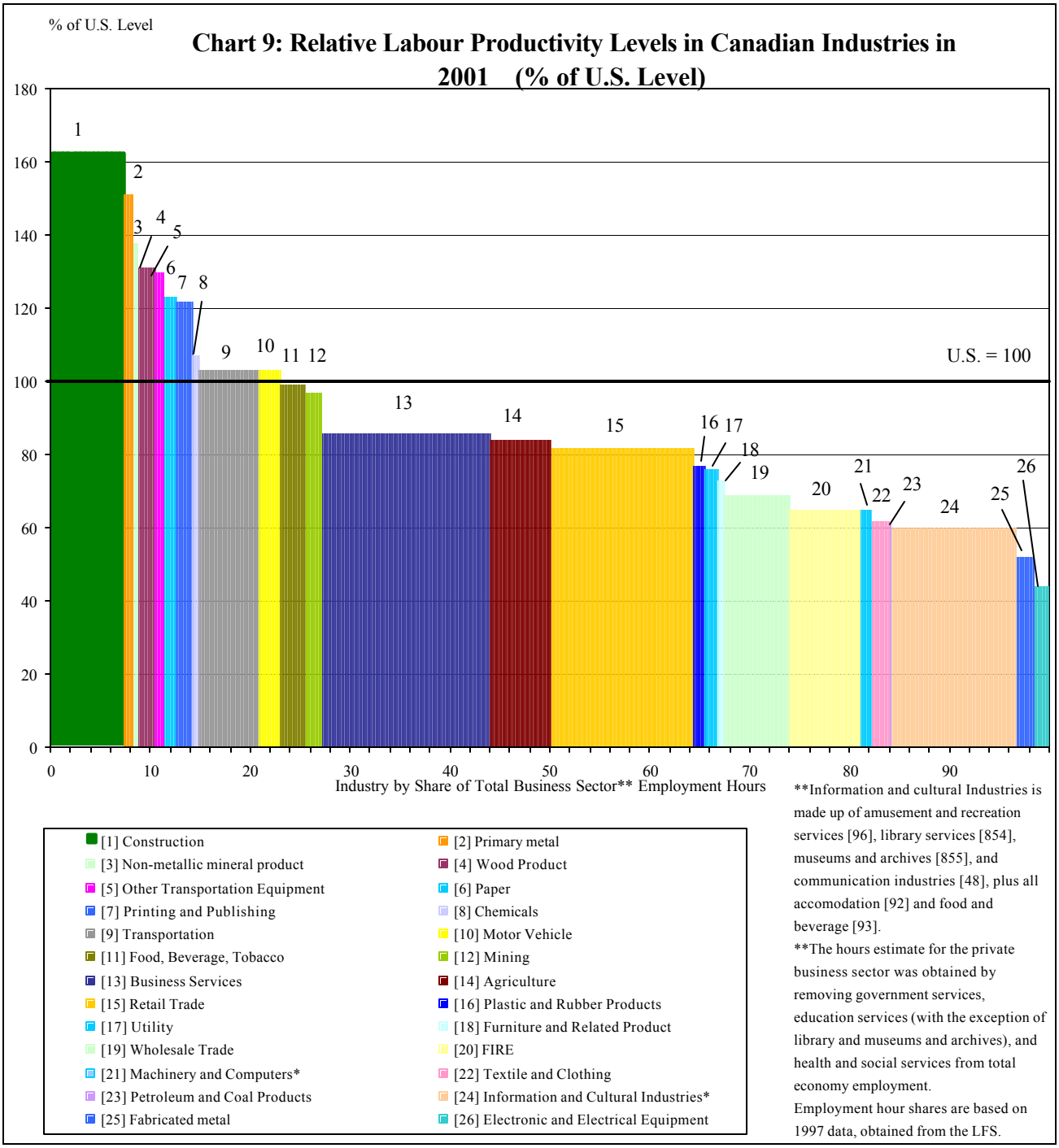

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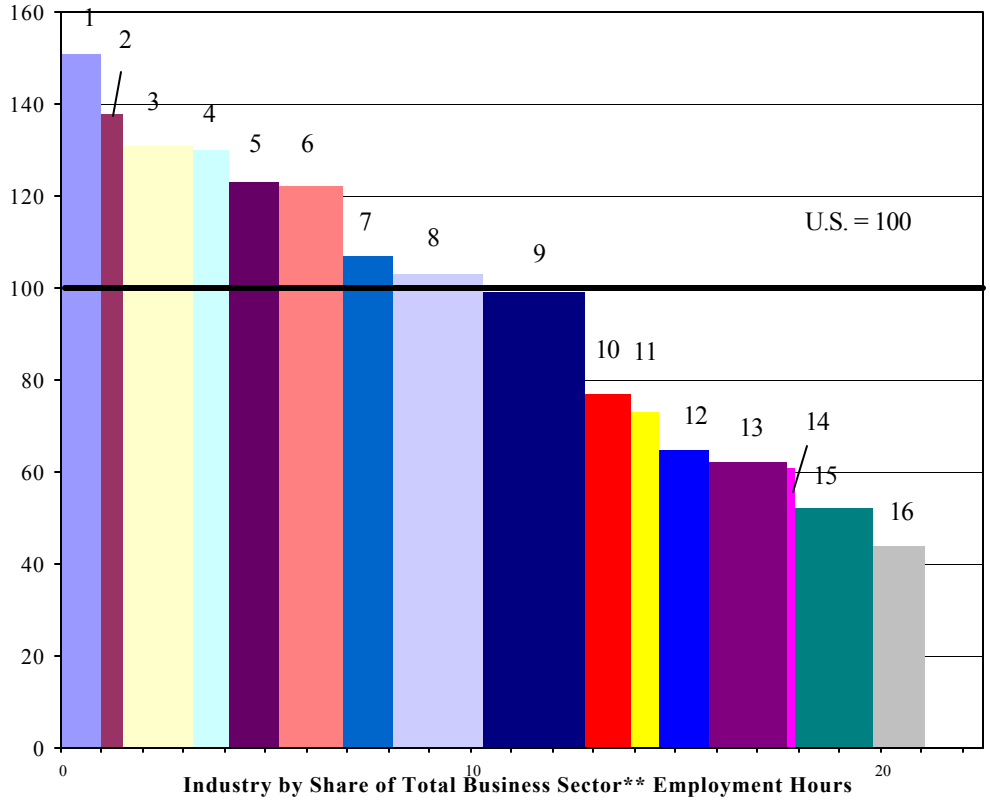
Chart 10: Relative Labour Productivity Levels in Canadian Manufacturing Industries, 2001 (% of U.S. Levels)



- [1] Primary metal
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- [13] Textile and Clothing
- [14] Petroleum and Coal Products
- [15] Fabricated metal
- [16] Electronic and Electrical Equipment

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